









AN

✦ ILLUSTRATED ✦ WEEKLY ✦ MAGAZINE ✦

FOR THE

ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR,  
SANITARY REFORMER, AND ART-LOVER.

CONDUCTED BY

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FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

"Every man's proper mansion-house, and home, being the theater of his hospitality, the seat of self-fruit, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kinde of private principedome, may, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

"Architecture can want no commendation, where there are noble men, or noble mindes."—SIR HENRY WOTTON.

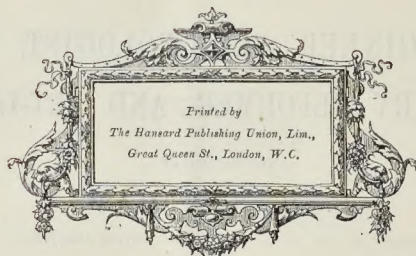
"Our English word To BUILD is the Anglo-Saxon Bylðan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—DIVERSIONS OF PURLEY.

"Always be ready to speak your mind, and a base man will avoid you."—WILLIAM BLAKE.

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*The Irish Drainage Bills: With Special Reference to the Shannon.*



THE work to be done under the authority of the four Drainage Bills before Parliament, and which have now been referred to a Select Committee, consists of the regulation of the channels of the Shannon, the Suck, the Barrow, and the Bann rivers. The Suck is a tributary of the Shannon, and in former propositions made to Parliament it has been included with the main river in respect of management, but now it appears likely that it will remain under its present Board. The area draining into it is about 400,000 acres, which is one-seventh of the whole. It enters the main river in its lower half portion, on the right, or west, bank, eighty miles from the head of the river. The source of the River Shannon is in the middle of Ireland, in the mountains round Lough Allen, westward of Newry and Dundalk. From this high ground the rain-water runs southward, eastward, and westward into the Allen lake, which has an area of nearly 9,000 acres, and a catchment area of 100,000 acres, English statute measure. The waters of the lake flow out of its southern end, and it forms practically the head of the river, the course of which is southwards to Limerick, where it meets the tidal waters, and thence westward to the sea.

Lough Allen is proposed to be converted into an impounding reservoir for the flood waters of its catchment area. At present these flow out of it, while the river below is at the same time in flood, although they cannot flow out as fast as they come in, for, during a great

flood, which here, as elsewhere, mostly occurs during the winter months, the surface of the lake rises several feet; but the flood waters, nevertheless, continue to flow out of the lake and increase the flood in the river, and the country through which the Shannon flows is overspread with water, which might be kept back until the river floods subside, or longer, until dry weather sets in. Mr. Bateman, the eminent engineer lately dead, reported to the Government in 1867 on the drainage effected by this river, and one of his recommendations was that Lough Allen should be utilised as an impounding reservoir. A great flood was estimated at from 1.5 to 2 cubic feet per minute per acre of the whole catchment area. This is not derived from any assumed depth of rainfall, being the result of measurements of the volumes of streams in flood times, but it may be converted into a rainfall depth for comparison. If the rainfall producing the estimated flow of say 2 cubic feet per minute per acre of the 100,000 acres were to extend over the whole of it, 1 inch in depth of rain in twenty-four hours would produce that rate of flow. Eight-tenths of an inch is, indeed, the actual depth represented by it, but making allowance for loss between the quantity measured in a rain-gauge, and that actually flowing off the ground, the full inch may be taken as the rainfall in twenty-four hours, which would represent a flow off the ground of 2 cubic feet per minute per acre; but on some occasions the result would more probably be due to a greater depth of rainfall over a part only of this large area. The water coming into the lake in twenty-four hours would, therefore, be 288 million cubic feet; but this, great as it is, would all be impounded before the level were raised 9 inches in height above its summer level, and the same rate of flow into the lake might continue for four consecutive days without raising the level more

than 3 ft. During that time, supposing this water to be impounded, the flood in the river below would probably subside, giving room within its banks to carry off the quantity which had been impounded, and which would in due time be let off from the reservoir until its surface subsided to its present summer level; but the lake might be raised 5 ft. or 6 ft., giving room for the impounding of 2,000 million cubic feet of water or more; if, indeed, it were necessary to provide for so large a quantity. Winter floods do now raise the surface of the lake 4 ft. above its summer level, according to the evidence of General Sankey, the Chairman of the Board of Works, from a memorandum prepared by Mr. Manning, the Chief Engineer to that Board. The lake having a free outlet, the raising of the surface shows the great quantity of water coming into it in a flood, and also the narrowness,—comparatively,—of the outlet, and it is considered that a vast amount of water might be impounded by an embankment of but little height.

Below Lough Allen the river course is in most parts confined within a moderate width from bank to bank, but the river portions are interrupted by numerous wide expanses of water which has overflowed low tracts of land in its course. The Shannon is navigable from end to end for vessels drawing 4½ or 5 ft. of water, and on the river portions there are weirs to increase the depth of water. Going downwards from Lough Allen, at Jamestown the crest of the weir is 6 ft. above the sill of the adjoining navigation lock.

At Rooskey is another weir 6 ft. above the lock sill; and the lowermost weir on this length of river is at Tarmonbarry, thirty-three miles below Lough Allen, the top of the weir being from 5 ft. to 6 ft. above the lock sills. The total fall of the river from Lough Allen to Tarmonbarry is 31 ft. All these old weirs were built solid, many years ago, by the



Board of Works, the floods going over the crests, but these are so nearly at the height of the adjoining lands that they begin to be flooded when the water rises at Jamestown 1 ft. above the weir; at Rooskey when it rises 1 ft.; at Tarmonbarry when it rises 2 ft. above the weir. But winter floods have been recorded which have risen at these places respectively 4 ft. 9 in., 3 ft. 5 in., and 3 ft. 3 in. above the weirs.

The quantity of water to be provided for was estimated by Mr. Bateman at 350,000 cubic feet per minute at Jamestown; 440,000 at Rooskey, and 500,000 at Tarmonbarry, and to keep down the flood level it was recommended that sluices should be built into these solid weirs, and opened in anticipation of a flood. Seven or eight miles below Tarmonbarry is the head of Lough Ree, eighteen miles in length, at the foot of which is Athlone. Sixteen miles below Athlone the River Suick joins the main river, on the right, or west, bank; and, five miles lower down the River Brosna comes in on the left bank. A few miles below the Brosna is Meelick, where deep and wide cutting in the river-bed was found to be necessary. Nine miles further down is the head of Lough Derg, twenty-three miles in length, and at its foot is Killaloe. From the foot of Lough Ree to the head of Lough Derg, about thirty-six miles, is the length of river most frequently overflowed. From Killaloe to Limerick, fifteen miles, the fall is rapid, being 97 ft. in that length, or about 6½ ft. per mile.

Thus Killaloe is called the key of the position, for if the level of Lough Derg could be lowered it would increase the rate of fall in the river above it up to Athlone. But this would, of course, necessitate a deepening of the river, if the navigation were to be maintained, and, accordingly, at Meelick and other places this was recommended to be done, as also to place sluices in the weirs at Athlone, Meelick, and Killaloe. At Killaloe the weir is 1,100 ft. long, and the number of sluices required was thirty-six, each 6 ft. by 6 ft. in the clear. The greatest flood here amounts to 1,600,000 cubic feet per minute, and as much as 1,200,000 was provided for. Mr. Bateman's recommendations, indeed, amounted to a complete scheme for carrying off the water in the river-course without injuring it as a navigable channel. Some of the works recommended have been carried out, and some portions of the flooded lands relieved; but the evidence given before the Royal Commission in 1887 tends to show that Mr. Manning's warning was justified,—that they could not result in complete control of the floods, to which end further excavation in certain portions of the river-bed would be necessary. In that conclusion the Commissioners concurred; the level of the water had not been sufficiently lowered to secure efficient drainage, even during the summer and autumn floods; and although, since these partial works have been carried out, no extraordinary floods have occurred during the critical times of the year, yet it may be expected that these will occur from time to time during summer and autumn, and then the damage will probably be increased because of the security which has been engendered by the partial success of the sluices; for these sluices cannot be really efficient while unaided by those improvements in the channels leading to and from them which were proposed, which are absolutely necessary to accelerate the flow of water, and which must be executed if a lasting improvement is to be realised. The Shannon, the Commissioners further said, like many others of the Irish rivers, has suffered from a want of completeness in treatment, and the time has now arrived when it would be desirable to grapple with the whole question. Accordingly, the present Bill proposes to empower the Commissioners of Public Works to execute the works recommended by the Royal Commission in 1887 for the further prevention of floods and the consequent improvement of the drainage of the lands adjoining the river.

In a memorandum delivered to the Royal Commission by the Chairman of the Board of

Works it was stated that the work which had been done, although only to a partial extent, has been effective as far as it has gone. Before anything was done there were 34,700 acres inundated by flood-waters, of which 13,200 acres have been relieved; and, whereas the number of days in a year during which a large extent of land was flooded,—taking the mean of the number of days at Jamestown, Rooskey, Tarmonbarry, Athlone, and Meelick,—was on the average fifty-two days in a year, it was only twenty-two days on the average of the four years following that in which the work was done,—1883.

At present, as we have said, the Shannon river is navigable the whole way from Limerick and Killaloe to the head of the river. Near the middle of this distance is Athlone. It was proposed by the Royal Commission to abandon the navigation above Athlone. The Commissioners reported that in 1886 the traffic of this upper part of the navigation returned only 30l. gross receipts, and that they saw no reason to suppose that the navigation above Athlone would hereafter become of more value, and they recommended that above Athlone the navigation should be abandoned; that the gates of the locks be removed; and that the canalised portions of the river be used for the discharge of floods. This, of course, would result in a considerable diminution of the works proposed by Mr. Bateman, whose scheme, while providing for the drainage, still maintains the efficiency of the navigation. A Bill has been introduced along with the Drainage Bills for making light railways through the "congested districts" in the west of Ireland. A large part of the agricultural population of these districts is crowded along the sea-shore, where seaweed is obtained for manuring the land, and the railways would bring the agricultural produce into some proximity with the market, and would also provide means of transit for the fishing industry. But with regard to the navigation of the Shannon river, it may be a question whether the construction of light railways in one part of the country can warrant the abandonment of the only means of transit in another part, unless it be intended to substitute the light railway for the river navigation throughout its course.

The proposals of the Government with regard to these rivers are as follows:—

**Shannon.**—The Commissioners of Public Works to be empowered to execute works recommended by the Royal Commission for the further prevention of floods. The works proposed are those recommended by Mr. Bateman, but with modifications in some particulars. It is proposed to give up the navigation above Athlone; but this abandonment of navigation, which is required in order to save expense in executing the drainage-works, need not necessarily be permanent. It is not intended to interfere with the masonry of the locks; and although it is proposed to lower some of the weirs and to reduce the navigable depths of water, yet the cost of restoring the weirs to their former level would not be great if it should hereafter be considered desirable that the depth of water should be restored to that which at present exists. The estimated cost of the works is 263,000l., of which it is estimated that 35,000l. can be charged upon the lands specially benefited, in the form of an annual charge of 4l. 10s. for every 100l. advanced by the Government, payable during the first forty years. This charge for capital expenditure would, therefore, be 1,575l. per annum, but will not begin to be payable until the whole of the advances have been made. The maintenance charge per annum upon the specially-benefited lands will be about the same amount, making in all a charge of 3,150l.: 65,000l. is proposed to be charged upon the catchment area of the river, repayable at the rate of 4½ per cent. for forty years. The share of the maintenance charge to be paid by the catchment area will be about 2,675l. per annum, which, with the charge for the capital outlay, will cause an addition of 1d. in the 1l. to the grand jury

cess: 65,000l. will be raised by a mortgage on the eel weirs, tolls, and surplus lands. The residue of the cost of the works, not exceeding 98,000l., will be supplied as a free grant from money voted by Parliament. It is not proposed that the works should be undertaken unless with the assent of the occupiers of lands specially benefited and of the occupiers of lands in the rest of the catchment area, and the voting power of the benefited area is to be three times the voting power of the rest of the area.

**Suck.**—The total amount required is 185,000l., towards which the Government will make a free grant of 50,000l.

**Barrow.**—The estimated cost of the works is 360,000l., of which it is estimated that 125,000l. can be charged upon the lands and buildings specially benefited, in the form of an annual charge of 4½ per cent. for forty years, amounting to 5,625l. per annum for that period. The annual maintenance charge upon these same lands will come to about 3,475l., making in all an annual charge of 9,100l. Twenty thousand pounds is to be charged upon the county cess. The share of the maintenance charge to be defrayed out of the county cess will be about 600l. a year, making, with the capital charge, an addition of about 1d. in the 1l. within the catchment area. The residue of the cost of the works, not exceeding 215,000l., will be supplied as a free grant from money voted by Parliament.

**Bann.**—The estimated cost of the works is 65,000l., of which it is proposed to charge 8,000l. upon lands specially benefited; 37,000l. upon the county cess within the catchment area, and the residue, 20,000l., will be a free grant. The local charge will be 4½ per cent. for forty years. The charge upon the lands specially benefited in repayment of the 8,000l. will be 360l. per annum, which will be apportioned by a final award according to the benefit received from the works. The maintenance charge payable by the improved lands will be about 660l. per annum, making, with the charge for capital expenditure, 1,020l. per annum. Upon the catchment area the maintenance charge will be about 3,383l., and, together with the charge of 1,665l. for capital expenditure, will add about 1d. in the 1l. to the grand jury cess.

#### THE COMPETITION FOR THE NEW MUNICIPAL BUILDINGS AT GLOUCESTER.



HE result of this competition, successful as it is, makes it apparent that the Gloucester Corporation ran considerable risk of failure in limiting the number of competitors to the local architects and three others. As a result only two local firms thought it worth their while to compete against the selected three—selected of course for their well-known skill and experience—and the promoters of the competition had but five designs to choose from. Fortunately one of the five, Mr. Hunt's, is an eminently good one, but without it there must have been a failure.

The site is a difficult one for an important public building—a long narrow strip from street to street, between high buildings, having some rights of light over it. The direction that the style of the neighbouring buildings was to be considered cannot have given any one much difficulty. The banking-house on one side is a modern building, of the style of which it is impossible to say anything more accurate than that it is "Classic," with a big dormer, an order, and a couple of Renaissance pinnacles. The inn upon the other side is not of architectural character at all. Opposite is a market, with a front of three large arches worked into the façade of a Roman temple, and close by are two more banks of a simple Renaissance character. Anything that could be called Renaissance, therefore, would have met the requirements of the instruction. The suggestion that the existing building on the site might be worked in if an alternative design were submitted may



have given more trouble, but only two of the competitors have been able to do anything with it, and they have not been very successful. This is rather a pity, for the old school building has a quiet, characteristic, seventeenth-century façade which, with some repairs to the stonework, might continue to be an ornament to the town for many years.

The accommodation asked for in the "Instructions" was that which would be required in municipal buildings for a town of 50,000 inhabitants, together with a large public hall, but exclusive of a police-station or courts. A detailed list of the number and sizes of the apartments was given, as well as a suggestion that the total cost ought not to exceed 12,000*l.*, but it was distinctly stated that the competitors might use their own judgment. They seem to have done; and, as a matter of fact, it is improbable that any of the designs could be carried out for the sum named.

Mr. G. H. Hunt, of London, whose design was placed first by Mr. Waterhouse, has saved himself from many difficulties and solved the troublesome problem of providing light for the offices on the ground-floor by placing a courtyard of considerable size about the middle of the west side of the site. All the other competitors have been content with small light areas and wells. He deserves also great credit for the idea, which does not seem to have occurred to anyone else, of placing the whole of the public offices and working parts of the building generally on the ground floor, devoting the first floor entirely to the public hall, Council Chamber, committee-rooms, &c. This is obviously convenient both for the business to be done in the building, and also for the giving of public dinners and entertainments, for which the instructions state, the Council Chamber and committee-rooms, as well as the public hall, will be used. These are the two distinguishing merits of the plans, and they probably were decisive with the judge; but there are also some minor points that are cleverly treated, such as the entrance to the School Board Room through the waiting room, and the direct exit from it, as well as the arrangement of the main staircase to the public hall, which will be exceedingly effective, though it gives offence to some of the other competitors who, happening to be in the Corn Exchange, where the drawings were exhibited, while our critic was examining them, were good enough to save the latter a vast amount of trouble by pointing out the faults of the winning design, and to get him out of a difficulty by explaining the merits of their own production. Mr. Hunt has a central entrance to his building, rather a narrow one, from the main street, from which, through a vestibule, a hall is reached, extending practically across the whole width of the site. At the east end is a large public staircase to the first floor and a small one to the public gallery of the Council Chamber; at the other end is a lavatory and small staircase for officials and councillors. From the hall several offices and a small committee-room are reached, and the rest of the offices are ranged along a corridor running from front to back on the east side of the building, communicating at the back with another smaller entrance hall and the staircase to the public hall. The School Board offices are in the rear of the building. On this floor, the chief faults are that the Town Clerk's strong-room is at present entered from the public part of his office, but a perfectly obvious alteration would rectify that; the Surveyor's drawing-office has a south light, which is unlucky, but not fatal. On the first floor there is a repetition of the hall below, which is lighted by a well in the floor between, and by a small well in the main staircase, which might with great advantage, and no loss of space that is valuable be more than doubled in size. At the back of this hall, lighted from the courtyard and from above, is the Council Chamber, and in front of it a suite of three rooms, the Mayor's Parlour, and two committee-rooms; the latter are badly placed, being too near to the noise

of one of the busiest streets in Gloucester. The public hall occupies on this floor the whole of the frontage to the back street, and between it and the Council Chamber, very well placed, is the principal committee-room. The caretaker's rooms and the kitchens are on the second floor, and the worst point of the design is, perhaps, the difficulty of communication between the latter and the principal public rooms. In the case of the large hall there is a small service-room having a lift from the kitchen; but in that of the Council Chamber, which is to be the usual banqueting-room, there is nothing, and in both cases the only access for servants is partly, at least, by the main public staircases. The front of this design to the main street, though too heavy, is of some merit architecturally, and the detail drawing of it is so well executed that it might readily lead the critic to form even a higher judgment of the design than it really deserves. The façade is divided vertically into a wide centre, and narrow end blocks, pavilions one would call them if they had any visible roofs, and horizontally into basement, principal story, and attic. The basement has rustications without vertical joints, and a simple cornice; the windows are plain, and the door is surmounted by a balcony carried on brackets. The centre part of the first-floor is composed of three plain semi-circular arches, rather incongruously divided by half-columns of a decided Greek character, and surmounted by a plain modillion cornice of considerable projection. The attic, which, by the way, masks only "spare" rooms, and is added to give height to the front, is elaborately carved with winged boys, and has circular openings. The whole is surmounted by a parapet and urns of neo-grec character.

The design "Prætorium," by Messrs. Medland & Son, of Gloucester, which obtained the second premium, has the peculiarity that the large public hall is placed upon the street level, an arrangement very convenient as regards itself, but one which has terribly hampered the architects in dealing with the site generally. In the first place, it occupies space that should have been given to offices, with the result that the Town Clerk's and Surveyor's suites of offices have had to be divided, and a part of each banished to the second floor. To add to the difficulties, it has been thought necessary, or at any rate desirable, to place the hall centrally on the site, apparently for the sake of symmetry, and with its length parallel to the long way of the ground. It thus cuts into the available space in such a way as to practically monopolise all the back part of the site which is devoted to it and the School Board offices, which are not only inconveniently planned, but have to be lighted entirely by skylights. In the front part of the building, a good vestibule gives access from the street to a small hall and comparatively poor staircase. The Town Clerk's offices are on the first floor, but the rest, with the exceptions above noted, are very conveniently grouped round the entrance-hall. The rest of the ground floor is given up to two committee-rooms. On the first floor the back of the site is taken up by the upper part of the great hall; the Council Chamber is in the middle, lighted from areas at both ends and by a skylight; committee-rooms, the Mayor's Parlour, and the Town Clerk's offices occupy the front. The kitchens are on the second floor, and their communication with the Council Chamber is well arranged, but they have none with the public hall without going outside the building or through the public corridor on the ground floor. The architectural treatment of the principal front in this design is lighter than Mr. Hunt's, and would probably please most people better, but it is less appropriate to the character of the building, and the two ugly bay windows on the first floor would have to be suppressed if the whole were to escape looking like a private mansion with a turret put on the top of it. Apart from the bays this front might claim to be a fair specimen of the French Renaissance style. This design has fairly beaten the other three, but it is a

long way behind the first, and would probably not have had a chance of a place in an open competition.

"Simplicity," by Mr. J. Fletcher Trew, of Gloucester, probably owes its third place to a happy treatment of the approaches to the public hall and Council Chamber, combined with the fact that the arrangements shown in the plans are, on the whole, fairly workable, and that its only conspicuous demerits are of an artistic kind,—a kind which, arbitrator or no arbitrator, seems seldom to have much influence in competitions. Mr. Trew has placed his public hall across the back of the site on the first floor, and his Council Chamber on the same floor nearer the front of the building, and separated from the first only by the landing of a pair of semi-circular staircases, which give access to it from a central corridor running from front to back of the building on the ground floor, and communicating with the entrances from Eastgate and New Inn-streets. At the west end these two large apartments are connected with the kitchens, &c., by means of a serving-room and small staircase; and over the double staircases they are again connected by a music-gallery. Except in this arrangement, the design presents no points of conspicuous merit, and the only blame we should be inclined to award to it would be for the worse than commonplace character of the design for the front.

Messrs. Giles & Gough, of London, and Mr. Wm. Dawes, of Manchester, have each submitted two designs, but none of the four found favour with the arbitrator. In both their designs Messrs. Giles & Gough have fallen into the strange error of placing the public hall upon the second floor, an arrangement which one would have supposed them experienced enough to know to be entirely inadmissible. In their second design, too, they commit the almost equally unpardonable error of putting the Council Chamber next to the street. If it had not been for these mistakes, and the fact that their best design would probably be even more costly than any of the others, they must have obtained a place, for most of the arrangements of their plans are excellent, and the design for the front of their building the most striking in the room.

Mr. Dawes places his large hall and Council Chamber adjoining on the first floor on which are also the committee-rooms, Town Clerk's offices and Mayor's Parlour; the rest of the offices are ranged on each side of a long central corridor on the ground floor. The chief features of the front are a great domical roof and lantern as the central feature, and high hipped roofs to the end pavilions, the general effect is rather heavy, but not altogether unpleasing. The provision of the open yard and driveway, stipulated for in the instructions, seems to have been more wholly forgotten in this design than even in the other unsuccessful ones, but that is the only other point calling for special remark.

Speaking generally, we cannot say that we think the level reached in the competition is very high; Mr. Hunt's design is excellent in most ways, but the façade, unless modified, will look unnecessarily heavy even for the class of building, and, for the rest, we doubt whether any of the other designs could ever have worked out satisfactorily without rather sweeping modifications.

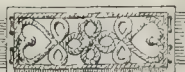
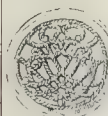
#### NOTES ON PORTLAND CEMENT: THE REACTIONS INVOLVED IN ITS CALCINATION.

BY B. H. THWAITE, C.E.

THE following few notes on the syntheses of the reactions involved in the calcination of Portland cement, based on Le Chatelier's researches, may be interesting to students of constructive science. No scientist has applied scientific reasoning to, nor analysed the development of, the various actions occurring in many industrial processes with more thoroughness and power than has Le Chatelier.

In the calcination of Portland cement, the





Icelandic Belt with Silver Ornaments and Clasp.



Icelandic Box for Knitting-pins.

first effect is the expulsion of the water at 100° Cent.

The next effect is the decomposition of the clay at a temperature of 600° Cent., and its dehydration.

Between 500° and 900° Cent. the calcic carbonate is decomposed with the expulsion of the carbon-dioxide (CO<sub>2</sub>). The calcic carbonate is then converted into quicklime.

This is an important phase in the calcination. Immediately the carbon-dioxide leaves the lime the influence of the contact with the clay is accelerated, and the two agents, lime and clay, combine,—the combination becoming more complete the higher the temperature, and the more it is prolonged.

The grains of lime and particles of clay form fusible amalgams of two kinds; one having a basic preponderance, the other an acid one. In any amalgam constituted of a piece of imperfectly calcined clinker, the centre will be found to consist of the clay constituents, silica and alumina. Around this will be melted glass, or an excessive preponderance of clay, in a mixture of the clay and the lime. Next to this will be a melted mixture of the double silicates (silicates mono and dicalcic), both fusible at the ordinary temperature of calcination of the cements. Next to this last amalgam, and forming the more perfectly burnt part of the clinker, are the silicates of lime, the silicates-tricalcic (infusible), and the aluminates of lime (fusible), and, finally, the quicklime.

The proportion of these various elements varies continually with the degree of advancement of calcination.

If there is a very considerable excess of the lime agent, the final product of calcination will be the silicate tricalcic and aluminate tricalcic along with quicklime—if the proportion of lime is not in excess—the quicklime will be absent if less lime is used, the calcic aluminate will disappear, and will be replaced by a double silicate, analogous in its composition to blast-furnace slag.

If the proportion of lime is further diminished, the silicate tricalcic will disappear, and be replaced by the silicate dicalcic, and a further calcic reduction will convert the silicate dicalcic into the silicate monocalcic.

The following table illustrates the influence of an excess of lime on the character of Portland Cement:—

Normal Cement.		Excess of Lime.	
S <sub>2</sub> O <sub>3</sub> = 1.00	} 1.21	1.00	} 1.17
Al <sub>2</sub> O <sub>3</sub> = 0.21		0.17	
Fe <sub>2</sub> O <sub>3</sub> = 0.04		0.03	
CaO = 3.29		3.71	
M <sub>2</sub> O = 0.08		0.05	} 3.76
CaO.S <sub>2</sub> O <sub>3</sub> = 0.015		0.01	
Bases = 3.37		3.76	
Acid = 1.21		1.17	} 3.2

The analyses of cement should show that the cement has not an excess of lime, or more than three equivalents of protoxide (CaO.M<sub>2</sub>O) to one equivalent of acid (SiO<sub>2</sub>.Al<sub>2</sub>O<sub>3</sub>).

**The North Sea Baltic Canal.**—The work of cutting the North Sea Baltic Canal is rapidly proceeding, some 3,000 men, ten steam diggers, and other machines being employed in the work. The work of excavation is entrusted to a firm of contractors, but the Canal Commission exercises a minute supervision. The workmen are lodged in commodious barracks, the charge for bed and food being only 1s. 9d. a day, whilst the average rate of wages is 2s. 6d. a day.

## NOTES.

THE remarkable address on "Hautes Etudes" or "Advanced Studies in Architecture" (as we have paraphrased it) delivered by M. César Daly at the International Congress of Architects in Paris, must have impressed all who heard it with the eloquence and command of language and ideas exhibited in a long discourse delivered with the greatest fluency and without a single note; an intellectual display remarkable in itself, apart from the question of the view taken of architectural study. Our report of it on another page is necessarily brief, and rather a summary than a report; on the other hand M. Daly intimates that he had by no means the necessary time to develop the subject as it presented itself to his mind. If it is objected by those who are called practical men that all this reasoning leads to no visible or immediate architectural result, it may be replied that the same kind of argument has been used against Darwin's Evolution theory, viz., that we do not see these changes and evolutions going on before our eyes; the objectors forgetting that a life-time is too short a space in which to see them. So the connexion insisted on by M. Daly between architecture and nature on the one hand, and architecture and civilisation on the other hand, is not the less real because it is difficult to detect it in detail, and it requires a very large survey of the history and aesthetics of the subject to perceive it. What M. Daly is endeavouring to do is to substitute for the unconscious development of architecture in former ages—a condition which modern extension of knowledge through history and travel renders no longer possible—a conscious development based on a wider and more comprehensive study of architecture, and the influences which act upon it, than has ever been undertaken before. The idea is at all events a grand one; and the discussion of it, if apparently of a somewhat intangible nature at the moment, may at all events lead to the study of architecture being taken up in a broader and more philosophic spirit than has yet been the case, perhaps with ultimate results beyond what are looked for at present.

THE case of Pritchard v. Lang and another, which has been heard on appeal before Lord Coleridge, was an action by a widow for compensation for the death of her husband by falling into a caisson chamber on leaving the works. In the report of the case in the *Times* it was stated that "men leaving the dock usually leave it by crossing a caisson 5 ft. or 6 ft. broad, and deep enough to drown a man. When they got to the end they came to two planks put across, side by side, from one side to the other of the dock wall. On passing over the planks there were three baulks of timber, 10 in. square, put across the caisson chamber, and a man could step from the planks on the baulks, which were close to one another, their surfaces being about 18 in. on one side above the level of the boards, and they were laid upon other baulks parallel to the caisson chamber. There were chains on the caisson, but which were not up on the night in question—in January. After passing over the caisson the men ought to turn sharp to the right. If they did not do so they would fall into the chamber. A fellow-workman said he 'thought the place dangerous.' There were lights placed there, but the men often took them away, and he had spoken to the dockmaster about it, and it appeared that

on this night the lights were not there. But on cross-examination, the witness said that before a man could fall into the caisson he would have to step on the planks and then on the baulks, and that the proper way for the men to go was to step on the planks and then turn to the right. There were other ways the man might have gone, but it did not appear that he knew of them." Lord Coleridge observed that the master was entitled to protection as well as the workman, and that if the workman chose to take a certain way when another was open to him, he took it at his own risk. He ruled that the disaster had not arisen from the negligence of any one for whom the employer was responsible, and that therefore the previous verdict for the plaintiff must be set aside, and a verdict entered for the defendants. On the basis of the facts as reported we entirely concur with the ruling. We have on other occasions spoken strongly of the duty of the employer to look after the safety of the workman; but the negligence of workmen in regard to their own and each others' safety is a constant source of accidents, as it appears to have been in this case, and they have neither the legal nor the moral right to expect that the employer should be made responsible for this.

IN the rooms of the Royal Archaeological Institute, at 17, Oxford Mansion, an Icelandic lady brought together for exhibition last week a small but interesting collection of the industrial and art products of her country. The immediate object of the exhibition, which is under the patronage of the Princess of Wales, is to raise funds to assist the better education of the women of the island, but among the exhibits are rolls of homespun cloth and some hand-knitted woollen socks and gloves, which may, perhaps, call attention to a possible rival of the Shetlands in supplying us with such things. Of these exhibits which are more properly works of art, the silver and silver-gilt work, especially the belts of one of which we give an illustration (above), chains, and clasps, are the most important and interesting. A few of the belts are entirely of metal, but the majority consist of a close row of independent ornaments, sewn on to a strip of cloth or leather. As all of them are heirlooms, handed down from mother to daughter for many generations, this is the more convenient form, since the length of the belt can be so readily adjusted to the girth of the wearer. After the silver work there comes next, in artistic interest, the wood-carving. This consists chiefly of boxes for trinkets, for wools, for knitting-needles, and for a variety of other purposes, among which the long narrow knitting-pin boxes (see illustration) are the most original. They are cut out of solid little logs—"dug-out," as one would say, of a canoe—and the methods of opening and securing the lids are various and ingenious. The carving is rough and generally very shallow; most of it is of the interesting kind which we connect with early Scandinavian art; some is poor in design, but generally the sweep of the bands or ribbons and the lines of the foliage into which they break are peculiarly pleasing. Together with these boxes are several porringers like squat little tubs with carved lids and handles.\* We noticed also some interesting primitive brass lamps, some embroidered woollen rugs, more notable,

\* One was figured in the *Builder* for April 3, 1886, under the name of a fish-pot.



certainly, for the brightness than for the harmony of their colouring, and some heavy looking brass mounted side-saddles and harness. The Exhibition is to remain open, we understand, until the 18th inst.

ANOTHER number (Dil-Don) of MM. Darenberg, Saglio, and Pottier's "Dictionnaire des Antiquités" has just been issued, and it contains several noteworthy articles. In the domain of mythology we have a good and very fully illustrated article on the Dioscuri by M. Albert, and another on Dionysus by M. Girard. The strong point of the "Dictionnaire" has, however, always been rather antiquities proper than mythology. The mythological standpoint has been, with one or two exceptions, somewhat behind-hand, and there is a lack of discrimination between early and late mythical tradition. The article on Greek and Roman houses (Domus) will be found very useful, though it seems to us a mistake to illustrate it so freely with woodcuts of Pompeian paintings; they are, indeed, part of the decoration of a house, but their proper place, surely, even though they occasionally show some architectural detail, is under the article "Peinture." In fact, one great defect from which the "Dictionnaire" suffers is that it is not easy—at least for the English reader—to know where to look for what he wants. Who that desired particulars of the inscribed votive pillars and vases recently found on the Acropolis would look for them, as he must, under the head of "Donarium?" One is left with the impression that the writer of the article had heard recently of these discoveries, and thought at all hazards he had better incorporate them. We ourselves have not wholly renounced the baneful and misleading habit of calling Greek things and persons by Latin names, but the French, owing, of course, to the unbroken tradition of their language, are worse offenders. In the matter of excellent and well-nigh complete bibliography, the "Dictionnaire" still stands alone.

THE *Scottish Art Review* for July contains an article on that celebrated old Scottish mansion, Pinkie House, with some illustrations from original drawings by Mr. T. Crawford Hamilton. We gather that the article is the first of an intended series on "The Mansions of Scotland and their Contents," a subject well worth treating in a continuous form.

MR. PHILIP NORMAN, F.S.A., has brought to an end his valuable series of illustrated articles, as contributed to the *Antiquary*, upon London Sculptured House Signs. The theme covers more ground than is generally known; and the author, whilst avowedly not quite exhausting his subject, shows how much yet remains for those who, in traversing the streets, will but be at the pains of lifting their eyes to a level higher than that of the fascias and shop-fronts. The lions, to take one example, that were so familiar to our last generation, become scarcer every year: one of the best of their kind distinguishes a public-house in Arthur-street, leading from New Oxford-street to St. Giles's Church. Mr. Norman gives a short list of certain signs that have altogether disappeared. In that category he places the little carving of the King's Porter and Dwarf, Newgate-street. This bas-relief, illustrated in Pennant's work, represents William Evans, a Monmouthshire man, with the fiery little Sir Geoffrey Hudson, whom Vandeyck did not disdain to portray, and whom Scott introduces into "Peveril of the Peak." Nevertheless, the stone can be seen, and close by its original position, in the front of No. 78, Newgate-street, over the central first-floor window. It formerly stood above the southern opening of Bull Head-court, between Bagno-court—since Bath-street, but now gratuitously re-named Roman Bath-street—and Butcher Hall-lane, now styled King Edward-street. Nor is Mr. Norman's tale of signs in the Guildhall Museum quite complete. He does not cite the St. George and Dragon, mutilated as it is, from George-

yard on Snow-hill; or the carved effigy of the giant Gerard from Gysours', or Gerard's Hall, Basing-lane, in the Parish of St. Mildred, Broad-street. The old hall, demolished some thirty-seven years ago, and famed for its Norman crypt, is mentioned in a deed of gift by William Cotterell, in the twelfth century, to the Knights of St. John, quoted in the Liber Johannis Stillingfleet, compiled in 1434.\* They used to show there a pole 39 ft. long, which the giant was reputed to have wielded in battle, and J. W. Archer says his tilting-helmet hung in the church. Into the civic museum were removed, too, the figures of a boy and girl from the Ward Schools in Bull and Mouth-street. That thoroughfare, by the way, now quite absorbed in the Post-Office new site, was for a while called Stewkeley's-street, as appears by a marble tablet, bearing date "1668," in the Museum. The Little Wooden Midshipman that plays its part in the still-life of "Dombey and Son," and which even Charles Dickens describes inaccurately, has, as is stated, migrated from Leadenhall-street to the Minories. There, though not without a rival, it still appertains to the nautical-instruments and charts business founded by Wm. Heather, a teacher of navigation, in 1765†, and now carried on by Messrs. Norie & Wilson. That figure, the oldest of its own sort in London, dates from an early year of this century; the uniform is exact and complete. Much is yet left to be said about the tablets at the street corners. In no quarter were these more numerous than in Soho, whence, however, nearly all have vanished in the making of the two new thoroughfares that now join St. Giles's to St. James's.

THE first case has arisen under Section 12 of the Working Classes Dwellings Act of 1885, which contains the enactment that "in any contract for letting, for habitation by persons of the working classes, a house or part of a house, there shall be implied a condition that the house is in all respects reasonably fit for human habitation," whereby a paternal care is exercised by the State over the interests of working class tenants, as against the landlords, which those who do not belong to that favoured but ill-defined order of men sigh for in vain. This was the case of Walker and wife v. Hobbs & Co., in which the plaintiffs took three rooms in a block of artisans' dwellings built by the defendants. There were two falls of plaster, about which apparently nothing was said, but in a third fall the wife was injured by plaster falling on her head, and the action was taken on three grounds (1) breach of actual warranty that the ceiling was sound; (2) wrongfully leaving the ceiling in an unsafe state; (3) on the enactment in the statute. The first two grounds, however, failed, and the case rested on the Act. The plaintiffs obtained 50% damages, and an appeal was made by the defendants, who contended that the clause only referred to sanitary defects, such as bad drains. Lord Coleridge upheld the original verdict, and dismissed the appeal as "irrational" in its grounds. Why cannot others besides "working-men" have the same justice done them when they are injured in health and pocket by the state of their residence, through no fault of their own?

A WARNING as to a possible danger from automatic sprinklers is given in the account of a fire at the Victoria Flour Mills, near Wellingborough. The buildings were fitted with automatic sprinklers, which acted as they were designed as far as putting out the fire was concerned, but no one could stop the sprinklers afterwards, and the place was deluged with water, which did a great deal more serious damage than the fire. The incident has its ludicrous side, though perhaps the owner of the property damaged did not appreciate that. It shows the importance of

arranging a sprinkler system so that the water can be easily shut off, and of seeing that those in charge of the premises know how to shut it off. If the sprinklers were actually fitted up with no provision for cutting off the water when it had done its work, we can only say that this shows a degree of carelessness or stupidity which deserved to be punished by a mishap.

AT Liverpool the other day, as appears from a newspaper cutting which has been forwarded to us, a man was brought before a local magistrate, Mr. Thomas Matheson, for selling indecent photographs. The following dialogue took place between the prosecuting counsel, representing the Corporation, and the magistrate:—

"Mr. Matheson: Are you aware, Mr. Marks, that there is on St. George's Hall, statutory that some people have objected to? Mr. Marks: I am aware that some have been objected to. Mr. Matheson: And that you are thereby setting a bad example to this young man? Mr. Marks: He is a middle-aged man. Mr. Matheson: You represent the Corporation, don't you? Mr. Marks: Yes, Mr. Matheson: And St. George's Hall? Mr. Marks: Well, I have an office there, but it did not emanate from my office. Mr. Matheson: Well, you are aware you have some statutory on St. George's Hall that is setting a very bad example to the public, and you are asking us to fine a man for doing what you do yourselves? Mr. Marks: These photographs are very obscene. Mr. Matheson: And so are the other things too, and it is far worse, because people who set the example ought to have known better."

These remarks, we presume, refer to the bas-relief by Mr. Stirling Lee on the exterior of St. George's Hall, in which a nude figure of a little girl of tender age is introduced! That is perhaps the last and most stupid of the insults to which one of the most gifted of our younger sculptors has been exposed at the hands of Liverpool official wisdom and cultivation.

#### THE INTERNATIONAL CONGRESS OF ARCHITECTS, PARIS.\*

AT the fourth sitting of the Congress M. Lefort (Rouen) delivered an address, in which he gave strong support to the views of M. de Baudot, and emphasised the point, calling for the decentralisation of scientific instruction. The result of the present system was that all opportunities of architectural instruction were concentrated in Paris, and the great provincial centres of France were deprived of them. The speaker said he fully appreciated the value of the work done in Paris, but the programme must be extended so as to include the subjects prescribed by the conditions of modern society, for unless these were satisfied the education of the architect would be for ever recommencing at the foot of an inclined plane, and the teacher would be condemned for ever to roll up the rock which would eventually crush him. The question of reform in the programme touched even the existence itself of the architect, who must be not only an artist but a man of science, —a *savant*. Plato's definition of the beautiful would remain true as long as the world and humanity should last, but the conditions of the realisation of the beautiful were forever changing. It was the spirit of the *savant* as well as the spirit of the artist which had to be created in order that the architect might be a creator and not a mere imitator—in order that, in seeing the works of past masters, he might dream of new combinations; and he must be himself a master of the work in order that he might clothe his intangible dreams with bones and flesh. He must not only have a knowledge of drawing,—of perspective especially,—but he must study the influence of climate with its infinite varieties and the effect of local surroundings which in themselves always tended towards the trivial and the commonplace, but could not be without danger neglected. Actuality and local colour were points which no true architect neglected, but how were these to be understood unless the architect was enabled to study among his local surroundings and form his artistic education in sympathy with the *genius loci*? To Paris they must come to study their dear master, Charles Garnier, to study Philibert Delorme, but while every enterprise which was undertaken in the

\* De Nomibus Fundatorum Hosp. S. Johan. Jerusalem. in Anglia. *Monastic. Anglie*, vi. 832. Edit., 1817-30.  
† At No. 167, Leadenhall-street, a house associated with memories of Nelson; rebuilt in 1881-2.

\* See *Builder* for June 29, p. 435.



provinces was directed by a committee sitting in Paris which gave its directions and prescriptions upon every detail, the student who desired to rise in his profession was compelled to go to Paris and to forsake that *genius loci* which it would be the part of a wise system to preserve with jealous care.

The President, as a member of many of the committees attacked, protested that while such committees necessarily had to decide upon details which involved questions of cost, they studiously avoided all interference with questions of art or design, so far as these were independent of the question of cost. Never in any such committee of which he formed part had he presumed to intervene in a mere question of art.

M. de Baudot also protested in the same sense. If M. Lefort had facts to cite which proved his contention, as he maintained that he had, let him produce them, and let them be inquired into. For his part he could affirm that he had never known a case of such interference with the free action of local architects as had been alleged by M. Lefort. He repudiated entirely the charge that Paris showed any jealousy towards the provinces.

In reply, M. Lefort disclaimed any disposition to confound the question of decentralisation in education with the question of political unity, which was a natural necessity of the country, and if they challenged him to cite instances of the undue interference of Paris with the freedom of action of the provinces, he was prepared to give them. He would not communicate them to the Congress, but was prepared to lay his proofs before the President.

Mons. Paul Wallon, Architect of the Government, introduced the subject of public competitive examinations, and with it the question of a reform of education in another form. He cited the resolutions of various previous Congresses upon the subject, from 1861 to 1878, some of which recommended a jury too comprehensive, and others a jury upon lines too narrow. He recommended to the Congress to reaffirm the resolutions of the Congress of 1878, which had succeeded in avoiding both extremes.

After some remarks from other members, Mr. Spiers, F.R.I.B.A., Master of the Architectural School of the Royal Academy of Arts, London, and one of the vice-presidents of the Congress, intervened for the first time in the discussion. Speaking in French, he said he had great pleasure, after an interval of eleven years, when he had taken part in the last International Congress, in again assisting at their deliberations as a representative of the Royal Institute of British Architects. He would endeavour to confine the remarks he proposed to make as much as possible to the practical side of the various questions. The question then under discussion was one of practice rather than one of principle. The questions of competitive examinations and of a compulsory diploma were not all of the same importance in England as in France. All that they had been able to do in England was to make a beginning in the teaching of architecture, and that question was the most important for the interests he represented. It might be said that in England they had no regular school of architecture. When the Royal Academy met in 1870, at Burlington House, for the first time a kind of school of architecture had become possible. As he (the speaker) had studied architecture in England, France, and Germany, and his name had become associated with the movement, then commencing, of the development of architectural knowledge, he was placed at the head of the School, and given an opportunity of putting his system to the test. The pupils only came in the evening, and they came with all sorts of differing ideas, which it was impossible to reduce to uniformity. In 1877 or 1878 an architect who held an eminent position, Mr. Street, demanded that architecture should be made the subject of special study, for without this the high character of the art could not be maintained, much less advanced and improved. Mr. Street threw all his energies into the work, yet, although he was a man of great power and influence, it was not till the end of three years that the fruit of his labours began to be apparent. There were two different ways of looking at the question, the Classic and the Gothic, and he (the speaker) was forced to trim, in order to run with both currents.

The question of diplomas had been long discussed in England. In 1862 the Institute of British Architects instituted an examination for

architects, but as it was facultative, not more than 100 persons had submitted themselves to it in eighteen years. In 1878 the Council of the Institute resolved that at the end of seven years the examination for the admission of Associates should be compulsory, and that after 1882 no one should be admitted without having passed the examination. This became generally accepted, and within the seven years a great many Associates had been admitted on the new conditions. The Council followed up their resolution by declaring that no Fellows would in future be admitted without having first been Associates. The practical result was that it would be difficult to find in London more than two or three architects of repute who were not members of the Institute. A single examination had been found sufficient, and at present, besides the preliminary examination, there was an examination three or four years later, which corresponded to the Baccalaureat in France, and at the age of twenty-two or twenty-three a third examination had to be passed for admission as an Associate of the Institute.

In 1884 an architectural association had proposed a Bill to Parliament for a compulsory diploma for architects, but, as it was proposed to apply to surveyors, who were in some way connected with engineering, it was opposed by the three representative bodies of the architectural, engineering, and surveying professions, and was lost. Another Bill was now proposed, and he hoped it would meet with a similar fate, because it proposed to admit all those who were at present in practice as architects, and that would give undue prestige to incompetent men.

The address was much applauded, and the thanks of the Congress were accorded by the Chairman to Mr. Spiers for his interesting and important communication.

The subject of a benefit fund was introduced by M. de Joly, and a brief debate ensued; after which M. Paul Gout was afforded an opportunity of replying to M. E. Guillaume, who had defended the system practised at the École des Beaux-Arts.

Mr. Spiers briefly described the system of study of architectural monuments introduced by the late eminent English architect, Mr. Burges, which was chiefly characterised by the method of comparison by actual measurements. The results of this system of measurement had been found very striking forty years ago, when Mr. Burges, architect of the Gothic cathedral of Lille, had produced work of so high a character that he was believed to have discovered and imitated the designs of some architect of the Middle Ages. All that Mr. Burges had done was to measure. His system was short-sighted, and as he could not gather in the ordinary way a proper idea of the proportions of the edifices he set himself to examine, he had perforce to resort to this device of actual measurement. All the precious monuments of Beauvais had been thus measured. He had adopted the principle in all his travels, and he had thus studied all the cathedrals of France. (Great applause.)

The question of copyright in works of art, as it affected the architect, was then brought up by M. Lucas, the secretary, who strongly urged the adoption of the resolutions of a sub-committee appointed early in 1889 to study the question. The following were the principal points in the resolution:—

1. The architect ought to possess the same right of controlling the reproduction or copying of his architectural work that is possessed by the painter, the sculptor, and all other artists.

2. The architect, like every other artist, should reserve to himself the exclusive right to reproduce, or authorise the reproduction of, his work; and any law which might be made in favour of the protection of any artist should apply to the architect.

3. Any architect who had conceived a plan of an edifice or directed its erection, should have the right to inscribe upon it his name and profession.

The committee considered it desirable that artists, including architects, should adopt a plan common in leases and insurance contracts, and give receipts for moneys received for artistic work on printed forms, containing an appropriate protecting clause, which could be struck out if insisted upon, and if the artist preferred for any reason to forego his rights in any individual case.

M. Dognée (Liège) argued very eloquently

and cogently for a simpler formula, by which the architect's right over his work should be declared to be as complete and absolute as that of the author over the offspring of his brain. He combated the views expressed by Victor Hugo at a congress in 1878, when he preached the doctrine of the universal right to copy or appropriate anything a man pleased.

M. Charles Garnier and M. de Handot were inclined to favour the more liberal views of Victor Hugo, but there was a general consensus of opinion in favour of the views advocated by M. Dognée, who was requested to formulate a resolution to be submitted to the Congress, and, if approved, to the Minister expected to preside at the closing sitting of the Congress. The sitting was then adjourned.

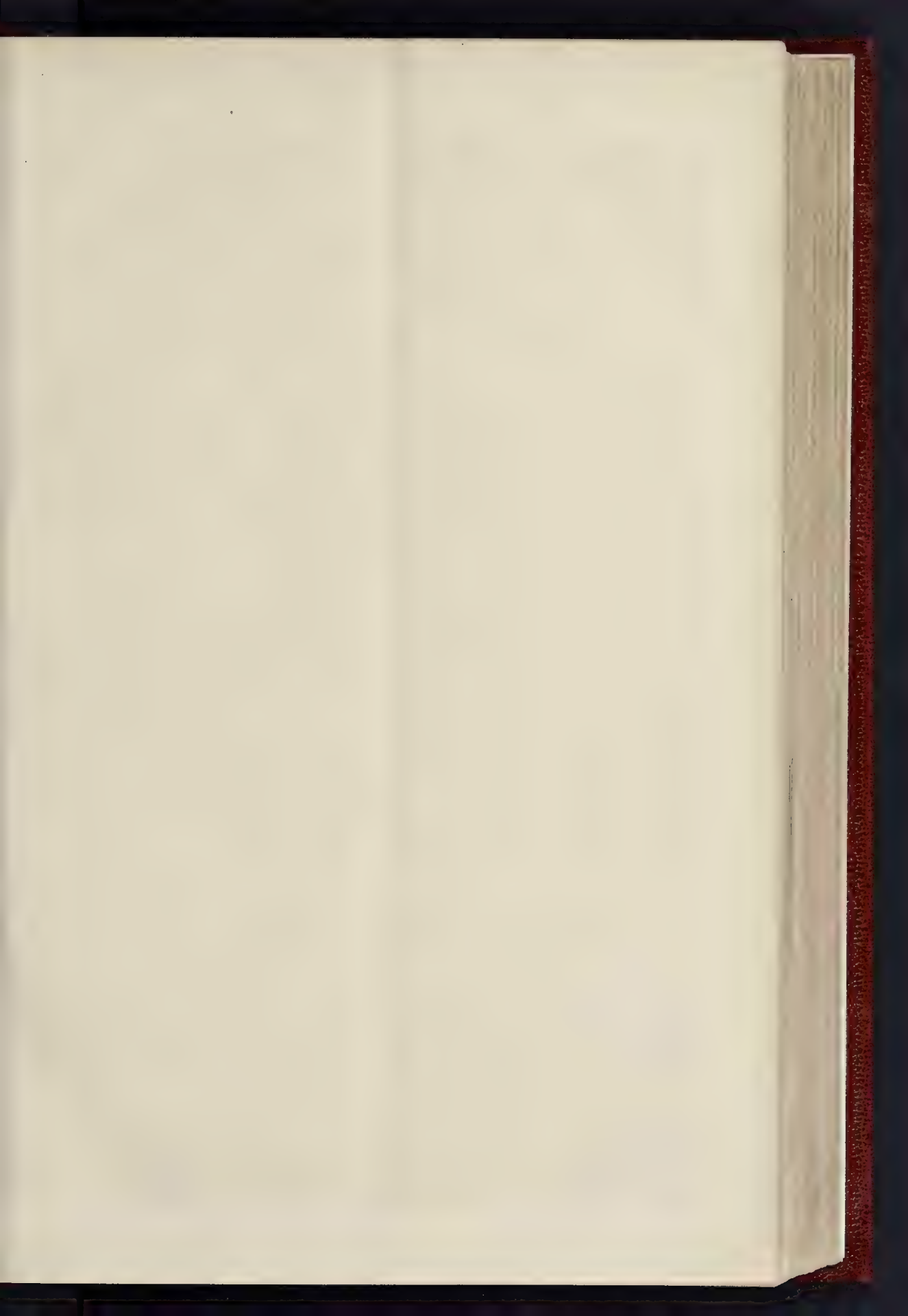
Before the delivery of the address of M. César Daly on "Advanced Studies in Architecture," to which it had been agreed to devote the whole Thursday morning sitting, and after the Secretary had read the minutes of the previous sitting, Mr. Spiers presented to the Congress a number of documents, on behalf of the Institute of British Architects, whose President, Mr. Waterhouse, R.A., and Secretary, Mr. W. H. White, had taken their places on the dais beside Mr. Charles Garnier, who again presided. The documents consisted of the Charter of the British Institute, its Calendar, a pamphlet entitled "Hints to Workmen," another called the "Conservation of Ancient Monuments," and five papers relative to the Institute examinations. Other documents were handed in, including the conclusions of M. Dognée on "Copyright," of M. Lefort on "Decentralization," and, on the motion of M. Ch. Lucas, a vote of condolence was passed to the relatives of an architect of the Government, M. Cernuschi, just deceased, who had long been prominent in all public movements.

M. de Joly was then called upon to deliver his lecture, which took the form of an extempore address, illustrated by diagrams.

The general position assumed by M. Daly in regard to the subject which he has lately made his own may be briefly stated thus: During a doctrinal period of Society, architecture has a style. During a period of transition between two doctrines, architecture has schools. These schools have led to a state of eclecticism, which has no accepted principles or doctrines of its own. A general or collective æsthetic principle exists no longer; we have abandoned the æsthetic evolution of antiquity and of the middle ages equally, and have fallen into individualism, a state of things which deprives architecture of its grandest characteristic, that of expressing the collective feelings of a civilisation. That is the actual state of architecture: how are we to emerge from it? By creating a *terrain* on which the debris of all the past schools could be united, without contradicting their position in the past, on the neutral territory between eclecticism and a scientific *æsthetisme* based on the unchangeable laws of architectural construction and design. The recognition of modern requirements, of the immense resources arising out of new materials and methods, the intelligent employment of great and important discoveries of modern science in the art of building; all these influences together could build up a logical and incontestable basis on which all schools could meet, with the full consciousness of the fusion effected between them. The last stage would be the æsthetic evolution of the new architecture which would arise, and which would be the expression of the tendencies by which the new era of civilisation was distinguished from previous civilisations. Past eras had been characterised by the prevalence of religious enthusiasm, of class privilege, of the present and future seemed likely to be characterised by the love of peace, by the *droit commun*, the prevalence of industry and commerce.

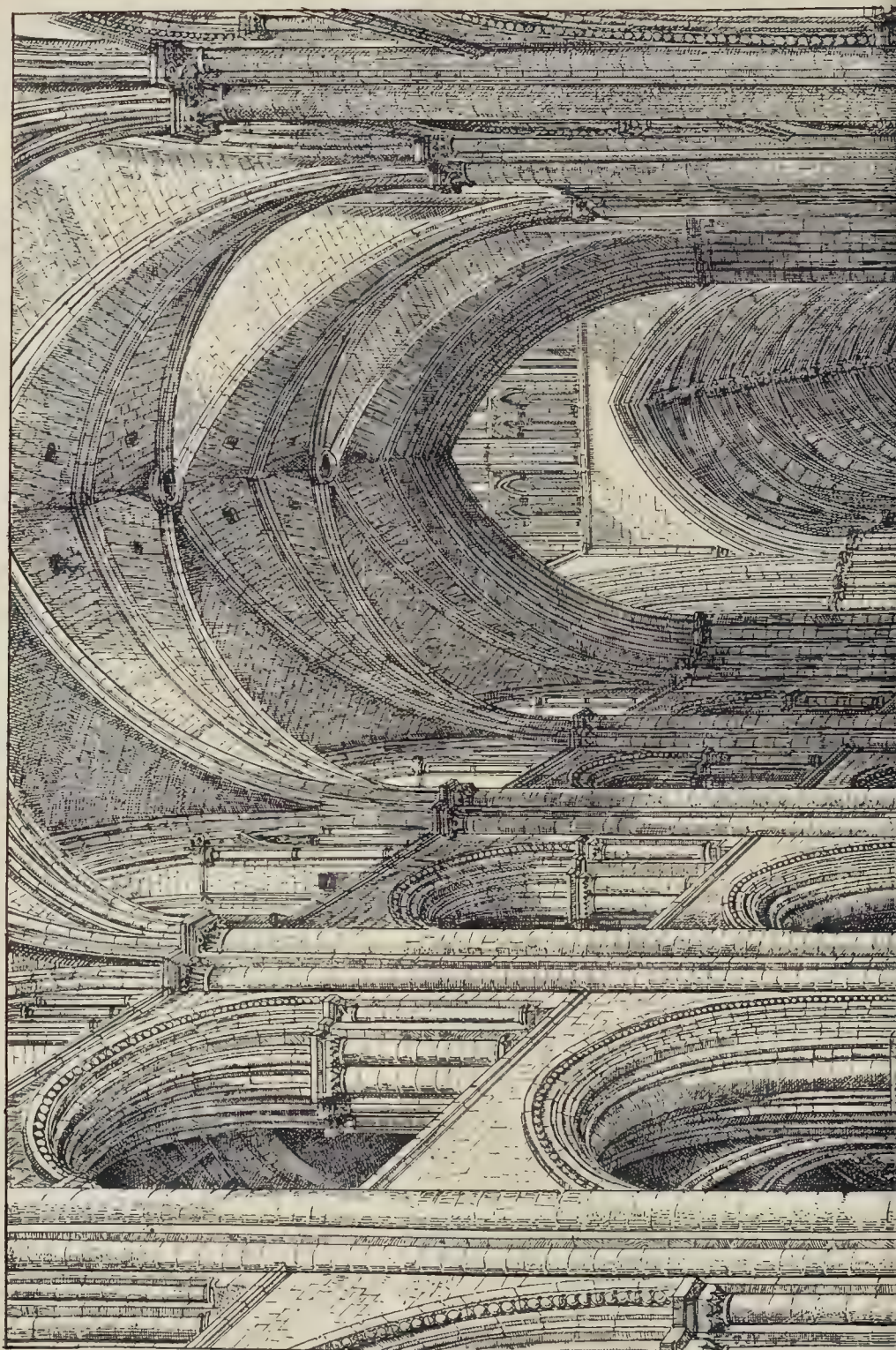
M. Daly went on to say that he did not ignore what had been done in France of late years for the encouragement of advanced study, and particularly for the study of art, but he regarded all that had been done as only a commencement. The more elevated their art the more proud they should be of it, and the more ready to help in its advancement. He did not merely desire to nationalise advanced study, but wished to extend it to the whole world; he desired to see it not merely general, but universal. In the remarks he was about to make, if he made no mention of the Church, it must not be supposed that he had forgotten all that the Church had done for their art, of which



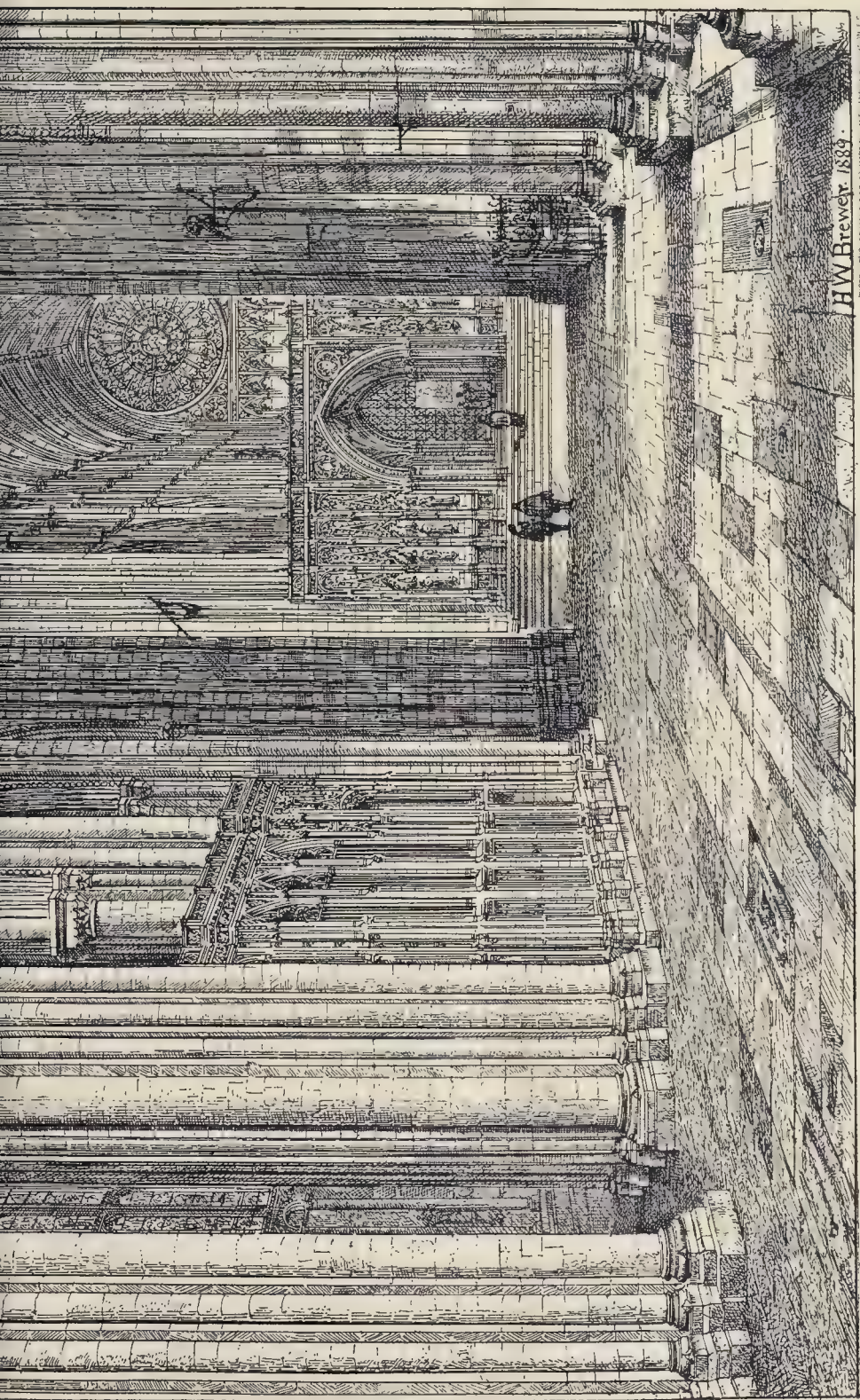




THE BUILDER, JULY 6, 1889.







"PAUL'S WALK." THE NAVE OF OLD ST. PAUL'S; A RESTORATION.







it had been a sovereign protector. But he wished to discuss the subject in a purely scientific spirit, and he would endeavour to do so without for one moment forgetting the enormous magnitude of the subject, of which he could not touch the fringe. He hoped that fifty years spent in the profession of architect would be sufficient justification for his undertaking so great a task, and as it was extremely unlikely, at his time of life, that he should be able to take part in another international congress, he would leave that effort as a legacy to his art,—a last service rendered to that art of which he was so proud.

Great progress had been made in Europe in the popularisation of higher studies. In France they called it secondary instruction, and it went by other names in other countries; but he extended the signification of the term, and when he spoke of advanced studies in architecture he meant much more than architectural composition. He meant the term to include the study of history and science under all its forms.

For the advancement of the scientific study of art, they had the gift of a noble man, Duc, an architect as well as an artist, painter, and sculptor, who devoted two-thirds of his *grand prix* of 100,000 francs to the encouragement of advanced study. He asked the Institut to undertake the administration of his gift, and, on accepting the task, it proceeded to found a prize competition which was, in its way, admirable, but which, probably, did not respond altogether to the aspirations of Duc, who had become a convert to St. Simonianism—a form of faith in which the doctrine of historic evolution was strongly developed. Commenced by the great Swedish naturalist, subscribed to by Cuvier, extended by Lamarck, and completed by Darwin in his theory of the survival of the fittest, the true science of evolution had rolled forward and rolled out until it embraced existence under all its forms. Architecture was, therefore, necessarily included in its embrace; indeed, he was of opinion that the very existence of architecture depended upon the comprehension of the principle.

Advanced study had for its object to give to architecture a unity which had always been wanting. The diagrams would show how the principle of evolution might be traced in architecture. Evolution was the result of unconscious progress. Unconscious progress, unlike designed progress (*progrès calculé*), was the result of the working out of natural laws. He had advised Duc that he would have done better to offer a prize for the study of the study. The Institut made a wise arrangement in the form in which the prize was offered, but it was not what Duc had anticipated, whose views were in fact more than a little Utopian. How could young people reason upon evolutive architecture before they had studied the application of the law of evolution to architecture? How could they give proof (by the prize test) of possessing knowledge which they could only have in consequence of knowing what they had never studied?

The main scope of the remainder of the lecture, which was most eloquently delivered throughout, but was too long for us to report in full here, was to draw attention to the universal character of the laws governing the development of form, and which were illustrated in the designs of nature as well as in architecture, and to recommend the comprehensive study of the architecture of the past along with the history of the civilisation of the past, as a basis of direction for the future. One of the diagrams which were exhibited went to show that historic analysis of this kind would lead to the conclusion that certain forms or combinations of forms, straight and curved lines, had predominated in certain epochs of architecture and of civilisation, and that we had yet to form an architecture dominated by the higher order of curves, instead of straight lines, circles, and their combinations. If this seemed at first rather a vague assumption, M. Daly could at least point to some very interesting and suggestive connections between line and sentiment embodied in words that were in constant use, though their original meaning was forgotten. What was "aversion," what "inclination," if not a picture of a line falling away from accession to the Empire, and his conversion to Christianity, the churches of the new religion had preserved the form of the Roman basilica, but afterwards, in the erection of the Church of St. Sophia, Justinian's idea was to give a new form and a more magnificent one in that structure, which he had intended to make the most

feeble curve the expression of fear or pain. In conclusion, M. Daly made an eloquent appeal to Paris and the provinces to constitute corps and societies for the encouragement of advanced studies in architecture. He desired to see in France, more than elsewhere, a disposition to take up such serious studies, but he also desired to see them prosecuted by all the great nations of Europe, by serious England, and by the great hemisphere of America. It was necessary to elevate our age, and the means to do so offered itself in the advanced study of scientific aesthetics (loud and prolonged applause).

The President (M. A. Normand) who at the moment occupied the chair in place of M. Charles Garnier, speaking for himself and his colleagues, thanked the lecturer with all his heart.

M. Daly having been requested to present his formal conclusions, the morning sitting concluded.

Thursday afternoon having been set apart for voting upon the resolutions of the Congress, there was a large attendance, and before the close of the proceedings a great deal of heat had been generated. Several members were called upon to speak for the last time on the question of a reform in the teaching of architecture, raised by M. de Baudot; among these being M. Émile Trélat, who, while sympathising with M. de Baudot's objects, could not accept his special views; M. Coquet, who espoused those views; M. Guillaume, who defended the existing system of instruction; and the Chairman, M. Charles Garnier, who earnestly sought to keep the peace between the rival factions. After a number of impetuous interruptions, particularly on the part of M. de Baudot, during which M. Charles Garnier, exhausted with his efforts to maintain order, again vacated the chair in favour of M. Normand, a resolution was proposed and carried by fifty-three votes to sixteen, to the following effect: Considering that the Congress is international, and cannot, therefore, with propriety decide a question purely French, it passes to the order of the day. This result was mainly brought about by the declaration of Baron H. de Geymüller, the Swiss delegate, that he would not vote upon the question, since he was a foreigner. The same reason was employed to shelve the decision with regard to the compulsory diploma and the other subjects discussed, except that of artistic copyright, which was admitted to be eminently international. But, in the case of these propositions, it was resolved to refer them to the next Congress, which will be a national one.

With regard to the question of artistic copyright, the majority came round to the views of M. Dognée, of Liège, who advocated the complete assimilation of the rights of architects in their work to the rights of authors, musicians, painters, sculptors, and other artists who have obtained the suppression of any reproduction of their work without their consent. It was resolved to submit this resolution to the representative of the Government at the closing sitting of the Congress at the Trocadéro Palace. The sitting was then adjourned, and the members of the Congress subsequently visited the new Lycée Molière at Passy.

The Congress resumed its sittings on Friday under the presidency of Mr. Spiers. The subject was "The Cupolas of the East and of the West." M. Gosset, the lecturer, enforced his observations by constant reference to drawings of the chief religious edifices whose construction was fitted to throw light on the point under discussion. He made a rapid sketch of the early history of the cupola, examining in detail what light modern discoveries had shed upon its introduction, and passed in review the structures of Thebes, Palestine, Syria, Greece, Turkey, Russia, China, and Asia to support his propositions. Layard, for example, found among the ruins of Nineveh a house surmounted by a hemispherical cupola, and, in later times, it had been ascertained that the Holy Sepulchre was covered with a roof of cupola form.

He dwelt particularly on the influence which Christianity had wielded in the development of the cupola. Up to the time of Constantine's accession to the Empire, and his conversion to Christianity, the churches of the new religion had preserved the form of the Roman basilica, but afterwards, in the erection of the Church of St. Sophia, Justinian's idea was to give a new form and a more magnificent one in that structure, which he had intended to make the most

vast and grandiose that had ever existed. One object of the selection of the cupola form was to permit of all the decoration possible throughout the whole of the interior surface of the church. Another element aimed at was to give pre-eminence to the height. Churches whose height was equal only to their length,—churches of the judicial order, such as were the preceding structures,—could not be found appropriate to Christianity. Christianity, in introducing a perfectly different idea of life from the philosophies which had gone before, required to express in its architecture a new idea. With the ancient philosophies the type of life was a voyage, through which one had to pass with as much dignity as possible, but beyond it there was no horizon. The Christian idea transformed it into a struggle here for perfection, and for the celestial recompense at last. Now, never was this predominant idea made more conspicuous or more characteristic than in the Latin churches, where the height was sometimes double the length. One characteristic of the cupola was that it presented a series of cupolas in perspective, but still making only one. It gave a prominent place for the figure, which struck the beholder from every part of the edifice,—that of a God pantocrator, often represented as in the act of blessing. Thus the cupola was characteristic of Christianity, as was evidenced in St. Peter's at Rome (which formed a monument in a monument) everywhere imitated in St. Paul's in London, where Christopher Wren had made the cupola conic in order to avoid too much extension at the base; and was being more and more appreciated in modern times, as in the case of a new structure at Berlin, and one which was about to be erected in Liverpool. There was again their own dome of the Invalides, which stirred the admiration of visitors from all parts of the world, but the preoccupation of Mansard when he designed it was rather to give satisfaction to the desire of the great King Louis XIV., giving an idea of height,—*gloria in excelsis*,—than to give any idea of religious unity. And, indeed, in many churches the cupola had become suggestive rather of the theatrical than of the ecclesiastical idea. The nineteenth century had produced a particularly grand specimen of the cupola in the Halle aux Biés; another in those of the Bibliothèque Nationale, which would last as long as Paris lasted; and another in the Church of St. Augustin. The Pope, Leo XIII., in a conversation he (M. Gosset) had with his Holiness, who, as they knew, took an intelligent interest in questions of architecture, expressed himself in favour of the cupola, as there was no form which enabled the faithful to gather round the altar in larger numbers. Finally, excusing himself for not having prepared his paper more in order, the lecturer, in addition to what he said as to the recommendation which a series of cupolas possessed of enabling the builder to stop at any stage desired, pointed out how much more economic was the cupola form in respect of the material necessary compared with what was required for the dome.

The President said there were a few points which it would be well that M. Gosset should add to his excellent paper before it was printed. He made a brief criticism on the paper generally, and expressed disagreement with the author of the paper as to the community of origin of the Pantheon and the Baths of Agrippa. The walls of the Pantheon had been several times examined, and never had there been found the slightest trace of means for the communication of heat or warming as in the latter structure. Again, the covering-in cupola form over the Holy Sepulchre was of comparatively recent date; at first it was not built over.

A vote of thanks was unanimously awarded to the lecturer.

In the afternoon a distribution of prizes took place under the presidency of the Minister of Public Instruction and Beaux-Arts.

On Saturday, the members again assembled at the École des Beaux-Arts, and, under the presidency of M. le Baron de Geymüller, Switzerland, took up the consideration of two papers which had been postponed at previous meetings. The first was that of M. Chénervier, who proceeded with his "Study on Fires in Theatres." He referred to the destruction of the Opera Comique, and to the prominence that disaster had given to the importance of providing all the means possible for securing the safety of the spectators of theatrical performances. For himself, even yet, he could never help having a feeling of insecurity and



danger whenever he happened to go to the theatre.

Treating the question very exhaustively, and drawing from the destruction of the theatres at Nice, Rouen, Oporto, and Exeter, the lessons they conveyed, he was generally of opinion that the security of the public was to be assured rather by the capacity given to the building of resistance to the fire, than by the multiplicity of the means of egress or *saute-voie*. The gist of his paper may be summed up in his concluding words, which, translated, were:—"I have pointed out with moderation the situation of affairs. I shall not insist more than is proper on the necessity of protecting these monuments against fire. I shall only add that if the security of the spectators may be considered at present as almost assured in the Paris theatres, there is still incumbent, and especially on the principal ones, the duty of protecting these edifices, as well as the works of art which might be destroyed through the piling up of masses of inflammable decorative drapery. It would be sufficient, indeed, for a fire otherwise of little importance to irremediably destroy their *chefs d'œuvre* of paintings, of sculpture, and even of architecture, which they all admired, and of which they had the task of taking care. I consider that the necessary protection would be afforded in general by securing the non-inflammability of the decorations; and I have the honour of submitting for the approbation of the Congress a proposed resolution, thus formulated:—

'Considering that the non-inflammability of the decorations and of the woodwork of the proscenium of a theatre is the first condition of the resistance of such an edifice against a fire, and that the security of the spectators is by this means assured, the International Congress of Architects, meeting in Paris in 1889, expresses the opinion that in future the decorations of the theatre, and the machinery connected with the scenery, should be made non-inflammable during the whole period of their employment.'

The resolution was adopted by acclamation.

M. Bauer had a paper on the same subject. He said that he participated in the opinion of M. Chenevier with regard to the feeling of insecurity he had in sitting out a piece at the theatre. All theatres were destined to be burned. But, while M. Chenevier laid special stress on preserving the building, he had occupied himself particularly with the question of the security of the public, and that of providing means whereby they would have time to escape on the outbreak of a fire. He illustrated, from a drawing of the Opera Comique, how the fire had broken out, and the course of its progress, and pointed out especially the part which the chandelier always played in attracting the air-currents. Now, in considering this point, the idea suggested itself to him whether it was not possible to profit by this fact, and he proposed to do so by establishing an air communication from the chandelier to a chimney to be constructed in theatres, and which in the case of fire would carry the flame and the smoke into this chimney, and thus keep the building free of both, and afford to the spectators time to escape by removing the danger of suffocation. The air-pipe would be worked by a button to turn it on in the chimney, and would be under the charge of a man who was to be absolutely secure himself from danger by having an external staircase reserved entirely to himself, the chimney being located near one of the side-walls of the theatre. He had explained his theory to the chief of the Fire Brigade and to several societies, and also before meetings of the general public, and those competent to judge had expressed concurrence with his views, and approved of the plan as likely to be successful.

In the discussion which followed, the theories of the author were combated on some points by MM. Chenevier and Bousard; but, on the motion of the President, who expressed himself favourable to the theories of M. Bauer, it was resolved to recommend the construction of an international theatre on the principles now laid down, so as to demonstrate their practicability.

The next subject discussed was that of the means in use among the ancients for the warming of baths. The author of the paper on this topic, but which principally regarded the heating of houses, was M. Bousard, who showed how the Romans warmed their houses by heating them from the basement, the temperature diminishing according to the elevation of the apartment. He had himself planned several

houses on this principle for clients of his, and the result had proved most satisfactory. A uniform temperature was secured, agreeable and wholesome beyond description. Compared with this plan of the ancient Romans, the houses of the moderns were constructed rather for the creation of draughts.

On the motion of the President, a hearty vote of thanks was awarded to the lecturer for his interesting paper.

The members then adjourned to meet at the Trocadero in the afternoon.

The members of the Conference assembled in full force, accompanied by several lady friends, in the Salle des Congrès, in the Trocadero. The chair was taken by M. A. N. Bailly, President of the Congress.

M. Lucas read his report of the work in which the Congress had been engaged. Among the subjects which had occupied their attention there were two of special importance,—the teaching of architecture in the École des Beaux-Arts, which could not be properly considered international, and in which the foreign members of the Congress could not freely take part; and the question of architectural copyright, which was eminently international. On the latter they were all in accord; and he asked the delegate from the Minister, in appealing to his high political situation, to support the resolution of the Congress on that point, although the terms of it were not yet in print. The resolution in question simply claimed for the architect the exclusive right of production in his work such as literary authors and others enjoyed, and the right to forbid any such reproduction without the written authorisation of the architect.

It was this resolution that he asked M. Tolain to support at head-quarters with the Minister of Public Instruction (applause). He (M. Tolain) had witnessed their exhibition, and had expressed the satisfaction it had afforded him; but in addition to the prizes which were offered, it was well to remember that once a year they sought out in all France all who in connexion with the building trade had distinguished themselves in any branch, and brought them to Paris to assist at their annual *fête* (applause). The Secretary also recommended to the support of the delegate their movement in favour of the formation of a professional syndicate.

M. Eugene M. Dognée, of Liège, Member of the Society of Antiquaries of France, then gave an address on the Etruscans. This was again a brilliant oratorical effort, a lively picture being presented of this ancient people, whose very name, said the learned lecturer, had perished. But they were a people of astonishing genius in architecture and art, and the authors of much of what the Romans had claimed as their own. It was they who invented the arch,—that form from which the cupola and the dome were developed. Some authorities to-day disputed this claim made on behalf of the Etruscans, and contended that none of the monuments attributed to the Etruscans contained evidence of the existence of the arch anterior to its use by the Romans. But he did not wish to enter into details on the point. The truth was that the Etruscans had founded three great political confederations prior to the growth of the Romans; and the Romans when they had conquered the Etruscans were careful to hide all traces of the artistic greatness of that people and of their own indebtedness to them. "Woe to the conquered" was the maxim of the Romans,—a maxim which they had carried out with respect to the Etruscans even to the concealment of their profound and astonishing advance in the arts. Nevertheless, as was evident from the Roman authors, whenever an edifice of surpassing importance was to be raised, whenever a monument of particular excellence was to be erected, it was to some captive Etruscan that the design was committed. And, to-day, in travelling through Tuscany, it was the same race that was still living and acting, and not only in many of the monuments that had been since built, but also in many of the works of our own day, it was the influence of the Etruscans that was yet visible, it was their genius that was still subsisting. It had been sometimes claimed for Christianity that it had elevated woman to the dignity which belonged to her, and made her the equal of man, a position which never before had been assigned to her. But it was, to his mind, established that the place of woman with the Etruscans,—the position of the mother,—was as

highly honoured as since the advent of Christianity. We found in the dwellings of these people that had been brought to light the portraits of the master and mistress of the house in the place of honour, just as in the houses of well-to-do families of to-day; and, more than that, the genealogy of the children was always established according to the name of the mother. The religious sentiment was also strong in this people; they were conspicuous not only for their piety to the dead, but also for the gifts which they placed in their tombs, and which were proof of their belief in a future life. He found in these underground mansions (and he had entered some forty of them) not only all sorts of objects supposed to be pleasing to the departed, but even the walls were filled with paintings of other things,—for which apparently there could not be found room in these chambers of the dead. The Etruscans synthesised their art, and their memorials,—some of them in close imitation of the Assyrians,—showed that they were a people much above the reproach of being exclusively utilitarian. From an artistic point of view, the predominant passion of the Etruscans was the display of their taste; their works of art were marked by a *finesse*, a delicacy, a grace and accuracy (and after all art was only the faithful imitation of nature linked with the ideal of the artist) that was astonishing. If "woe to the conquered" had on the one hand been the law of the Romans, another law also existed, and that was the law of "glory to the conquered," for a great people would prove and assert its greatness notwithstanding every effort to crush it, being possessed of a persistent vitality.

M. Tolain said he thought he could say, without promising too much, that he would lay their request before the Minister with great pleasure, and that, so far as depended on him personally, with the greatest desire that it might be accorded. But he wished to point out that, viewed from a legislative standpoint, it was to be considered how far the granting of their request was consistent with the public interests. This right of property in works of art, industry, commerce, and architecture was one of the most complex of the epoch. Now, as to the establishment of a syndicate. That reminded him that he had spent a considerable part of his life in the furthering of this principle. Such associations had often been opposed in the first case from a belief that they were combinations for the purpose of attack; but he was convinced that the society would conquer the right of constituting themselves into a syndicate. One point to which he ventured to call their attention was that of the necessity of improving the dwellings of the Paris workmen, so as to promote the sentiment of personal dignity,—of studying what was the most suitable sort of house or habitation that could be erected for him within the city, instead of sending him, when his work in his *atelier* was over, to a dwelling beyond the fortifications, where he could no longer be constantly under the influence of the works and ideas of art which exerted so powerful an impression on the imagination and the taste. This was, he thought, a point of capital importance, and he begged to recommend it to their most serious attention.

The Congress was then declared closed.

#### THE KINGSTON SEWAGE-WORKS.

THERE was a gala day on Saturday at the Kingston Sewage Works to celebrate the opening of the finished works. There was, before the close of the past year, an official ceremony in order that the much-respected Mayor, Mr. East, might receive during his term of office a well-earned and well-deserved recognition of the valuable services he has, during many years, devoted to the ancient borough, but the works then, although in partial working, were not complete. It was their thorough order, neatness, and success which gratified everyone present, and made Saturday a red-letter day, not only for the Native Guano Company, who were entertaining, but for everyone concerned. The selection of guests was very well advised. The Royal Engineers were represented by Sir Lintorn Simmons, G.C.B.; civil engineers by the veteran Thomas Hawkesley; and there were many members of the Local Government Board, the Corporation of London, the London County Council, the Surrey County Council, the Corporation of Kingston, the Surbiton Improvement Commissioners, the



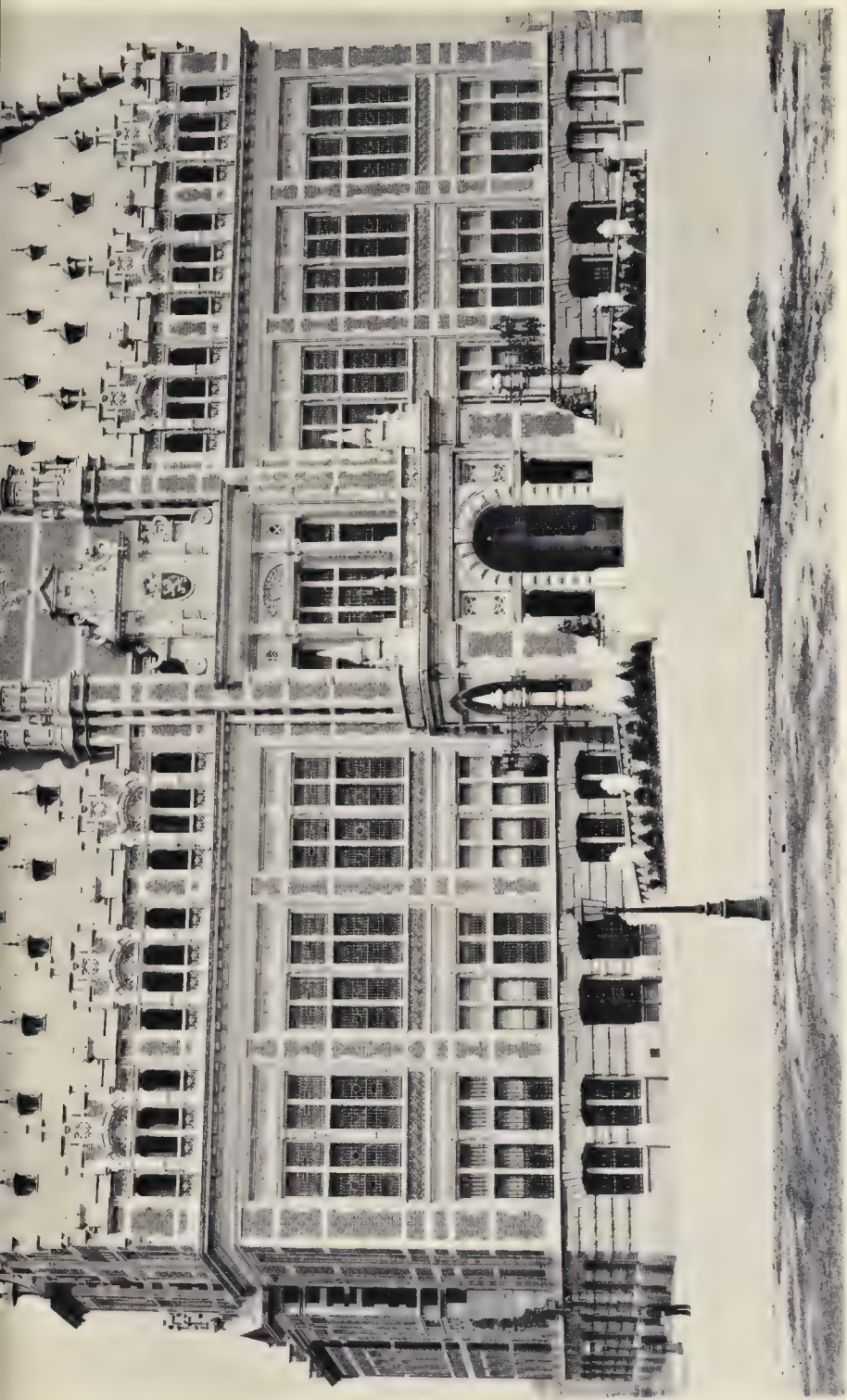




THE BUILDER. July 6. 1839







HOTEL COMMUNAL DE SCHAEERBEEK, BRUSSELS. M. VAN YSENDYCK, ARCHTIT.







Hampton Wick Local Board, the Guildford Corporation, and the Mayors and officials of many other important towns.

The works have been carried out very nearly upon the lines originally laid down; the few alterations being slight, but nevertheless important. In view of coming events, the Kingston Corporation some years ago acquired a valuable property extending along the river-side, near the outfall of their general system of drains, and containing in all about fifteen acres of land. The present works stand on the first portion of this land, the site being about two acres in extent. They consist of boiler and engine house and the factory of the Guano Company, all in one building. Adjoining this is a series of eight precipitating tanks, in which the purification of the effluent water is effected. The sewers of Kingston have for the most part been laid many years ago, but improved when and where opportunities permitted. Similarly, from time to time sections for the provision for storm-waters have been laid. Formerly the outflow of the polluted sewage was direct into the Thames by an egg-shaped sewer, 5 ft. in vertical diameter, with a gradient of only 1 in 2,000, and the mouth of which was almost submerged in the water. This sewage is now cut off at about 80 or 40 yards from the river-bank, and its contents turned at a right-angle into the penstock of the new works. A new broad road is being made by the Corporation over a considerable length of this sewer from the Thames to the railway-station. The Surbiton sewage is brought through Kingston in a closed iron pipe to a penstock adjoining the Kingston penstock. Iron gratings here stop all garbage, and the arrested matters are taken away and buried in the soil. From the penstocks the combined sewage flows on to the pumping-station. The Surbiton sewage, after passing through a meter, falls over into Kingston well, where the "B.C." mixture of clay, charcoal, and blood, is poured in. The mixture so treated is pumped by Gwynne's centrifugal pumps through a second meter, which registers the total quantity. The current of sewage thus treated flows on in an open channel to the settling-tanks, receiving at a few yards' distance from the meter a constant run of alum-water. As the treated sewage flows on, it can be by a system of gates be turned into any one or more of the precipitating-tanks.

We return, however, to the boiler and engine rooms, and to the other details of the guano factory. The boilers are three in number, of the multitubular type,—one of 80-h.p. and two of 40-h.p. each. The engine-room is most striking and novel, completely different from ordinary practice in sanitary engineering. Williams high-speed tandem engines being used for every purpose. Their smallness and neatness make a vivid impression. There are two driving engines of 40-h.p. each, one being commonly held in reserve. There are then three Gwynne's "Invincibles," each driven by a high-speed Williams engine of 15-h.p. coupled on to the spindle of the centrifugal pump. Each pump can raise 1,650 gallons 12 ft. high per minute. The three Surbiton pumps are of the same nature, and driven direct by similar engines, only they are smaller, and throw 750 gallons per minute. The settling-tanks, which receive the treated sewage, are each 85 ft. long by 50 ft. broad, and are divided by a central wall nearly three-quarters of the entire length, giving plenty of time and very slow motion to the fluid sewage. The water, after passing two of these tanks, runs off by a trumpet-mouthed standpipe, and, under ordinary circumstances, is clear and bright, without the slightest odour. These tanks are about 6 ft. deep, and their floors slope towards the front walls, along the inner side of which there is a long sump, from which the semi-fluid sludge is drawn off by the sludge-pump to a circular sludge-well. From this well the sludge is drawn as required into a set of four iron closed cylindrical accumulators by vacuum, and, as each is filled, an air-blast of 100 lb. pressure to the square inch blows the contents to an upper floor of the guano factory. The water is there pressed out of it by strong, specially-designed presses, and the dark, clay-like residuum is passed, broken up, down a hopper into a revolving drying cylinder below. The fumes given off in this drying are very offensive, and, if allowed to escape, would cause nuisance to the neighbourhood. They are treated, however, with great ingenuity and perfect effect. They are first driven by a fan into a chamber filled with brushwood, over which a continual water-spray is driven. They are next passed through

a second chamber, and are then driven through a pipe below the furnace, and are completely consumed in passing through the fire. The condensed water passes to a receiver, and is treated by the "A.B.C." chemicals, as with the original sewage. The dried residue is the native guano. It is pounded into powder by the machines, and put into bags, and sold for agricultural purposes. The pumps and machinery for these manure-works are well selected, and very efficient for their various purposes.

The works have been erected by Mr. W. Cunliffe, contractor, to the designs and specifications approved by the Borough Engineer, Major Macaulay, to whom credit is due for the boldness with which he has applied the most modern inventions in this direction.

The total cost of the sewage-works is about 25,000*l*. The number of inhabitants in Kingston at the last census was 26,156; in Surbiton, 38,068. The sewage of both these places is now being fully dealt with. Hampton Wick, containing 2,500 inhabitants, is preparing to send its sewage over the railway bridge by Shone's pneumatic ejectors, which will raise the total population contributing the sewage dealt with to over 64,000 when the works are in full demand. They can, however, by a slight outlay be made ample for a population of 100,000.

The Company, we believe, has hitherto had no opportunity of working its process except in connexion with the sewage of small places like Aylesbury and Wellington College. The work that it has done in these places has proved satisfactory, but, inasmuch as the question of bulk is often the determining factor in processes of this kind, the Kingston experiment possesses a special interest. The Corporation have agreed to pay the Guano Company at the rate of 3*d*. in the pound on the rateable value of the districts connected with the works; the Company, on the other hand, undertake to treat the sewage in such a way as to produce a clean and inoffensive effluent water, such as will satisfy the Thames Conservancy authorities. The Company have also, of course, to reduce the solids to a condition that will cause no nuisance in the neighbourhood of the works. So far as inspection on a showday, such as was possible on Saturday last, went, the Company may fairly be congratulated on their success; whether that success can be maintained amid all the varying climatic changes and the idiosyncrasies of that fickle fluid, sewage, time alone can prove. There are many who decry all methods of treating sewage chemically, and certainly many of the processes adopted have created as great a nuisance as the one they were intended to abate. Irrigation processes, which have converted smiling pastures into stinking swamps; and lime-processes, which have produced an alluringly clean-looking effluent, which is death to all fish who come within its range, and which in warm weather often becomes nearly as foul as the virgin sewage, are largely responsible for the suspicion with which patent methods of dealing with a great problem are regarded. Still it is obviously short-sighted policy to see no good in one process because another has proved a disastrous failure. The befouling of our water-courses and of our sea-coast by the sewage of adjacent towns and villages will sooner or later have to be stopped, and the great truth realised that it is better for a district to adopt an expensive good process of dealing with its excrementitious refuse rather than a cheap and inefficient one, such as is represented by the emptying of the stuff into the nearest water-course, or on to the nearest seashore. Co-operative action with many smaller towns and villages might reduce the expense considerably. Take, for instance, the towns of Thanet; from Birchington to Ramsgate there are some five watering-places of note, some of which are befouling the sea that brings them their prosperity, and other places are doing the same thing. The favourite coast walks in almost every direction lead past, or will shortly lead past, outfalls of crude sewage. A very little power of grasping a life-and-death problem would show the local authorities that one great scheme of collecting the sewage of the whole of Thanet in the marshes between Minster and Sandwich, there to treat it chemically and run the effluent water into the sea, would remove danger of nuisance, and, in the long run, prove the cheapest as well as the most scientific and natural system. We refer to this matter here, as it is a striking instance of the absolute necessity of co-operation of localities such as has been adopted by Kingston,

Surbiton, and Hampton Wick, in arranging for the joint treatment of their sewage by some tried process.

The sewage precipitates as it flows, and the effluent which runs off is undoubtedly "clear, bright, and odourless," and, as the well-known sanitary engineer, Mr. Baldwin Latham, after his inspection of the effluent produced at the Aylesbury Works by the same process, reported the presence of fish in the carriers, it is evident that the water is fit to pass into the river. The production of a practically pure effluent is, however, only one difficulty overcome. The solids or "sludge" have also to be disposed of. At the Kingston Works the stuff is dealt with in the way we have described, forming ultimately a granular black material, for which the Company state they can obtain as much as 3*l*. 10*s*. per ton.

This not being a chemical or an agricultural journal, it is not necessary here to enter into the question of manurial value, or as to whether farmers would long continue to pay 3*l*. 10*s*. per ton for stuff which must necessarily vary in composition, and which, consequently, cannot be sold by analysis. It is sufficient to point out that an inoffensive dry material and a clear effluent water can be produced from the sewage, without nuisance, in the heart of an important residential district. This seems to be done at a reasonable cost, and even if the so-called "Native Guano" had to be sold at 2*s*. or 3*s*. per ton, or even to be given away, the process would still merit the careful consideration of sanitary reformers. Let the rather hocus-pocus name of "A. B. C." be dropped, and undoubtedly a good deal of prejudice, which, consciously or unconsciously, was created by an unfortunate cognomen, will also disappear. Years of practical working are yet required to prove the wide applicability of the process, but the promise of success is, indeed, a fair one.

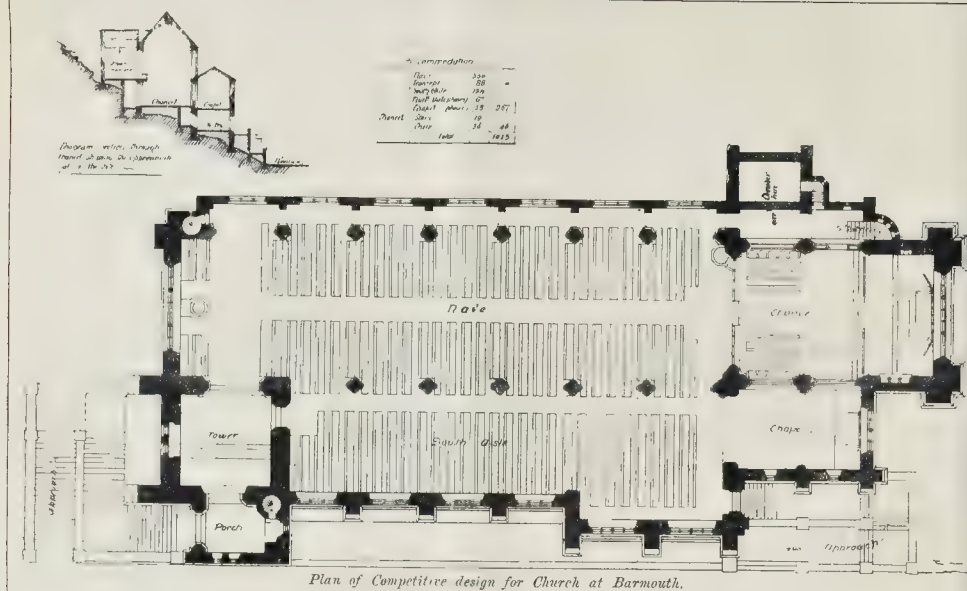
#### ARCHITECTURAL ASSOCIATION VACATION VISITS.

ON Saturday last the members of the Association visited the Halls of the following City Companies:—Merchant Taylors, Drapers, Brewers, and Skinners. Although they mustered at Brewers' Hall, in Adde-street, the first visit was to the hall of the Merchant Taylors, where they were received by Mr. Hilton Nash, who read an interesting paper on "Merchant Taylors' Hall." This we are obliged to defer until next week.

Mr. Nash afterwards conducted the members over the buildings, where the various treasures in the Company's possession were inspected, terminating with a visit to the strong-room where the plate is kept,—the golden snuff-box, the silver cloth-yard, and the mace, to which Mr. Nash referred, being especially noticed.

After leaving Threadneedle-street, the party proceeded to Throgmorton-street, and soon found themselves in the cortile of the Drapers' Hall. This is quite a modern building, being finished in 1881, though it stands on the site of the earlier Hall. The staircase leads from the lobby (divided only from Throgmorton-street and its busy stockbrokers by a pair of large glazed doors) to the first-floor, on which all the principal rooms are placed, surrounding the quadrangle noticed on entering. Passing through the drawing-room, with its Gobelins tapestry, the "Court" dining-room was reached, overlooking the gardens, of which but a small portion remains to suggest the original prospect from the windows before the blocks of warehouses and offices (still bearing the name of Drapers' Gardens) had sprung into existence. The original Hall was almost entirely destroyed by the Great Fire, being the most northern limit reached by the conflagration. The Company's plate was, however, saved, being hidden in a sewer in the garden. The Hall was rebuilt by Jarman, and again suffered severely from a fire in 1774. The present building was completed in 1881 from the designs of Mr. Herbert Williams. Marble, in columns, inlays, &c., is largely used in the decoration, the marble columns surrounding the Hall being monoliths of large size. Stained-glass and heraldic devices assist in the colour decoration, and the panels on one side of the Hall are filled with the portraits of royal personages. The arms and motto of the Company are noticed in all parts of the building, and are emblazoned thus:—*Arms*, three clouds radiated proper, each adorned with a triple crown *or*,





Supporters, two lions or, pelleted. Crest, on a mount vert, a ram couchant or, armed sable. Motto, "Unto God only be Honour and Glory." The Company boasts of possessing seven original charters, each with the great seal, in good preservation, attached.

On leaving Drapers' Hall the party proceeded to Adde-street, in which is situated one of the most picturesque of the existing Halls. It belongs to the Brewers' Company. Passing through a rich English Renaissance gateway, which abuts on the street, the small courtyard is reached. The Hall extends along one side, and the principal floor is reached by an external staircase across the end of the courtyard. The ground-floor has an arcade with Roman Doric columns and three-centred arches; the windows and doorways are square-headed, and reach only to the level of the astragal of the columns, horizontal mouldings with bold volutes forming a head to the openings, while the space above is filled with carving. Ascending the staircase at the end of the courtyard, the Hall is entered through the "screens," which are a rich piece of work dated 1673. Corinthian columns, flanking a circular-headed doorway, and supporting a richly-carved entablature with a curved and broken pediment, form the central feature, while above, in bold relief, are the arms and crest of the Company. The end of the Hall behind the dais has also rich carved woodwork. The Court-room is a small chamber, but very picturesque, with a very ornate fireplace, over which is an oval panel, which sets forth that—

THE  
RIGHT WORTHY<sup>ST</sup> SAMUEL  
STARLING KNIGHT AND  
ALDERMAN OF LONDON AND  
WORTHY MEMBER OF THE  
BREWERS COMPANY DID WAINECOTT  
THIS PARLOUR IN THE YEAR  
1670 THE SAID SAMUEL  
STARLING BEING THEN  
LORD MAYOR OF THE CITY  
OF LONDON.

A visit was next made to the Skinners' Hall, belonging to the Company to whom Mr. Nash referred in his paper as having contested the right of precedence with the Merchant Taylors. The name of Budge-row, opposite Dowgate-hill, in which the Hall is situated, takes its name from the dressed lambskin called "budge," which was hung out in the row for sale by the early members of this ancient guild. One of the old chroniclers of the Company claims for it the honour of having enrolled "six kings, five queens, one prince, nine dukes, two earls, and a baron."

## Illustrations.

### NEW "HOTEL COMMUNAL," SCHAERBEEK, BRUSSELS.

THIS is the new Town Hall in course of construction for an important suburb of Brussels, and which is given here as an example of contemporary Belgian architecture in this type of building.

Although some of the detail will hardly recommend itself to English eyes, there is a fine breadth of effect about the façade, with its large ranges of mullioned windows. A certain degree of sober polychromatic effect is obtained on the exterior by the employment of stone of different tints.

The porch gives access to a large vestibule, from which a flight of steps leads to the *salle des pas perdus*, which is lighted with stained windows representing the arms of various corporations. The State staircase also leads from the vestibule to the first-floor. The Council Chamber and the *Salle des Mariages* are to be richly decorated with tapestries as well as with stained-glass windows.

A vote of 1,200,000 francs was passed by the authorities for the building, but the architect, M. van Ysendyck, claims to have succeeded in producing a building such as the authorities wished for, at a cost of 70,000 francs less than the estimate.

### "PAUL'S WALK": A RESTORATION.

The nave of Old St. Paul's, profanely spoken of in Elizabethan days as "Paul's Walk," was a splendid example of the later developments of the Romanesque style,—one of those, in fact, which almost call forth a regret that our Medieval ancestors did not rest a little longer before passing on from the Round Arched style to the Early Pointed.

Judging from Hollar's views and the measurements given by Dugdale, its proportions must have been very noble and its effect singularly striking. Its dimensions were, according to Hollar's plan, 300 ft. in length from the lantern-tower to the west front, 105 ft. in width outside the walls, 50 ft. from centre to centre of the nave piers, 36 ft. in the clear.\* Dugdale gives the height of 102 ft. to the crown of the vaulting.

The pier arches were more lofty than is usual in Norman work, and the triforium consisted of a single arch in every bay, like that of Norwich Cathedral. The clearstory and vaulting were Early English, the clearstory windows having sharply-pointed heads, composed of such small segments of the circle as to appear nearly

\* These dimensions are taken off the ground-plan, and differ from those given in Dugdale's text.

straight-sided. Hollar's view of the exterior of the nave (before Inigo Jones's alterations) shows them absolutely angle-headed, but in the interior views they are more correctly drawn.

The original aisle windows had been replaced by large six-light Perpendicular ones, but the Norman circular windows which lighted the triforium remained down to the period of Inigo Jones's "restoration," when they were surrounded by Classical mouldings, &c. The great lantern-tower was Early English, and open to the church.

The rood-screen beneath it was a fine work probably of the Early Perpendicular period, not unlike that of Canterbury Cathedral.

There were not many monuments in the nave of Old St. Paul's, and the absence of such memorials, in this part of the church, is a peculiarity which will also be remarked in Westminster; in the latter church, however, the deficiency has been more than amply supplied in later times. The only monuments of importance in the nave of Old St. Paul's were those of John Beauchamp, one of the first knights of the Order of the Garter, whose effigy was represented in full armour upon a fine altar tomb. The other was the beautiful chantry chapel of Thomas Kemp, Bishop of London who died in 1489. After the Reformation, at the time of Charles I., the nave of St. Paul's was terribly desecrated; it was, in fact, used as a kind of market, and even previous to the Reformation there would appear to have been cases of persons buying and selling in this part of the church, as Nicholas Braybrooke, Bishop of London, who died in 1440, issued a pastoral letter threatening with excommunication all those who should so desecrate the church. During the Commonwealth, "Paul's Walk," as it was called, was used as a cavalry stables, and for any other purpose which the Government of the time required. Under Charles II. it would appear to have been a kind of market for books, pamphlets, quack medicines, &c., down to the time of the Plague, when it was used as a "pest-house." At the time of the Great Fire it was full of scaffolding.

Our view, which is founded on Hollar's drawings, represents it as it existed about the year 1641.

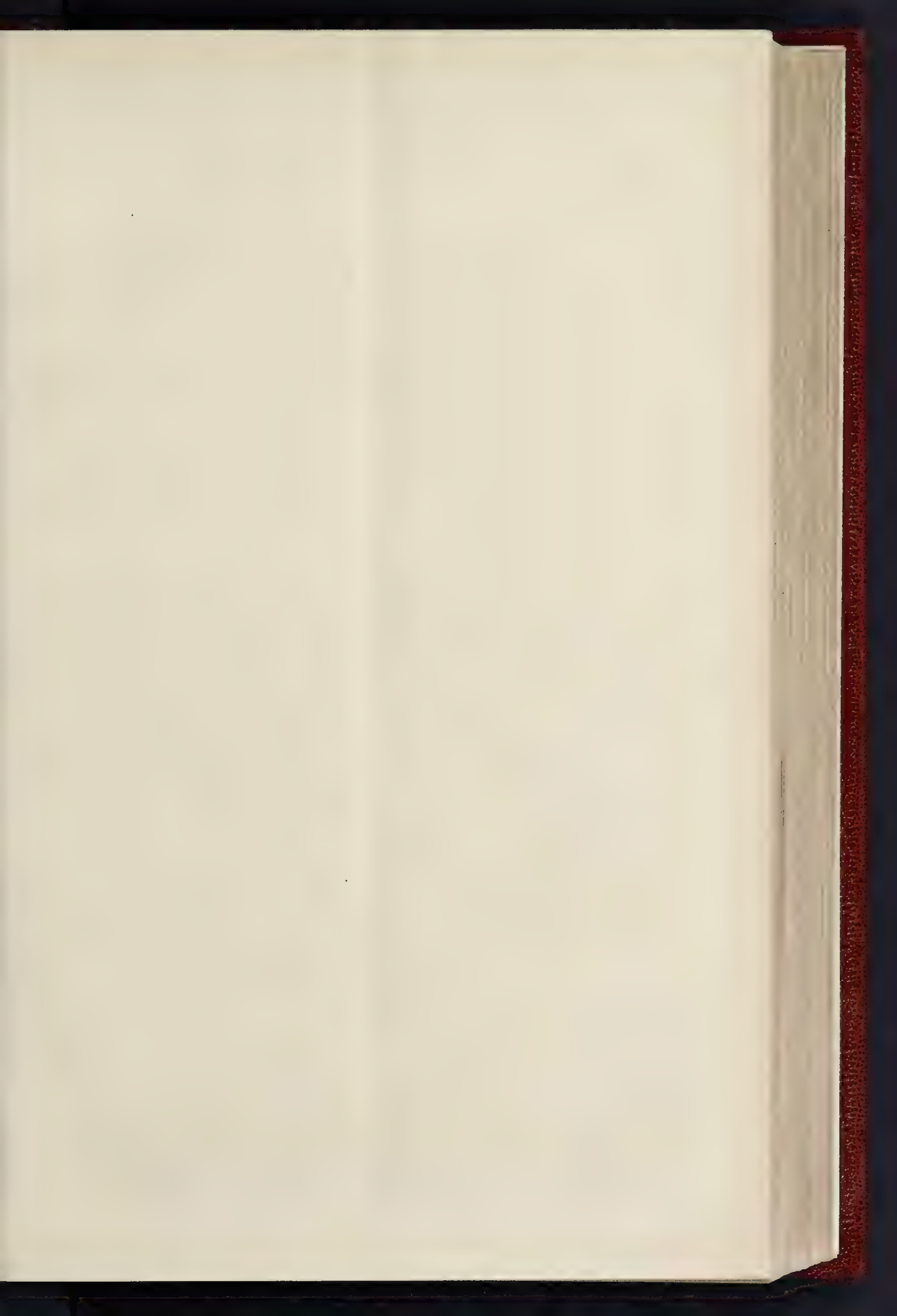
H. W. B.

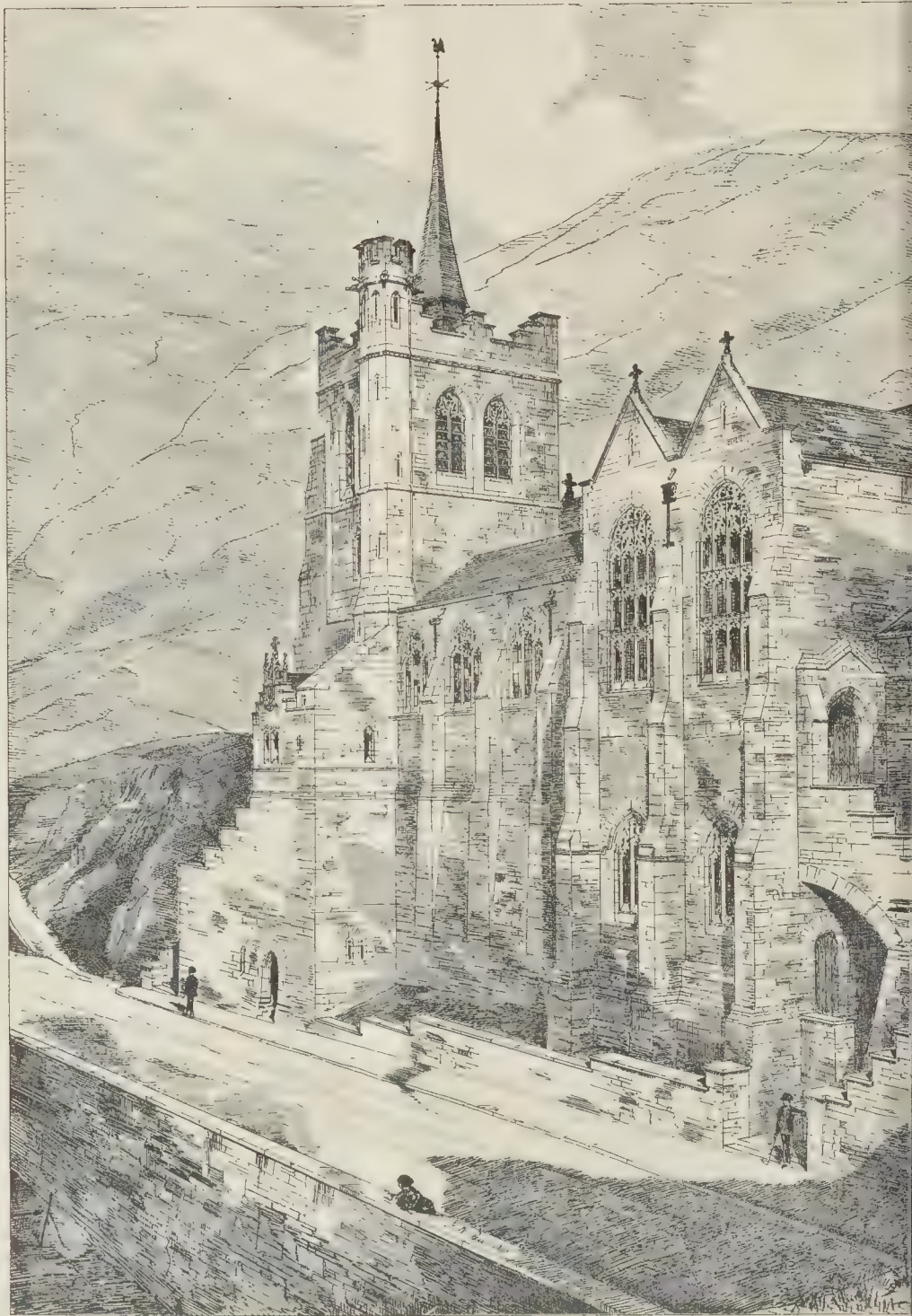
### PROPOSED NEW CHURCH, BARMOUTH COMPETITION DESIGN.

THIS church was designed to stand upon the mountain side, above the town, facing the sea. The site was a very fine one, but was rendered somewhat difficult to treat owing to the steep parts, almost precipitous nature of the rocks.

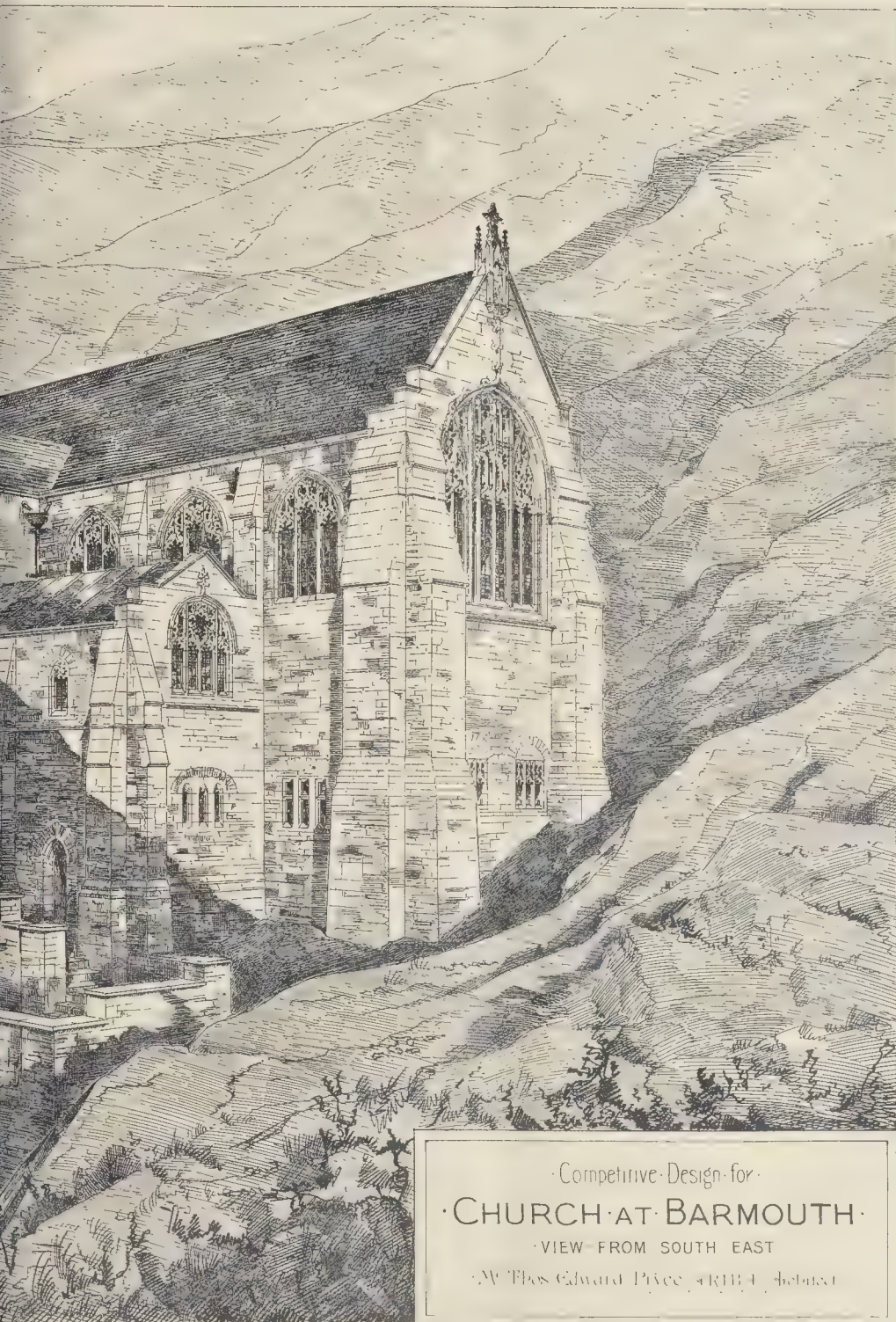
Breadth of plan was avoided, as it would have involved an amount of quarrying greater







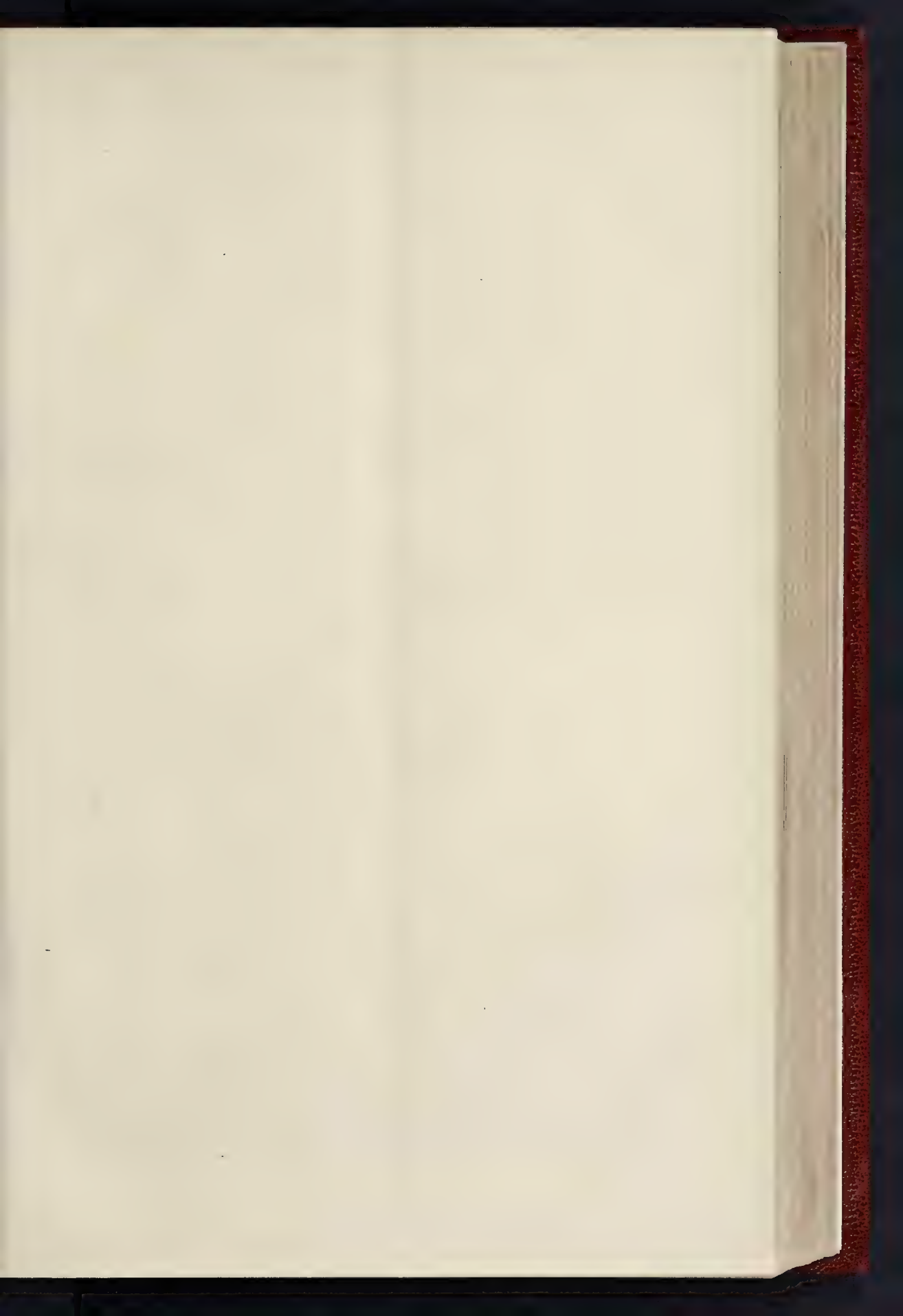




Competitive Design for  
·CHURCH AT BARMOUTH·  
·VIEW FROM SOUTH EAST·  
By E. Edward Price, Architect, Belfast









WOLLATON HALL.—FROM A . . .











*Grotesques, Wollaton Hall.—Drawn by Mr. Percy K. Allen.*

pointed out in speaking of Surrey, it is in such neighbourhoods, rather than in agricultural districts, that the humbler architecture is of value.

The mills of the district have never been concentrated in one town, but are scattered over a wide area along the streams in the romantic valleys. Surely this neighbourhood is the paradise of the mill-hand! Here, instead of the back court of a smoky town, he lives on the hill-tops in one of the most beautiful parts of England, in perhaps the finest air to be found in the island, close to, but out of sight of, his work-place, and generally with ample garden and allotment.

Out of consideration to those who already make this part a holiday-resort, I am loth to say too much in its favour, but in my experience there are few parts of inland England to equal it—whether in respect of such places as the magnificent plateau of Amberley Common, with its thousand acres of splendid turf; of wooded valleys such as Todgmoor, below Bussage; of delightful old towns running down the hills into the valleys, such as Nails-worth; or of such magnificent and extended views over the valley of the Severn as can be obtained from Rodborough from Hetty Pegler's tump, from the old limekilns above Stroud, or from Painswick Beacon.

The buildings surviving are nearly all of similar date to those of Surrey; that is, from the end of the fifteenth to that of the seventeenth century. The excellence of Painswick stone is well known, and a similar quality is to be obtained in various places, such as Chalford; rough stone for walling may be quarried anywhere on the hills.

Certainly one misses here the rich colour given by bricks and tiles, and some of the picturesque-ness of form so easily achieved in timber-building, but in return one has a sobriety and propriety of design and good proportion, and a certain "monumental" appearance that has its compensations. Whereas, in the timber country, it is rather an exception to find an original window; here they exist nearly as perfect as the day they were put up. The walls being of rough stone are commonly covered with rough-cast, and this involves somewhat of monotony of colour, as there are no red roofs to contrast with it. This might be partly obviated were more attention paid to the cultivation of the many varieties of gorgeous creepers.

Of the roofing materials and peculiarities of form, and of other features, such as the labels and drip-stones, I shall speak in later papers, as well as of the so-called Flemish cottages.

Of the buildings shown this week, Egypt Millhouse is perhaps the most complete example of its sort in the neighbourhood; the view shows the outside angle of an L-shaped house. At the time this was built, the master-clothiers were rich and important people, whose fortunes have been the foundation of many noble houses. The sketch above is of a little bit in the street; the manner in which the point is formed to the gable should be noticed; I gave a similar example from Surrey. There are some other

view of the hall by the same architect, and also two more illustrations of the clever and curious grotesque heads which abound in the building.

#### OLD COTTAGES, &c., ABOUT THE GOLDEN VALLEY, GLOUCESTERSHIRE.

LAST year I illustrated, in these pages, the cottages and other simple buildings of south-west Surrey. These were good and typical examples of buildings in timber and weather-tile. I now commence a series illustrating similar stone buildings. These are taken from the neighbourhood of Stroud, in Gloucestershire, from the Cotswold Hills and the Golden Valley. In this district, among others, Edward III. settled a number of Flemish weavers, and on inquiry, some years afterwards, it was found that Stroud had prospered beyond all other settlements. Ever since, this part has been an important manufacturing centre; and, as I

than was necessary to supply the stone for the walling.

The plan shows, in accordance with the committee's requirements, seats for 967 people, a choir of thirty-six, and ten stalls. Choir and clergy vestries are placed in the space formed by the fall of the site, beneath a part of the chancel and the chapel, and a parish room beneath the transept.

The materials available are the grey-green stone of the site, the slaty rock of the neighbourhood, and freestone dressings.

THOS. EDWARD PRYCE.

#### WOLLATON HALL.

WE have in a previous number published Mr. Percy K. Allen's complete set of measured drawings of this celebrated mansion (see *Builder* of April 13, 1889). To these we have now the pleasure of adding a reproduction of a perspective



"bits" in Nailsworth that I may return to Rooksmoor is a sort of annex to a much larger house of the same style; this latter is very good, but too extended to get on paper. In the example shown, the tall windows have evidently been substituted for others older and smaller. Southfield is an example of a wing of the latest date, at which mullioned windows were used, added to an earlier part. On the gateposts are vases of beautiful design and workmanship, such as is commonly found in Classic work in this part of England.

Stanfield is a group of early and particularly unaltered work that I shall return to; the Bear Inn, the Greyhound, and Burleigh, are examples of a very useful form of double-gabled front, that has numerous slight variations. The Market Hall was built by a lord of the manor in 1698, but the market refused to come; the stone-pillars support oak beams, and there are turned oak columns inside.

RALPH NEVILL.

#### EXAMINATION FOR CARPENTERS.

THE second Examination held by the Worshipful Company of Carpenters took place on the 24th, 25th, 26th, and 27th of last month. On the first two evenings the candidates were engaged on the written work from questions prepared by Professor T. Roger Smith, F.R.I.B.A., and Mr. Banister Fletcher, J.P., F.R.I.B.A.; and on the 26th the candidates attended at the workshops belonging to the Company, at their Institute at Stratford, to be examined in practical work and setting-out. On the 27th the Board of Examiners met at Carpenters' Hall, amongst whom were Mr. Arthur Cates, Vice-President of the Royal Institute of British Architects; the President of the Institution of Civil Engineers (Sir G. B. Bruce); the President (Mr. L. A. Stokes) and ex-President (Mr. H. D. Appleton) of the Architectural Association; the President (Mr. F. May) of the Institute of Builders; the President (Mr. L. Dillon) of the Clerks of Works' Association; and Sir Philip Magnus, representing the City and Guilds' Technical Institute.

After going through the written work, and receiving the report drawn up by Mr. Dashwood, the Secretary of the Clerks of Works' Association, who acted as Moderator at Stratford, the candidates were orally examined on the work they had done, and as to their general knowledge.

The work done both at the Hall and at Stratford was of a very high character, and the judges showed their approval by awarding gold, silver, and bronze medals. It is a sign of the value that the candidates attach to the certificate that all the candidates who last year only obtained a second-class certificate again competed this year. The following are the successful candidates:—

*First-class Certificates*.—C. W. D. Boxall (Gold Medal), H. Kent (Silver Medal), A. Whillier (Bronze Medal), S. Evans, A. D. Johnson, J. D. McNaire, G. W. Chilvers, A. G. Morrice, and C. T. Aston.

*Second-class Certificates*.—W. Benn, J. Hunt.

#### THE LONDON COUNTY COUNCIL.

THE ordinary weekly meeting of the London County Council was held on Tuesday last in the Council Chamber, Guildhall.

*The Architect's Department: Proposed Appointment of a Valuer.*—The Standing Committee reported that they were proceeding with their investigation into the staffs of the various departments, and that they had now to make a report as the result of certain preliminary suggestions made by the Sub-Committee which has been inquiring into the Architect's department. It was necessary that these suggestions, which relate to the appointment and duties of a valuer, should be considered and dealt with before the Sub-Committee could usefully proceed further with their investigation, because the arrangement of the department in other respects would depend partly on what the Council might determine with respect to the Valuer. It was mentioned that since July last there had been no valuer undertaken by the Architect and his assistants. The Committee were of opinion that whilst the omission to fill the vacancies in those offices effected a saving of money, it adversely affected the efficiency of the Architect's department. They thought it desirable, therefore, that the vacancy in the office of Valuer should be filled up as soon as may be, and that the Valuer's office (hitherto included in the Improvements, Compensation, and Estates Branch of the Architect's Department) should be reconstituted as a separate de-

partment. The head of this department should be the Valuer, whose duties should be (1) To survey for purposes of valuation lands or buildings to be purchased for improvements, and advise as to value. (2) To confer with the Architect as to the reserve price for letting of surplus lands by auction. (3) To prepare estimates as to value of land or property to be taken for improvements to be presented to the Council, and to support the same before the Parliamentary Committee. (4) To advise as to claims for compensation sent in by owners of property or others, and to report upon the same in the manner prescribed by the Council. (5) To confer with the Architect, and advise as to the plotting of surplus lands. (6) To advise as to local improvements carried out by the local authorities, and towards the cost of which the Council will contribute. (7) To advise when a local authority desires to raise a loan to carry out a local improvement. (8) To examine into the mode in which the Valuation (Metropolis) Act is carried out by the Assessment Committee. (9) To report monthly to the Council at the first meeting in each month. The Committee were of opinion that the Valuer should, when he was required to make a valuation for purposes of compensation, or for other purposes, report in the following form:—

#### Description of Property Proposed to be Acquired.

No.	and	in	street.
Character of tenure.			
How occupied (Business, if any).			
Name of owner.			
How long he has been owner.			
How he acquired it.			
What he paid for it (or price paid for it last time it changed hands).			
Amount at which it is rated.			
Estimated value (based upon years purchase).			

#### Remarks.

Under this head the Valuer should state (when possible):—

- (1) The value of adjoining property and how rated.
- (2) Any special feature which may have influenced his valuation.
- (3) If the owner has ever before received compensation for property taken for public services, and if so, under what circumstances.

The Committee believed that by the adoption of this system the following results would be obtained:—

(1) The grounds upon which the valuations are made would, in all cases, be so plainly and fully set forth that the Committee or official to whom they were submitted could easily check them and, if necessary, question the Valuer in respect to them.

(2) The speculation in lands likely to be required for public purposes might be more easily traced and prevented.

(3) The practice of under-rating properties for local taxation purposes would be discouraged.

To enable the Council to better protect itself against those property-owners who undervalued their property when the question was one of rating, and over-valued it when the question was one of compensation from public authorities, the Committee ventured to suggest that declarations in connexion with the quinquennial valuations should be revised, amplified, and made open to the Council. The Committee, before agreeing to the foregoing suggestions, made it their duty to consult the various Committees concerned with the valuation of property upon the merits of the suggestions. Those Committees were:—The Improvements Committee, the Bridge Committee, the Local Government and Taxation Committee, and the Corporate Property, Charles, &c., Committee. All were agreed on the expediency of the Council appointing a Valuer as an officer independent of any other department. The Corporate Property, &c., Committee, in a report presented to the Council on May 14, suggested that the Valuer should also act as auctioneer for the Council. The Committee, however, had grave doubts as to the expediency of requiring the Valuer to act as auctioneer, and they were not prepared to recommend that course to the Council. Upon the question of the salary to be assigned to the Valuer, the Committee, after careful consideration, were of opinion that 1,000*l.* a year would be a proper amount. They accordingly recommended:

"That the Council do appoint a Valuer, who shall be independent of any other department, and whose salary shall be 1,000*l.* a year; that his duties be those above set forth, with any others that may hereafter be prescribed by the Council; that he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office, and be not allowed to take any private practice; and that he be appointed to the office in respect subject to the conditions already laid down by the Council with regard to all appointments made in its name."

That advertisements be issued inviting applications for the appointment, and that the applications, when received, do stand referred to the Standing Committee, with instructions to select (after conference, if necessary, with other Committees concerned) and report to the Council, the person or persons whom it considers the most suitable for the appointment."

This recommendation led to a long discussion, in the course of which the expediency of combining the offices of Valuer and Auctioneer was freely discussed. Councillor Johnson was opposed to the appointment of a permanent official as Valuer, and said he thought that the Council would be best served by going to professional men outside. Councillor Westcott was of the same opinion, and, moreover, said he did not think the salary proposed to be offered was at all adequate to the

duties of so responsible an office, which called for the highest professional ability combined with the most undoubted integrity. The discussion was continued by Councillors Marks, Clarke, Charles Harrison, Wren, Torr, Thornton, Edis, Beachcroft, Beal, and Eccleston Gibb, and by the Vice-Chairman (Sir John Lubbock) and Alderman Sir Thomas Farrer. Councillor Edis, as one with some knowledge of the subject, urged the Council to pause before passing the recommendation of the Committee. He was prepared to say that probably nine-tenths of the valuers were specialists; and it was, he thought, almost certain that no man whom the Council was likely to get for a salary of 1,000*l.* a year would understand and be master of the whole of the special classes of property with which the Valuer to the Council would have to deal. It would really be far cheaper, because much more reliable, to call in the services of outside valuers from time to time. The recommendation was ultimately referred back to the Committee for reconsideration.

*The Blackwall Tunnels Scheme.*—The Bridges Committee reported that, in accordance with the resolution of the Council of April 16 last, the Committee nominated Mr. J. Wolfe Barry as the engineer to advise the Council upon the scheme for the construction of the proposed tunnels under the Thames at Blackwall. The fee to be paid to Mr. Barry for the reference to be 500 guineas. This was agreed to.

*The Housing of the Working Classes.*—Alderman Lord Hobhouse, the Chairman of the Corporate Property, Charles, and Endowments Committee presented the following report:—

"Your Committee have to report that the land comprising the Hagen (Deptford) area, which is six or seven acres in extent, was acquired by the Metropolitan Board of Works under the Artisans' Dwellings Acts and under a Provisional Order confirmed in July, 1885. It was cleared of houses in January, 1888. Delay has occurred in the further operations owing to the circumstances that the first plans were made for two storey houses, which then were found to leave an insufficient amount of space and ventilation. The number of persons to be housed is 1,786.

(b) Sub-Committees of this Committee and of the Housing of the Working Classes Committee have repeatedly met to consider the best arrangements, and they are unanimous in their recommendations, which we proceed to state, though they are difficult to understand without looking at a plan, which has been prepared by the Architect, and which will be present in Council for reference, if desired.

(c) The proposed arrangements are—First, to build some of the houses to three stories in height, the maximum allowed by the order. Secondly, to form a passage 17 ft. wide from Benbow-street (a street dividing two of the rows of houses) to a piece of ground coloured green on the plan, and about fifty-eight perches in extent. Thirdly, to keep the green plot as a recreation-ground for children, and to connect it by an opening with a contiguous recreation-ground formed from a disused burial-ground. Fourthly, to retain in hand the plot marked B on the plan (about 10½ perches) to await the contingency of improvements in the immediate vicinity. Fifthly, to sell the three other plots coloured blue on the plan, measuring respectively about 69, 7, and 2½ perches.

It is also proposed that the Council shall itself build the required houses. The Council can do this with the consent of the Home Secretary. The Architect has roughly estimated that the cost will not at the utmost exceed 40,000*l.* If the Council determine to build, the law requires that the property shall be sold within ten years after completion. Your Committee recommend to the Council:—

"1. That the arrangements stated in paragraph (c) of the report be adopted.

"2. That the Council apply to the Home Secretary for his sanction to build the proposed houses."

This report was also discussed at very considerable length, Councillor Rotton warmly opposing the suggestion that the Council should itself become the builders and owners of artisans' dwellings. On the other hand, Councillor Ennes Smith strongly supported the recommendation of the Committee, urging that power to build such dwellings was conferred upon the late Metropolitan Board of Works, though it remained unexercised. It was, he contended, at least desirable that the Council should make an experiment in the direction indicated. Councillor A. Hoare deputed Thornton (who said that the people did not want "barrack buildings"), Osborne, Charles Harrison (who pointed out that by the Holborn Valley Improvement Act the Corporation of London was invested with power to do, and had done, just what the report recommended the Council to do), Burns, Lowler, and others, the Vice-Chairman (Sir John Lubbock) after an amend-







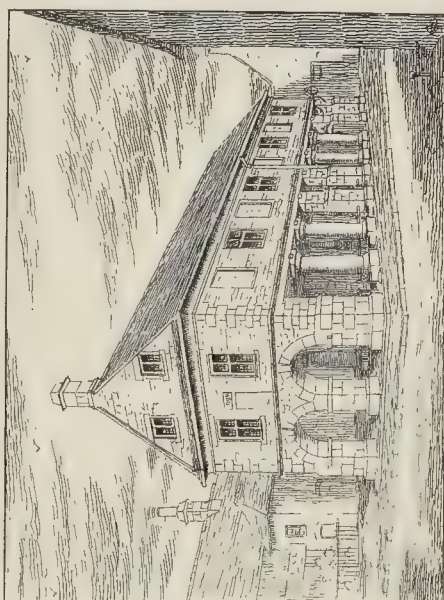
BARNET CH. FARM



IN MINCHINHAMPTON



BEAR INN, RODEBOROUGH



MARKET HALL, W. MINCHINHAMPTON

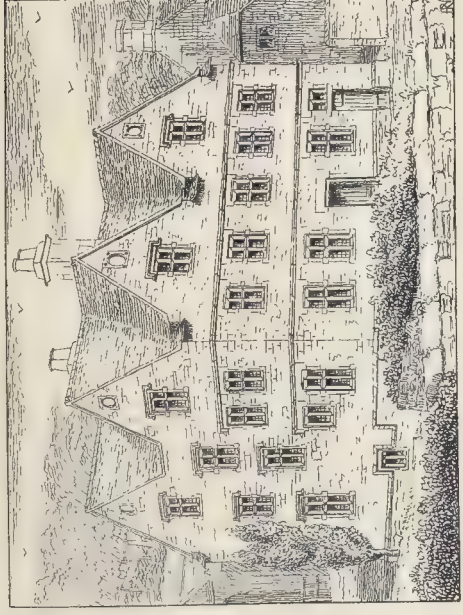




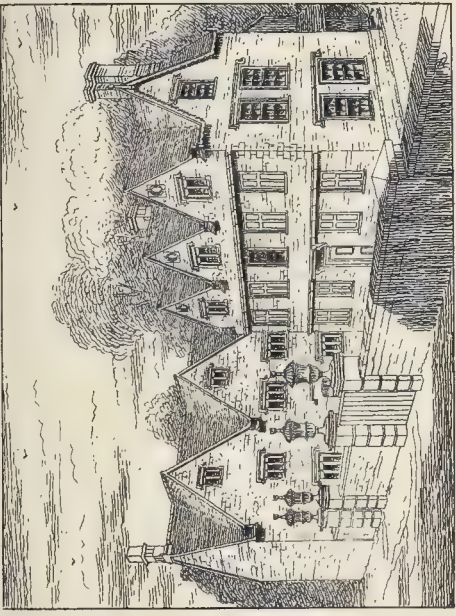
ROOKSMOOR



STANFIELDS, ROTHERBOROUGH



EGYPT MILL HOUSE, NAILSWORTH.



SOUTHFIELD, WOODCHESTER.

PHOTO LITHO BY J. & F. W. B. & CO. 22, WEST HENDON, LONDON, E.C.

SKETCHES ABOUT THE GOLDEN VALLEY, GLOSTERSHIRE.—By MR. RALPH NEVILL, F.S.A.





ment to refer the matter back had been negative, moved the following further amendment, viz. :—

"That before spending the money of the ratepayers in building at Hughes's-fields, the Committee on the Housing of the Working Classes be instructed to inquire whether, and on what terms, the existing societies constituted for the purpose of supplying buildings for the working classes would be willing to rent the land for that purpose." Sir John Lubbock argued that it would be a mistake for the Council to attempt to compete with private enterprise in the matter, as the various companies and associations who had already done so much would be discouraged. Alderman Sir Thomas Farrer seconded this amendment, though stating that he thought he was undergoing the process of conversion to the view that the Council ought to build. This amendment was lost on a division by thirty-eight votes against it to twenty-one votes for it, and after some further discussion the Committee's recommendation was agreed to by a large majority.

The Council shortly afterwards adjourned, after sitting nearly five hours.

#### THE BROMLEY SCHOOL-BOARD COMPETITION.

IN regard to this competition, our readers will remember that a fortnight ago\* we published the letter from the Royal Institute of British Architects to the School-board, recommending that, under the circumstances, a new competition should be initiated.

At the meeting of the Board, on the 24th ult., The Chairman (Mr. T. Davis) read a letter from Mr. Waterhouse, the President of the Royal Institute of British Architects, regretting his inability to serve as assessor in the competition for the Valley Schools, and, in accordance with the Board's request, nominating Mr. James Brooks, of the Strand, to fill that position.

Mr. Robson wrote, thanking the Board for their letter of the 14th ult., and for the copy of the report of the Institute of Architects.

The Chairman said various other letters had been received, and one of them, signed by four of the architects who sent in plans for the competition, asked the Board to reconsider their desire with regard to having a fresh competition for the Valley schools. He stated, to the effect, that he expected the architects to send in practically fresh plans. This letter was signed by Messrs. W. A. Williams, F. Rogers, A. W. Hemmings, and Bushell.

Messrs. Vacher and Hellcar, who also competed, wrote, requesting the Board to submit the designs of the Manor and Valley Schools to a competent architect, who was to be approved by the competitors, and to award a premium which was to be merged into the commission if the successful plans were used.

Another letter was received from Mr. C. E. Soames, who also competed, in the course of which the writer remarked that the public generally appeared to think that it cost the architects nothing to prepare plans, but he need hardly inform the Board that such was not the case. He asked that the architects who sent in plans might be remunerated.

Mr. Weeks thought that the motion in favour of a fresh competition was rushed through at the last meeting of the Board. He thought the Board ought to accept the instructions of the Institute of Architects as far as they went, but his opinion was that it was simply an easy way of letting down Mr. Robson. The competition was for one-story plans, and he thought such plans were more in accordance with the spirit of the Board. That matter was fully discussed when the instructions were given. He thought it was very hard for the architects to be called upon to prepare a fresh set of plans, and he did not see the desirability of it being done.

The Chairman said if Mr. Weeks did not move a resolution he could not lead a discussion.

Mr. Gedney said after the correspondence they had just heard read he would give notice at the next meeting of the Board to rescind the resolution passed in favour of a fresh competition, and move that the plans reported upon by Mr. Robson be re-motivated and referred to the Architect of the London School Board for his award. Mr. Gedney added that he had inserted the Architect to the London School Board in his notice to rescind the resolution before Mr. Brooks's name was mentioned, but he had no objection to the plans being referred to Mr. Brooks if the Board desired it to be done.

Mr. Weeks said he should be very happy to second Mr. Gedney's motion.

After some further discussion, It was resolved that Mr. Gedney's motion should stand on the agenda for the next meeting of the Board.—(Abridged from the *Beckenham and Penze Advertiser*.)

#### Engineership, London County Council.

—The *Times* of Thursday says it is stated that the Committee of the London County Council have resolved to recommend to the Council the appointment of Mr. J. Gordon, Surveyor to the Leicester Corporation, to the office of Engineer to the County Council of London, at a salary of 1,500*l.* per annum.

\* *Builder*, June 22, p. 472.

#### THE VIGNOLES RAIL.

SIR,—In reading the interesting notice of the "Life of Vignoles," in your last number, I am struck by the glaring inaccuracy of the portion which relates to the "Vignoles rail." The writer says, "Of course with the longitudinal sleepers went the Vignoles rail, which was really a clever thing, but it was only suited for longitudinal sleepers," &c. Now, in point of fact, the Vignoles rail is laid on cross sleepers throughout in the Tudela and Bilbao Railway in Spain, and also on the Warsaw and Tereopol Railway, which lines were designed and carried out by the late C. B. Vignoles. It is essentially an elastic rail under the cross-sleeper system, its section forming a true girder, and allowing a greater distance between the sleeper than would be admissible in a rail of less scientific construction.

F. S. A.

\*\* The rail in question is a thing of the past, we believe, in England, and the information in the "Life" seems to be exceedingly inaccurate. The author, on the first reference to the Vignoles rail, says, "A sketch of it from his own hand will be found in the next chapter"; and this is the sketch.



Not a single word is said as to Vignoles having ever thought of using it on cross sleepers; on the contrary a special point is made of his preference for longitudinal sleepers.

We find also that the author is incorrect, as we supposed, in stating that the longitudinal sleepers on the Great Western Railway have been all taken up. All the new portions are laid with transverse sleepers, and no doubt the change will be made throughout, but it is not so made yet.

#### A COMPETITION INCIDENT.

SIR,—In September of last year, Messrs. Cory Bros. & Co., of Cardiff, advertised for competition designs for their new offices in Bute-road, Cardiff. The conditions stated that the proposed building was not to cost more than 8,000*l.*, which sum was to "complete the building with all usual fittings," and further, "upon the various plans being culled by a local professional man, any plan exceeding this amount would not be considered." This looked like a very good competition, and many went in for it. Observe the result,—it appears in your last issue,—a Cardiff firm obtained the commission, and the lowest tender for their design was 13,499*l.* Amended tenders being obtained, the lowest was 10,240*l.*, but this was passed over, and the tender of a Cardiff firm of builders at 10,285*l.* accepted.

Now, does it not seem from this as if the result of the competition was settled from the first, and that it has been simple cruelty to a large number of architects and builders, inviting them to take part in it? The local professional gentleman must have been singularly wide in his estimate, or the promoters of the competition deliberately acted in violation of their own printed conditions.

Yet one other sample of the pleasures of competition,—or perhaps somebody can give a satisfactory explanation. J.

\*\* If the facts are correctly stated, we call it a scandalous case.—Ed.

#### PRICES OF WOOD.

SIR,—Noticing the "Prices Current of Materials," published in your journal weekly, they are extraordinary to my mind. Could you kindly explain, for instance, where Italian walnut at 4*d.* to 6*d.*, Cuba mahogany 4*d.* to 6*d.*, also the other timbers at prices quoted in last week's issue, are to be procured? Of course, not quoting "Fresh goods," "Undersized," or "inferior," I take it you mean ordinary stock prices?

Would you please publish this letter in the interest of the timber merchants as well as the builders? W. G. WEST.

56, Jenner-road, N.

\*\* The "Prices Current of Materials" are quoted by us weekly (by arrangement) from the columns of the *Public Ledger*, a daily commercial journal of repute and standing published in the City. We have written to the Editor of the *Public Ledger* on the subject, and he very courteously replies to the effect that, as our correspondent will have observed, "the prices for wood in 'Prices Current' are very often the 'cargo average,' and always the price *ex ship*, which would include all sorts and all sizes; but, of course, when you see any account of wood sales in our commercial report, those are the prices actually paid by the trade at public auction."—Ed.

**East London Waterworks.**—An account of these works, visited by the Society of Engineers on the 27th ult., is in type, but is crowded out until next week.

#### The Student's Column.

##### WATER-SUPPLY.—I.

##### INTRODUCTORY REMARKS.



COMPLETE knowledge of all the aspects of water-supply demands a close acquaintance with certain sections of many distinct sciences, especially physical geography, meteorology, geology, biology, chemistry, and engineering.

Physical geography is utilised in considering the contour of the ground, the position, depths, and drainage areas of rivers and lakes, and the sites of forests, moss-beds, peat, and other vegetable accumulations. Under this heading the position of farms, and the extent of arable and pasture land, might also for our purposes be included.

We require meteorology primarily to arrive at the distribution and amount of rain and moisture falling or forming on the earth's surface, to understand which it is necessary to know something about the laws governing the formation of rain, snow, hail, and dew. The distribution and degree of temperature in time and space in regard to evaporation and freezing of large water surfaces, and, in fact, all phases of the science relating to the augmentation or removal of moisture or water by atmospheric agency, may be made use of in some way or other.

Certain departments of geology are of the greatest assistance to us in water-supply problems. Our purposes demand a complete knowledge of stratigraphy, or the geographical distribution of the sedimentary rocks, their thickness, depths from the surface of the ground, general and chemical constitution, degrees of porosity, relations to surface and underground drainage areas, together with their inclination to the horizon, curvature, contortion, and dislocation. Also the distribution, disposition, general lithological character, and porosity of igneous and metamorphic rocks. The sites, output, and nature of strata met with in all wells, fluctuations of water-levels, position and origin of springs, and the causes of augmentation or diminution in the volume of rivers and lakes, must claim our attention, as well as the suitability of strata for specific purposes, such as the foundations and sides of large reservoirs and embankments.

We may utilise biology only so far as it deals with the determination of the organised matter in water, with a view to finding whether that matter is prejudicial to health, or otherwise; and the botanical section of the science is useful in showing the functions of certain plants in purifying water.

Chemistry assists in determining the presence and the chemical constitution of mineral and organic matter in water, presenting us with chemical analyses from which, in many cases, we may gather its quality, degree of hardness, and suitability for various purposes, as well as the methods to be adopted in its purification.

Engineering science is called for in such a number of ways in dealing with water-supply questions, that there is scarcely any part of the science that is not laid under contribution in some form or other. It gauges the flow of rivers and artesian wells, surveys the ground of proposed schemes, and does all kinds of preliminary work of the same nature. It comprises more or less information in regard to all the sciences previously mentioned, which latter may be classed together as affording a means whereby we may arrive at the quantity (in part) and quality of water available, and its present disposition and occurrence; whilst the chief functions of engineering are to devise methods of capturing the supply, purifying it, and bringing it to the houses of consumers.

In addition, there are to be considered various legal and political points which complicate nearly every large water-supply scheme, such as compensation to mill-owners and others for the abstraction of river water, the pollution of wells from various artificial causes, the utilisation by towns of distant drainage-water from areas geographically belonging to towns nearer the seat of supply, making use of a distant supply which might be seriously affected in the event of military invasion or internal dissension, &c.

We do not propose, in the following articles, to give detailed information under all the headings mentioned; such a task would involve the preparation of many portentous volumes; at the same time an outline of all will be sketched, with details here and there, the



"natural science" portions receiving a great share of attention, especially in the consideration of water-supply from a geological point of view. Neither do we propose to strictly adhere to the manner of dealing with the subject in the order just laid down. It was thought useful to classify the matter in a scientific form, but inasmuch as each article must be as nearly as possible complete in itself, it is desirable after giving a few details of any subject, immediately to show their connexion with water-supply questions, instead of leaving this for some future article in the series, when that connexion might be less clearly understood.

#### PHYSICAL FEATURES.

Commencing with that portion of physical geography dealing with the contour of the ground, we may at once state that for any serious scheme of water-supply in which the fluid is derived from a large drainage area, the heights and contour of the ground must be accurately ascertained, either by reference to detailed contour maps, such as those issued by the Ordnance Survey, or by independent leveling. So far as England is concerned, it will be found that the higher ground is formed by hard rocks, chiefly in the western and central portions, and the low-lying or slightly undulating land by softer materials. One of the first things that strikes one, after having settled the contour, is that the majority of streams are situated in valleys the bottoms of which are slightly inclined, and that the uppermost extremities of the valleys end in a *cul de sac*. This phenomenon is, of course, far better defined in hilly regions than low-lying land, where it is not always easy to trace the commencement of slight hollows. The reason for this is clear enough. The rivers at present occupying the valleys, or their ancestors, have in nearly all cases carved out the valleys in which they run, by unceasing action throughout long periods. Valleys will be found in which no stream or rivulet at present exists, but which, nevertheless, have been worn away in ancient times in a similar manner. Some depressions, however, have been made by ice and other action.

In this way we see that each stream, with its minute tributaries, has its watershed, which is quite distinct, and divides it from any other stream. If the stream is merely a tributary of some larger river flowing into the sea or a lake, the same law holds good: the larger river and all its tributaries are confined to one large valley with several minor ones opening into it, along which the various tributaries come, and the whole are surrounded and enclosed by one continuous, uneven, irregular watershed open only at the outlet of the river. This enclosed area is known as a river-basin, and it will be seen that many minor basins are frequently formed by the junction of a series of tributaries with one another, before reaching the main river. These are very simple, elementary facts, and they must be clearly borne in mind.

These facts are utilised by the civil engineer in many ways, chiefly in choosing a suitable spot to derive a supply of water, making Nature assist him to her utmost in bringing it as near as possible to consumers. He takes advantage of the enclosed valleys by erecting dams across them, behind which the water accumulates as a reservoir, allowing any superfluous fluid to flow off by means of waste weirs or otherwise. He can approximately estimate the amount of water capable of being delivered by natural means from any river-basin, and should this amount prove insufficient for his purpose, he can frequently arrange to cut through the watershed, and tap an additional supply from an adjoining river valley or basin.

The positions and heights of different river-basins with reference to each other have, therefore, to be studied in making preliminary inquiries to get the necessary gradients, &c. Where a river-basin (or lake) lies at a considerable height, it often happens that a distant city at a much lower level can be supplied from this source, on the water being conducted over lower basins lying between the two points. It is evident that the physical contour of the ground plays a most important rôle in enabling such schemes to be successfully put into practice. The heights, slopes, and distances all along the line of route of the conduit must be accurately known, not only to enable the proper gradient to be observed for the flow of the water, but to ensure correctness in calculating the cubic contents of rock which may have to be excavated, the length of piping, brickwork,

&c.—important items in arriving at an estimate of the cost of any scheme.

The position and extent of moss-beds and peat should be carefully noted, as they assist in throwing some light on the nature of certain organic impurities in water, when the latter is known to be derived from drainage areas containing these vegetable accumulations. How, we shall see when considering the quality of water. In general, peaty water has a slight yellow tinge.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

8,412, Securing Doors and Windows. H. Riess (Berlin).

This patent relates to a contrivance for arresting hinged windows or doors, and securing them in position when opened to any suitable extent. A hinge-joint is detachably secured with its two extremities to the side frame of the door or window, and to the wing respectively. The contrivance is fixed in its joint by means of a screw-pin and nut, temporarily rendering the two plates immovable by the aid of a pin and borer or grooves.

10,180, Urinals, &c. J. H. da Fonseca.

By this invention, an arrangement is provided for supplying disinfecting, deodorising, or antiseptic fluid to urinals, &c. Within the basin or pan is placed a plate of metal, which freely can be turned. This plate is so placed that when the water is allowed to flow it will cause the plate to turn and thereby allow disinfecting, &c., fluid to flow into the basin. When the water ceases to flow the plate is turned by means of a weight or spring into its normal position, and is thus caused to shut the trap or valve and arrest the flow of disinfecting fluid.

17,796, Hanging Window Sashes. W. Roberts. According to this invention, the upper and lower sashes balance each other, and are attached by means of a rope passing over a pulley at the head of the window.

3,057, Improvements in Window Fasteners. J. H. Evans.

This invention relates to a fastener acting with a tumbler and catch. The action is as follows:—When the sash is closed, the inclined side of the tumbler, coming in contact with the fixed lug on the window-frame, pushes the said tumbler back into its recess; but as soon as the tumbler has passed the lug it springs out and prevents the sash being opened. The catch may be applied to windows, doors, or shutters.

5,210, Contrivance for Scaffolds. F. Triebert. According to this invention, a clamp or fastener is formed in iron, with rings, hooks, or sockets at either end. Its use is to connect the horizontal beams of a scaffolding or like structure to the vertical beams or poles which support them.

6,517, Fireproofing Buildings. G. Hayes.

This invention consists in covering the beams, or one face of the beams, with a sheet metal lathing formed with upturned flanges or bends curving over the flanges of the beam as a grip. The lathing is adapted to receive and hold plaster, and also as a casing for columns and girders, and may be fixed so as to leave an air-space between the lathing and that which it encloses. It is also particularly adapted to hold plaster for the formation of partitions and enclosures for light and elevator-shafts.

##### NEW APPLICATIONS FOR PATENTS.

June 17.—9,584, A. Hosack, Chimney-tops or Cows and Ventilators.—9,913, W. Wheatley, Swinging Scaffold.—9,915, F. Wells, Combined Supply, Overflow, and Waste Fittings for Basins, Baths, &c.—9,973, J. Wilson, Rolling Partitions.

June 18.—10,000, S. Deards, Glazed Roofs and Skylights, and Metal Bars for Same.—10,013, J. Redden, a Window Sash Fastener.—10,032, G. Bellingham, Burglar Alarm Fasteners for Doors and Windows.—10,035, R. and E. Sankey, Wall-decoration and in Tiles, Panels, &c.—10,052, J. Cleminson, Sliding Doors.

June 20.—10,069, W. Bird, Façade Adjustment.—10,070, J. Atherton, Door Hinges.—10,080, E. Kempe, a Window-closet.—10,083, The Brosely Thiers Company and J. Crump, Earthenware Quarries or Tiles.

June 21.—10,120, S. Wormald, Rising and Falling Hinges for Doors, &c.—10,126, W. Bracewell, Joiners' and Cabinetmakers' Holding-down Cramps.—10,127, J. Norton and Others, Door Checks and Springs.—10,134, E. Shaylor, Window-sash Fastener.—10,156, J. Simple, Drain or Sewer Pipes.

June 22.—10,212, W. Read, Painters' and Plumbers' Blow Lamp.

##### PROVISIONAL SPECIFICATIONS ACCEPTED.

6,949, J. Middlehurst, Flushing Apparatus for Water-closets.—5,966, J. Bone and W. Wilton, Fastener for Window Sashes and Casements.—8,339, R. Taylor, Window-sash Fastener.—8,444, W. Macdonald, Sash Fastener.—9,126, T. Bear and C. Whitefield, Mitreing Machines.—9,252, J. Anderson and W. Wilson, Whitewashing Brush, &c.—9,436, J. Fleming, Paint.

##### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to Opposition for Two Months.

10,343, J. Crosswhite, Construction of Chimney-pieces, Mantelpieces, &c.—10,586, A. McLean, Blocks or Slabs for Paving.—11,027, R. Petrie, Draw and Push Bolts for Doors, Windows, &c.—12,018, H. Ramsay, Composite Watertight Pipe-joints.—12,330, W. Morgan, Walls or other Brick Structures.—14,174, F. Vane, Fastenings for Windows.—4,345, W. Poppelwell, Saw Sets.—5,312, T. Tutin, Wind-guard Smoke-preventor.—7,164, J. Kimm, Chimney Pot or Top and Fixing same.

##### RECENT SALES OF PROPERTY:

##### ESTATE EXCHANGE REPORT.

June 18.—By Finch & Sons (at Ashford). Tenterden, Kent—The Pickhill Estate, 287a. 3r. 17p., £1,800.

By HUMBERT, SON, & FLYNN (at Watford). Watford—Forty-seven plots of land, 3,960.

June 20.—By WITCH & SONS (at Maidstone). Goudhurst, Kent—"Fitchinghill House," and 40a. 2r. 21p., £2,340. F. cottage and 9a. 2r. 9p., £480. F. cottage and 9a. 2r. 9p., £480. An enclosure of f. land, 6a. 1r. 2p., £245. F. orchard land, 6a. 0r. 15p., £185.

June 21.—By G. E. CHAMBERLAIN. Walthamstow—2a. Benet-st., f., r. £32 p., £410.

June 22.—By D. BURTH, SON, & OAKLEY (at Shrewsbury). Ludlow, near—The Crofton Estate, containing 1,268a. 39p., £32,000.

By MESSRS. COPE (at Canterbury). Canterbury—33 and 34, Wincheap-st., f., r. £15. 535.

"Wincheap House" and grounds, f., r. £35 p., £925. A plot of f. land, 6a. 3r. 34p., £660.

Wingham—An enclosure of f. land, 2a. 1r. 29p., £120. 4a. 2p., £480.

Staple—Cottage and 4a. 0r. 23p., £100. Cottage and plot of land, 6a. 1r. 6p., £100.

Preston—"Paragon Farm" and 4a. 0r. 19p., £100. r. £35 p., £600.

Westbury—Enclosure of f. marsh land, 20a. 2r. 11p., £1,030. r. £32 p., £600.

Ile of Thanet—Thorne Farm and 1a. 3r. 30p., £1,300. 307a. 0r. 31p., £631. 10a. p., £145.

Enclosures of land, 18a. 1r. 34p., f., r. £48. 10a. p., £145.

Enclosures of marsh land, 81a. 3r. 30p., £375. £120 p., £375.

June 24.—By J. BAKER & SONS. High Barnet—43, Wood-st., f., r. £20 p., £405.

Enclosures of land containing 12a. 0r. 19p., £300. South Mimms—An enclosure of f. land, 3a. 0r. 19p., £119.

Enclosures of f. land, 22a. 2r. 5p., £1,250. Elstree—F. land, 4a. 0r. 13p., £650.

F. accommodation land, 12a. 3r. 30p., £650. By D. J. CHATFIELD.

Orpington—1, Grassmere-villas, f., r. £50 p., £550. By S. CARTWRIGHT.

Walham-cross—F. house with stabling and grounds, 6a. 3r. 30p., f., r. £25 p., £810.

"The Britannia" p.h., f., r. £40 p., £900. A plot of f. land, 6a. 0r. 39p., £200.

Enclosures of f. land, 16a. 0r. 36p., £1,100. High-road—F. house and shop, with outbuildings, r. £70 p., £1,490.

F. house and shop, r. £25 p., £400. Park-la.—F. house and two villa residences, r. £43. 8s. p., £1,090.

Vauxhall—F. house, 321 (odd), Upper Kennington-lane, f., r. £151 p., £1,660.

By WALKER & RUNZ. Lee—102, Lee High-road, f., r. £2. 10s. p., £710.

By H. HATNER & SON. Clapham—53, 55, 57, Old Town, f., r. £145 p., £2,030.

Ret Hill, Woodlands—"Claremont Villa," e.r. £55 p., £785.

By GREEN & SON. Ravenscourt-park—101, DANKING rd., f., r. £32 p., £400.

By A. W. TAYLOR & CO. Southfields, Putney—"Northumberland Villa," u.t. 61 yrs., g.r. £11, r. £45 p., £340.

By BROOK & WILKINSON. Lee—3, Woodstock-villas, u.t. 86 yrs., g.r. £15, e.r. £100 p., £600.

By MOSS & JAMESON. Brompton—The Spa Factory and 2, Clements-rd., f., £120 p., £1,800.

F.g.r. of £80, with reversion in 65 yrs. to an e.r. of £300 p., £1,625.

F.g.r. of £10, with reversion in 65 yrs. to an e.r. of £195 p., £260.

14, Clements-rd., at 65 yrs., g.r. £2, r. £30 p., £235.

By W. MILLARD. Walthamstow—11, Cromwell-rd., f., r. £20 p., £400.

By E. MILLARD. Marylebone-rd.—No. 15, and 21, Alsop-mews, u.t. 32 yrs., g.r. £20, r. £125 p., £950.

152, Marylebone-rd., and 20, Alsop-mews, u.t. 32 yrs., g.r. £36, r. £128 p., £750.

Dorset-sq.—11, Balcombe-rd., u.t. 30 yrs., e.r. £25 p., £630.

Ilidington—L.g.r. of £170, at 19 yrs., at a g.r. of £14 p., £1,200.

Kingland—L.g.r. of £14, at 17 yrs., at a g.r. of £38. 6s. p., £85.

By A. RICHARDS. Woodford Wells—Two c. houses in Whitehall-rd., r. £30. 4s. p., £320.

An enclosure of f. land, 4a. 7r. 18p., £1,160.

By GIBBY & TURNER. Wallington—3, Alsop-rd., u.t. 78 yrs., g.r. £8. 10s., r. £42 p., £390.

Blackheath, Bennett-park—"Frome House," u.t. 63 yrs., g.r. £10, r. £45 p., £390.

By E. G. BARRY. Shortlands, Kent—A plot of f. land, £40.

By DEBENHAM, TAYNOR, & CO. Hind Head, Hants—"The Chalet," u.t. 21p., £1,720.



By FULMER, MOORE, & FULMER.	
Croydon—1 to 6, Station-ter., f., r. £240 p.a. ....	£11,600
"The Crown" p.h., f., r. £150 p.a. ....	10,000
20, Church-st., f., r. £33 p.a. ....	1,440
JUNE 29.—By HOWELL, SON, & BONNIN.	
Nottingham—33, Walsingham-st., ut. 98 yrs., g.r. 27, 10s., e.r. £30 p.a. ....	160
By NORMAN, SON, & BOWEN.	
Lincoln's-inn-fields—"The Coach and Horses," p.h., f., r. £40 p.a. ....	1,325
By COLLEY & COLLEY.	
Westbourne-park—119, Tavistock-st., ut. 75 yrs., g.r. £28, r. £40 p.a. ....	335
By L. FARNER.	
Kilburn—41, Princess-st., ut. 73 yrs., g.r. £20, e.r. £45 p.a. ....	80
By FARRER, BROTHERS, ELLIS, & CO.	
Stroud, Gloucestershire—The Rodborough Manor f. estate of 163a. ....	14,000
Greenford—"Greenford Cottage," and 3a. 6r. 8p., f. A plot of f. meadow land. ....	2,250
By L. FARNER.	
Fulham—111, Arthur-st., f., r. £15 p.a. ....	675
By D. SMITH, SON, & OAKLEY.	
Hatton-garden—11, Cross-st., and "The Three Tuns" p.h., f., r. £188 p.a. ....	3,540
By R. F. JOLLY.	
Holloway—79, Tunnel-lane, ut. 75 yrs., g.r. £9, e.r. £55 p.a. ....	470
Dalston—32, Greenwood-st., ut. 63 yrs., g.r. £7, e.r. £18 p.a. ....	450
Stratford—16, 17, and 18, Livingston-st., ut. 79 yrs., g.r. £9, 8s., r. £24 p.a. ....	330
Plaistow—12, London-ter., ut. 92 yrs., g.r. £4, r. 7s. ....	200
By L. FARNER.	
74, Upper-st., ut. 92 yrs., g.r. £22 p.a. ....	175
By L. FARNER, SHARP, & HARRINGTON.	
Spitalfields, Corbett-court—F. stabling, r. £45 p.a. ....	650
By RUTLEY, SON, & VINE.	
Horton—227, New North-st., ut. 62 yrs., g.r. £3 and 9, 38 yrs., g.r. £6, 6s., r. £70 p.a. ....	635
19, Arlington-st., ut. 38 yrs., g.r. £4, 4s., r. £36 p.a. ....	285
Croydon, Queen's-rd.—"The Four in Hand" beer-house, f., r. £50 p.a. ....	800
Gray's-inn-rd.—1 and 2, Phoenix-pl., ut. 22 yrs., g.r. £10, r. £20 p.a. ....	835
Brunswick-sq.—11, Grenville-st., and 2 and 4, The Colonnade, ut. 6 yrs., g.r. £33, 12s., r. £26 p.a. ....	350
Hamstead-rd.—2, 3, and 4, Little George-st., ut. 21 yrs., g.r. £15, 12s., r. £20 p.a. ....	370
Haverstock-hill—No. 25, ut. 48 yrs., no g.r., e.r. £40 p.a. ....	370
JUNE 27.—By NEWSON & HARDING.	
Crouch-hill—"The Red Lion," Angel-side, ut. 200 yrs., g.r. £3, r. £2 p.a. ....	1,000
Dulwich—18, Belvoir-rd., f., r. £2 p.a. ....	365
Holloway—12, Windermere-rd., f., r. £20 p.a. ....	3,250
Tottenham-court-rd.—No. 11a, f., e.r. £260 p.a. ....	1,785
Islington—5 and 7, Church-st., f., r. £75 p.a. ....	1,700
1 to 12, Bath-pl., f., r. £250 p.a. ....	405
Upper-st.—A plot of f. land. ....	275
Addencombe—63 to 69, Clyde-rd., ut. 75 yrs., g.r. £50, r. £16 p.a. ....	805
Green-lanes—40a, Springdale-rd., ut. 92 yrs., g.r. £5, 6s., r. £32 p.a. ....	320
By SQUIRE & NEWTON.	
Sydenham—1 and 2, Highbury-st., f., r. £40 p.a. ....	1,620
4, 5, and 6, Oaksford-avenue, ut. 64 yrs., g.r. £10, 10s., r. £85, 10s. ....	220
By R. STIMSON.	
Old Kent-rd.—F.g.r. of £41 with reversion to £170 p.a. in 9 years. ....	1,925
F.g.r. of £32, 8s., with reversion to £170 in 10 yrs. ....	1,200
Kensal-green—4 and 5, F.g.r. of £11, 10s., with reversion to £46, 12s. 6d. p.a. ....	65
Wandsworth—F.g.r. of £24, with reversion in 8 yrs. to £187 p.a. ....	580
Richmond—F.g.r. of £12, with reversion in 8 yrs. to £235 p.a. ....	1,000
New Kent-rd.—116, Falmouth-rd., ut. 4 yrs., g.r. £45, r. £25 p.a. ....	1,265
Battersea—88, Ingershall-st., f., r. £45 p.a. ....	620
Oxford—14, Canterbury-rd., f., r. £35 p.a. ....	2,100
Old Kent-rd.—285, 288, and 290, St. James's-rd., f., r. £25 p.a. ....	1,800
No. 598 to 594, (even), St. James's-rd., f., r. £121 p.a. ....	775
By Mr. JAMISON.	
Putney—23 and 23, Stratford-ge., ut. 60 yrs., g.r. £6, r. £50 p.a. ....	620
By BAXTER, PAYNE, & LEPFER.	
Kent, Bromley—"The f. residence" "Tintern" ....	2,100
Knockholt—"Mariners' Lodge," and 7 a. f. ....	1,800
By C. C. & T. MOORE.	
Wapping—2 and 13, Red Lion-st., f., r. £140 p.a. ....	775
JUNE 28.—By E. OWERS.	
Willesden—2 and 3, "The Chestnuts," ut. 95 yrs., g.r. £12, r. £2 p.a. ....	580
4 and 5, "The Chestnuts," ut. 95 yrs., g.r. £12, r. £20 p.a. ....	585
Kensal-green—54 and 56 Greyhound-rd., ut. 95 yrs., g.r. £10, 10s., r. £24 p.a. ....	375
By G. BROOKING.	
Camden-rd.—No. 1a, ut. 63 yrs., g.r. £20, r. £60 p.a. ....	560
By THE GREAT WOOD COMPANY.	
Walthamstow—10, Cammell-rd., f., r. £20 p.a. ....	245
By BAKER & SONS.	
Brussels—"The building materials forming the British section of the Exhibition" ....	800
By H. V. CREW.	
Leytonstone—"The f. residence" "Maunstead," e.r. £48 p.a. ....	655
Leyton—17, F.g.r. of £20, with reversion in 38 yrs., to £120 p.a. ....	315
By R. REID.	
Soho—171, Wardour-st., f., r. £100 p.a. ....	2,000
Burton—F.g.r. of £20, with reversion in 38 yrs. to an e.r. of £100 p.a. ....	500
By NEWSON & HARDING.	
Holloway—19, Lonsdale-rd., f., r. £48 p.a. ....	630
King'sland—F.g.r. of £25, with reversion in 38 yrs., to £120 p.a. ....	630
F.g.r. of £30, with reversion in 16 yrs. to £285 p.a. ....	840

Barnsbury—82 and 84, John-st., ut. 70 yrs., g.r. £2, 10s., e.r. £34 p.a. ....	£900
15, Gibson-sq., ut. 38 yrs., g.r. £29, r. £40 p.a. ....	375
1, Richmond-cres., ut. 62 yrs., g.r. £28, r. £27, 10s. 6d. p.a. ....	500
Balls Pond—9 to 13, Hawthorne-st., ut. 64 yrs., g.r. £21, r. £118 p.a. ....	930
Hackney—21, 23, and 25, Spurntowed-rd., ut. 85 yrs., g.r. £18, r. £34 p.a. ....	660
Islington—16 and 17, Popham-st., ut. 31 yrs., g.r. £20, r. £33, 4s. ....	195
By RANDALL, BEARD, & BAKER.	
New Southgate—2, 3, 5, and 6, Clydesdale-ter., ut. 92 yrs., g.r. £21, r. £83 p.a. ....	420

[Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; e. for copyhold; l. for leasehold; e.r. for estimated rental; ut. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

TUESDAY, JULY 9.

*Builders' Accident Insurance.*—Ordinary General Meeting to receive the Directors' Report and for electing Directors and Auditors. 4 p.m.

SATURDAY, JULY 13.

*Architectural Association.*—Fourth vacation visit to Professor Herkomer's House and Schools at Bushey (see advt.).  
*Glasgow Architectural Association.*—Visit to Kelly House, Wemyss Bay.

## Miscellaneous.

**Church of St. Edmund the King and Martyr, Lombard-street.**—In our last week's number we announced that it had been decided to demolish yet another of our typical "City churches,"—that in Langbourne Ward, dedicated to the memory of the East Anglian king who suffered martyrdom in the mode of Sebastian, at the hands of the Danes, in the year 870, at Hoxne, county Suffolk. Of the former structure but little more is known than that therein was buried John Shute (1563), author of "The First and Chief Grounds of Architecture,"—one of the earliest works of its kind published in this country. Rebuilt by Wren, after the Tuscan style, in 1690, and at a cost of 5,207l. 11s., it has since served for the united parishes of St. Edmund the King and St. Nicholas Acons. The church is not square on plan, nor are the opposite sides parallel. The interior dimensions, *feste* the late Mr. George Godwin's work, are 60 ft. (that is, north to south) exclusively of the tower, by 39 ft. wide. The tower, projecting from the southern elevation by less than 2 ft., and having its piers within the church, rises to a height of about 90 ft., the spire forming a later addition. The communion-table stands within a wide recess of the northern wall, between two paintings, by Etty, of Moses and Aaron, which were set up after the repairs of 1833. The fabric was restored by Butterfield, and was re-opened in 1865, and again in 1880. The two stained-glass windows representing SS. Peter and Paul, formerly in the chancel, were given by the parishioners; that between them was "set up in the memorable year of the union, 1707." The two windows, together with the "memorial" window, were removed from the northern to the southern side of the church about nine years ago, when the organ was transferred from a stage in the tower to the western wall. Hatton describes the "painted monument like a hatchment with her arms and supporters" in memory of Queen Mary, consort of William III. The organ (1833) was built by J. C. Bishop. The value of the living is stated in "Mackeson's Guide" to be 1,500l. with a house. A petition against this church's demolition lies for signature within the entrance.

**Presentation to a Surveyor.**—Mr. J. W. Hudson, of the Surveyor's Department of the Vestry of St. John, Hampstead, on retiring from official life on June 24, after thirty-three years' service, was presented by his brother-officers and friends with an elaborately-chased and engraved silver salver, inscribed with feeling expressions of regard and esteem, and it was accompanied by a purse of one hundred guineas. The presentation was made at the Vestry-hall by Mr. C. H. Lowe, C.E., in the presence of a large number of friends, and was suitably acknowledged by the recipient. The whole of the workmen in the employ of the Vestry also spontaneously subscribed for a watch and guard as a mark of respect. Mr. Hudson retires upon a superannuation allowance unanimously voted by the Vestry.

**The Artists' Benevolent Fund.**—The eightieth anniversary dinner of this corporation is announced for Wednesday, the 17th inst., at Freemasons' Hall, the Bishop of Ripon in the chair.

## The Portland Industrial Dwellings.

A notorious Marylebone rookery, in the neighbourhood of Conway and Grafton courts, and adjacent to the new open burial-ground in Paddington-street, has just been replaced by seven blocks of dwellings for occupation by the working-classes. These buildings have been erected by Messrs. Wall Bros., of Kentish-town, who tendered for 13,743l., from the designs and under the direction of Mr. Charles Fowler and Mr. Alfred R. Pite, architects, Mr. G. Wren acting as clerk of the works. The several blocks contain 209 rooms in all, whereof the lowest rent is fixed at 1s. 6d. per week for each room. Messrs. Berry & Sons, engineers, of Regency-square, Westminster, have fitted up a separate steam laundry, with all the necessary appliances for washing, wringing, drying, and ironing. Each block consists of four floors and a basement, and on every flight are supplied water, two water-closets, and gas. The County Council have been petitioned for authority to re-name these tenements by style of "Ossington-buildings," in tribute to the helpful interest which Lady Ossington takes in the domestic improvements of the parish. Various bands, including that of the "F" police division, play in the recreation ground; and the tender of Messrs. W. H. Lascelles & Co., of 121, Bunhill-row, for 55l., has been accepted by the Vestry for the erection of a band-stand, seats, &c.

**The English Iron Trade.**—The English iron trade appears to be on the verge of an upward move again, the tone of the market being healthy. There is a greater anxiety on the part of buyers to place their orders at present rates, and this causes prices to be strong, and advances are heard of from various quarters. The Scotch warrant market has been firmer, and quotations are higher than a week ago. Slight advances have been made in Cleveland iron, and Bessemer is very steady at old prices. In Lancashire and Staffordshire pig-iron shows a rising tendency. There is a further upward movement in finished iron. Sheets have gone up 10s. a ton, and Lancashire and Staffordshire bars are 6s. dearer. Steel prices are very much stiffer. Rails and wire rods in the north-west are 8s. better in price, while blooms are quoted 2s. 6d. more. Ship-builders are not booking orders quite as readily as lately, but this is due, more particularly on the Clyde, to the continued trade disputes and the uncertainty to which they give rise. Engineers, on the other hand, continue very busy, and in many cases are unable to book more work.—*Iron.*

**Bear Yard, near Clare Market.**—In the course of last month were demolished some old workshops, store-houses, and the like, constructed mainly of wood, which stood within the area of Bear-yard, at the rear of the Board School in Vere-street. These messuages, we believe, had formerly served for slaughter-houses. After a fire which broke out here on September 17, 1809, some red-brick walls came to light which were considered to be the remains of the theatre—not to be confounded with the neighbouring Lincoln's-inn-Fields Theatre.—In Gibbons's tennis-court, Vere-street. That theatre was opened in the tennis-court by Killigrew's company in November, 1660, and there they abode until their removal in April, 1663, to the King's house, the first on its site, further westward, which is now represented by Drury-lane theatre.

**New Harbour Works at Copenhagen.**—We referred recently to the construction of a new free harbour, with docks, warehouses, &c., at Copenhagen, and it is now stated that several offers have been made by German *entrepreneurs* to carry out the same. However, this has caused certain banks in the Danish capital to provide the funds required,—about 120,000l.,—and therefore the work will, no doubt, shortly be taken in hand.

**The Cripples' Home, Marylebone-road.**—With reference to this building, a notice of which appeared in our number of the 22nd ult., Mr. Archibald D. Dawney writes to say that the whole of the floors, roofs, and vaults were fireproofed by him upon his system of solid concrete, and that he also supplied and erected all the structural ironwork, cast-iron tank, and roof. The Seyssel Asphaltic Co. asphalted the concrete roof-slats.

**Cremation in Finland.**—A cremation society,—the first of its kind,—has been formed in Finland, and as soon as it has been recognised by the authorities, a crematorium will be erected.



**Society for the Protection of Ancient Buildings.**—On Wednesday afternoon the twelfth annual meeting of the Society for the Protection of Ancient Buildings was held in the Old Hall, Barnard's Inn, Holborn. The chair was taken by the Hon. B. C. Grosvenor. Mr. William Morris read a paper entitled "Old and New," in which he said that no private reasons, such as gain or profit, were strong enough, and no public reasons that he had met with were sufficient, to warrant the destruction of historical and romantic buildings. If we had a population that could not appreciate beauty we should also have one that could not produce beauty. As regarded the romance of the society, he considered that romance meant a capacity for the true conception of history,—for seeing the past times live in the present through the relics that were left to us. We should look upon ourselves as only trustees for those who were to come after us when we were dealing with public or ancient buildings, and if we were not rich enough to preserve them in all their beauty and romance, then we were poor indeed. As specimens of mere craftsmanship, as showing us what sort of work our workers could turn out before the intervention of the middle-man or huckster, everything that was old should be carefully preserved and handed down to our posterity. Craftsmanship now appeared to be confined to our surgeons. No one could get a decent house built, but everybody could have his leg cut off in a most beautiful manner. Mr. Morris wound up with an indignant protest against those whom he described as "ignorant restorers of the works of our forefathers." A vote of thanks was passed to Mr. Morris for his paper.

**Architecture at University College.**—The following prizes have been awarded to the members of Professor T. Roger Smith's Classes:—*Fine Art.* Donaldson Silver Medal, H. P. Adams. 2nd Prize, E. C. Finch. Certificate, 3<sup>rd</sup>, Louis Jacob. *Second Class*, J. P. Cooper and E. B. Hoole. *Third Class*, K. Sakurai and A. G. Salmon. *Construction*: Donaldson Silver Medal: P. S. Worthington. 2nd Prize, S. A. Lang. Certificate, 3<sup>rd</sup>, A. G. Salmon. 4<sup>th</sup>, A. G. Robertson. 5<sup>th</sup>, W. W. Hind Smith. *Second Class*, H. P. Adams and V. H. King. *Third Class*, C. W. Dawson, E. Cubitt Nicholls, and Tokitaro Okada. *Modern Practice*: Prize: Walter Taylor. Certificate, 2<sup>nd</sup>, Harry Sirt. *Second Class*, H. P. Adams, S. C. Arding, Sidney Mart, Jas. Simpson, and F. S. Worthington. *Third Class*, E. C. Finch, F. W. Fryer, and H. B. Young, of Slough. Those names marked with an asterisk obtained the number of marks qualifying for a prize.

**Exhibition of Ecclesiastical Art.**—The Marquis of Ely has granted the use of the drill-hall at Cardiff for the eleventh annual Ecclesiastical Art Exhibition, to be held during the Church Congress. We are informed that "the leading church and school furnishers throughout the country have already signified their intention of exhibiting, and it is expected that the trade department of the Exhibition will be larger than ever, while great pains are being taken to secure a large and interesting loan collection." The exhibits will embrace every object used in the building and adornment of churches,—goldsmiths' and silversmiths' work, ancient and modern and ecclesiastical metal-work in general, tapestry, embroidery, wood and ivory carving, church furniture, paintings, drawings, architectural designs, &c. The offices of the Exhibition have been removed to Maltravers House, 17 and 18, Arundel-street, Strand, W.C.

**Exeter Diocesan Architectural Society.** A general meeting of this Society was held on the 26th ult., in the Hall of the Vicars' College. In the report read by the senior secretary, Rev. J. L. Fulford, notices were given of the works of restoration recently carried out in two or three churches in North Devon, Braunton, and Heanton Punchardon, and the work was generally commended. Mention was made of the small parish church of St. Pancras, Exeter, recently reopened, after having been shut up for years, and of its satisfactory restoration. A paper was read by Mr. Ashworth, architect, on "Basilican and Greek Churches," carefully illustrated.

**Shop Shutters.**—The Bostwick Gate and Shutter Co. send us a diagram showing the application to shop fronts of their patent folding iron shutters and gates, the application of which to dwelling-houses we have before noticed.

## PRICES CURRENT OF MATERIALS.

TIMBER.		£. s. d.	£. s. d.
Greenheart, B.O.	ton	2 10 0	2 10 0
Teak, E.I.	load	11 0 0	15 0 0
Sequoia, U.S.	foot cube	0 2 3	0 3 0
Ash, Canada	load	3 10 0	5 0 0
Birch	load	3 10 0	5 0 0
Elm	load	4 0 0	5 0 0
Fir, Dantisc, &c.	load	2 10 0	3 10 0
Oak	load	4 0 0	5 10 0
Canada	load	5 0 0	7 10 0
Pine, Canada red	load	3 5 0	4 0 0
" yellow	load	3 10 0	4 0 0
Lath, Dantisc	load	4 10 0	5 10 0
St. Petersburg	load	5 0 0	6 10 0
Wainscot, Riga, &c.	log	2 15 0	4 0 0
Deals, Finland, 2nd and 1st	std. 100	9 10 0	11 0 0
" 4th and 3rd	std.	8 0 0	9 0 0
Riga	load	7 10 0	9 0 0
St. Petersburg, 1st yellow	load	11 0 0	15 0 0
" 2nd	load	10 0 0	11 0 0
" white	load	11 0 0	10 0 0
Swedish	load	9 0 0	16 0 0
White Sea	load	9 10 0	17 0 0
Canada, Pine, 1st	load	16 0 0	18 10 0
" 2nd	load	11 0 0	17 10 0
" 3rd, &c.	load	8 0 0	10 10 0
" Spruce, 1st	load	9 10 0	11 0 0
" 2nd and 3rd	load	7 10 0	9 0 0
New Brunswick, &c.	load	6 15 0	8 15 0
Battens, all kinds	load	0 10 0	20 0 0
Flooring Boards, 4, 1 in., prepared, First	load	6 11 0	0 14 6
Second	load	0 8 0	0 10 8
Other qualities	load	0 5 6	0 7 6
Cedar, Cuba	load	0 0 4	0 0 4
Honduras, &c.	load	0 0 4	0 0 4
Mahogany, Cuba	load	0 0 4	0 0 4
St. Domingo, cargo average	load	0 0 4	0 0 4
Mexican	load	0 0 4	0 0 4
Tobacco	load	0 0 5	0 0 6
Honduras	load	0 0 5	0 0 6

## TIMBER (continued).

	£. s. d.	£. s. d.
Box, Turkey	ton	4 0 0 13 0 0
Rose, Rio	ton	16 0 0 20 0 0
Bahia	ton	14 0 0 18 0 0
Satin, St. Domingo	foot	0 0 6 0 1 0
Porto Rico	ton	0 0 9 0 1 3
Walnut, Italian	ton	0 0 4 0 0 0 4

## METALS.

	£. s. d.	£. s. d.
Iron—Bar, Welsh, in London	ton	5 5 0 5 10 6
" at works in Wales	ton	4 15 0 5 0 0
" Staffordshire, in London	ton	6 10 0 6 10 0
Copper—		
British, cast and ingot	ton	46 0 0 48 0 0
Best selected	ton	47 0 0 47 10 0
Sheets, strong	ton	53 10 0 0 0 0
Chili, bars	ton	41 10 0 0 0 0
Yellow Metal	lb.	0 0 5 0 0 6
Lead—Sheet, English	ton	13 10 0 14 0 0
Spelter—		
Silesian, special	ton	18 15 0 19 0 0
Ordinary brands	ton	18 12 6 18 15 0
Tin—		
Strait	ton	80 0 0 0 0 0
Australian	ton	83 0 0 0 0 0
English ingots	ton	93 0 0 0 0 0
Zinc—English sheet	ton	21 0 0 22 0 0

## OILS.

	£. s. d.	£. s. d.
Linseed	ton	21 0 0 21 7 6
Coconut	ton	26 10 0 27 10 0
Ceylon	ton	24 10 0 0 0 0
Palm, Lagos	ton	24 0 0 24 10 0
Rapeseed, English pale	ton	27 0 0 28 10 0
do	ton	27 0 0 28 10 0
Cottonseed, refined	ton	25 10 0 27 0 0
Tallow and Oleum	ton	21 0 0 40 0 0
Lubricating, U.S.	ton	6 0 0 6 0 0
do refined	ton	7 0 0 12 0 0
Tar—Stockholm	barrel	1 3 0 1 3 6
Archangel	barrel	0 15 9 0 16 0

## COMPETITION, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Shops, Waiting-rooms, &c., Victoria Pier, Douglas	Isle of Man Harbour Commissioners		Not stated.	i.

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Wood Blocks, Thames Ballast and Sand, &c.	Chelsea Vestry	G. R. Strachan	July 9th	ii.
Broken Granite and Kentish Flints	Barking Town Loc. Bd.	C. J. Dawson	July 11th	ii.
Painting Works	St. Saviour's Union	Jarvis & Son	do.	ii.
Swimming Bath	Forest Gate Sch. Dist.	Official	do.	ii.
Kerbing, Channelling, Roadmaking, &c.	Plumstead Bd. of Wks.	do.	July 12th	x.
Underground Urinal, &c.	Paddington Vestry	do.	July 15th	ii.
Broken Guernsey Granite	Barnet Vestry	do.	do.	ii.
Casual and Receiving Ward	Strand Union	W. S. Cross	July 18th	x.
Wood-Paving	Wandsworth Bd. of Wks.	Official	do.	x.
Well-Sinking	Tottenham Local Board	J. E. Worth	do.	x.
Cast-iron Pipes	Kettering Waterworks Co.	do.	July 18th	x.
Brick Sewer, &c.	Leamthorpe Vestry	Hugh McIntosh	do.	x.
Pastal Sorting Office, South Tottenham	Com. of H.M. Works	Official	July 19th	x.
Kerbing and Paving	Chelmsford Town Coun.	C. Pertwee	July 22nd	x.
Additions, &c., to Oldswell Police Court	Com. of H.M. Works	Official	do.	ii.
High Level Sewer, &c.	Belfast Corporation	J. C. Bretland	July 23rd	ii.
Wood-Paving	West Ham Council	Lewis Angell	July 24th	x.
Formation of Wharf	Fulham Vestry	J. P. Norrington	do.	x.
New Drainage System, Works Soil Pipes, &c.	Porter Union	Messrs. Clackson	do.	x.
Pipe Sewers, Manholes, Gullies, &c.	Shirley and Premantia	do.	do.	x.
Reproduction of Groups of Figures	Local Board	H. J. Weston	July 29th	x.
	St. Pancras Vestry	W. B. Scott	Not stated.	x.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Borough Surveyor	Stratford-upon-Avon Town Council	200£	July 8th	xvi.
Clerk of the Works	Trickham Local Bd.	Not stated	July 9th	xvi.
Inspector of Sewers and Drains	Hackney Bd. of Works	St. 3s. per week	July 10th	x.
Second Clerk in Surveyor's Department	St. John (Hampstead) Vestry	100£	do.	xvi.
Inspector of Nuisances, &c.	St. Saviour's District Board of Works	110£, &c.	July 15th	xvi.
Surveyor	Acton Local Board	350£	July 16th	xvi.
County Surveyors, Ireland.	Civil Service Com.	Not stated	July 26th	xvi.

## TENDERS.

(Communications for insertion under this heading must reach us not later than 12 Noon on Thursdays.)

**BISHOPSTON (Devon).**—For alterations to house, &c. Mr. S. Sagar, architect, Newton Abbot.—*Estimate* 2597 8 9  
Fey & Son, Bishopstoke—374 10 0  
\* Accepted.

**CANTERBURY.**—For proposed alterations and additions to the Canterbury Club, St. George's-street, Canterbury. Messrs. Cowell & Bromley, architects, Folkestone.—*Estimate* 23,200 0 0

Knock, Ashford—2,300 0 0  
Gaskin, Canterbury—2,300 0 0  
Judge, Houghton—2,910 0 0  
Gentry, Canterbury—2,878 0 0  
Druce, Walsme—2,838 0 0  
Martin, Ramsgate—2,788 0 0  
Denne & Son, Deal—2,780 0 0  
Cozens, Canterbury—2,693 0 0  
Wiltshire, Canterbury—2,634 0 0

**COBHAM.**—For sanitary works at "Fairlawn, Cobham, for Mr. Maling Grant. Mr. J. Nixon Horsfield, surveyor.—*Estimate* 2134 0 0

**COLCHESTER.**—For alterations and additions to "Delaval" Lodge, Colchester, for Mr. G. D. Shafto. Mr. J. W. Start, architect, High-street, Colchester.—*Estimate* 2500 0 0  
E. K. Orfeur—485 0 0  
R. Beaumont—377 0 0  
F. Dupont (accepted)—453 0 0  
[All of Colchester.]

**DUBLIN.**—For additions to the library and museum buildings, Trinity College, for Mr. Thomas Drew, R.H.A., architect, 24, Clare-street, Dublin.—*Estimate* 2235 0 0  
Callen Bros.—1,875 0 0  
J. & W. Black—1,375 0 0  
H. Sharpe—1,408 0 0  
S. Bolton & Sons—1,499 0 0  
\* Accepted.



STUBBINGTON.—For the erection of fernery, earth-  
sets, &c., at Stubbington House, for Mr. M. H. Foster.  
Wm. Yeardye, architect. Quantities supplied:—

W. Hill & Co., .....	£570	0	0
J. Plummer .....	525	0	0
J. Crockerell .....	510	0	0
C. Wareham (accepted), .....	458	10	0

Accepted, Messrs. Fraser & Fraser's tender for Specification A

**SADBURY**—For new Baptist Chapel at Sudbury.  
Mr. Wm. Bate, architect:—  
Wanford ..... £1,779 0 0  
Hawking ..... 1,487 0 0  
Grimwood & Sons ..... 1,398 0 0

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# The Builder.

Vol. LVII. No. 2423.

SATURDAY, JULY 12, 1889.

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### French Architectural Drawings.



ACCORDING to a report in the columns of *L'Architecture*, one of the foremost English architects of the day, in replying to a toast in honour of the foreign architects and architectural societies

at the dinner of the International Congress of Architects at Paris on the 21st of last month, characterised France as the chosen country of architecture, and added "When I meet you in your noble *École des Beaux-Arts*, and feast my eyes on the fine prospects of your streets and on the architectural designs placed on the walls of the Paris Exhibition, I am proud to be able to say—"I, also, am an architect." Allowing something for the natural enthusiasm of the occasion, and perhaps deducting something towards a more sober judgment of the street architecture of Paris, in some at least of its developments, the sentiment expressed is one which really follows very naturally from a study of the collection of French architectural drawings collected in the gallery which runs round the main sculpture-hall in the Paris Exhibition building. As far at least as the graphic illustration of architecture is concerned, the show of drawings here reduces the architectural room at the Royal Academy to a somewhat third-rate position.

Of course it must be remembered that this collection at Paris is a very large one, and includes the prominent works which have been exhibited at the *Salon* for several years back: but the difference is not only in quantity or in brilliancy of execution of the drawings; it lies also in the eminently architectural character of the work. The French architects have fully grasped the fact that architectural illustration means something more than the production of pretty and taking perspective views, mere pictures of buildings; that it implies the accurate illustration of the whole working out of a design from the plans and sections, and that a carefully finished geometrical drawing, showing all the detail in accurate relation to the plan and construction, is of more value to the architectural eye than a perspective view which makes a good pictorial effect but is accom-

panied by no indication of the constructive basis of the design.

The very large size of many of the architectural drawings exhibited by French architects, as compared with that of drawings of the same kind in England, is of course partly to be accounted for, or is at least rendered possible, by the extent of wall space available for these at the *Salon* exhibitions. The one small room at Burlington House would only hold a very few drawings executed on the scale common enough with French architects. But English visitors must be struck not only with the absolute size of the French drawings, but with the relative size and importance of the plans. At the Academy the minority who condescend to append plans at all do it as if they thought a plan was something to be ashamed of, something calculated to shock and repel the spectator, and they content themselves at most with a very small plan introduced in a shrinking manner in one corner of a drawing. In the collection of drawings at the Paris Exhibition the plans occupy the same space as the rest of the drawings, and hardly a single exhibit is without its complete plan drawn to the same scale as the elevations, and grouped with them as of the same importance. That is illustrating architecture as an architect ought to illustrate it: our Royal Academy room mostly illustrates architecture as amateurs might illustrate it, if they could draw architecture in perspective. Perhaps the explanation is partly to be found in the fact that the French drawings are made for the appreciation of architects and artists, and the English ones are done to catch the eye of the public. At all events the contrast is striking, and not altogether gratifying. Not that we would by any means have perspective omitted in such exhibitions, but we would have it take its right place as the complement and finish to the geometrical drawings, not as superseding them. Introduced on that footing, perspectives would add a further element of great interest to some of the sets of drawings at the Paris Exhibition; and it can be fairly maintained that the best of our architectural draughtsmen are superior to the French in the art of making a picturesque and effective perspective drawing. French perspective drawings of architecture tend to be too hard and mechanical in style. But at least they have cultivated the style of drawing which is the basis of architectural representation, whereas we have mostly neglected this for the merely pretty

element of perspective views. And when it comes to the perspective representation of a building or a part of a building in detail, in an architectural rather than a picturesque sense, the French again take the wind out of our sails, as any one must admit who looks at such a drawing as M. Chipiez' perspective detail of the "couronnement" of one of the Persepolis palaces restored; a water-colour showing part of an elaborate coloured wooden entablature with the heads of the Persian twin-bull capitals below, which in drawing and in its brilliant representation of multitudinous coloured detail, is a *tour de force* of its class such as we never remember to have seen in an English architectural exhibition.

It must be admitted on the other hand, that the chief interest of a *Salon* collection of architectural drawings (and the drawings collected in the Paris Exhibition Gallery are mostly exhibits of the *Salons* of former years) lies in the ideal drawings and restorations, and that the drawings representing modern buildings for practical use are both comparatively few in number and generally rather inferior in interest, as compared with the restoration drawings. This is natural enough with a people who cling so much to the ideal as the French; and seeing that on paper one can build what one likes without being hampered by economical and other restrictions, the production of these ideal restorations of ancient buildings has an undoubted fascination for the intellect and the fancy, and is an admirable mental training also in the higher paths of architecture. We can hardly desire to see less of so interesting a branch of architectural study and illustration, but we should be glad to see, in French exhibitions, more examples of modern practical architecture, and of a more interesting type. It is not that the restoration drawings are too ideal, but that the modern designs (those that get into exhibitions, at least) are not ideal enough. In the picturesque of modern architecture we are before the French, as one of their ablest architects admitted in some critical reviews of English architecture. In the collection we are now speaking of some of the modern buildings illustrated, mostly very practical in their treatment, are so dull and heavy in effect that it seems doubly curious to find them among a collection of drawings showing such a keen sense of the beauty and artistic interest in the buildings of the past.

Among the first drawings we noticed in this remarkable collection are some fine



restorations of some of the Medieval castles of France, by M. Benouville; a class of remains on the illustration of which the French architects have bestowed a degree of study and ability second only to that which they have given to the more beloved relics of Roman architecture. Among the châteaux here illustrated are those of Chalucet and Madaillan, carefully delineated in plan, actual state, and restoration. The château of Chalucet is shown in an exceedingly fine geometrical drawing realistically coloured, so as to give the effect of relief, an effective form of architectural drawing very well carried out in this instance. The same architect exhibits a set of drawings entitled "Parallèle des Châteaux Gascons," a number of drawings of castles with their towers capped with wooden galleries projecting far beyond the masonry and covered with low-pitched roofs. Adjoining these very characteristic Medieval examples are M. Blavette's large drawings of the restoration of the Pantheon and of the Temple of Ceres at Eleusis; the latter is a remarkably fine set of drawings, including a polychromatic study of the façade of the Temple, one of the many illustrations of work of this kind which are to be seen. M. Blavette, as well as other French restorers, seems to think the Doric architraves, though without any modelled ornament, were decorated with delicate flowing ornament in colour; a theory which, if accepted, would upset some larger theories about "where you can rest, there decorate," &c.; he shows a "honeysuckle" ornament meandering over the architrave, triglyphs blue (now apparently the accepted colour), metopes, yellow ground with red conventional flower decoration; some of this does not look very probable or very Greek. The decoration of the interior walls shown in the section, a dark red ground with a serpent ornament on it, is fine and more antique looking in spirit. The "Ecole Supérieure d'Algers," one of the few large modern designs (we believe by M. Dauphin, but the catalogue and arrangement present the usual French obscurity) is a cold symmetrical Classic structure, shown in large highly finished drawings, and just redeemed from mere commonplace by some original treatment of the details of the Corinthian order employed. Another modern design not far from this, but of humbler character, M. Camut's "Ecole Normale d'Institutrices à Clermont-Ferrand," is a good example of very simply-treated scholastic architecture, a combination of grey stone basement and window-dressings, with red brick arches, and the piers between the window-dressings white, apparently cement; the elevation is remarkably well coloured in a realistic manner, and the combination of materials has a good effect. This is one among other instances in the exhibition of a tendency to employ brick in the reverse way to the English custom, as "dressings" or archivolts, when the main wall surfaces are stone or cement; we commented on it in noticing the model Ecole Primaire building on the Esplanade des Invalides.

Previous to this last set of drawings we had passed M. Deglane's fine set of the restoration of the Palace of the Cæsars, which was formerly in the *Salon* and was commented on in our columns at the time. These are geometrical drawings, the exterior elevations lined in and slightly touched with colour in a very effective manner; the sections splendidly finished in the matter of marbles and other decoration and sculpture. M. Hector De George presents a contrast to this Classic and rather imaginative restoration by his fine set of realistic drawings of the Abbey Church at Vezelay, realistic at least in that they are not a restoration, though they represent the building as it may have appeared when new, with its red walls glaring in a hot sun, the masonry being very effectively treated. This is a more gratifying Medieval exhibit than M. Albert Ballu's view of his restoration of the Church of Lamballe, a piece of very hard wry Gothic. Near this, M. Daumet exhibits drawings and photographs of his restoration of and additions to Chantilly, which were illustrated in this journal some time ago. M.

Albert Ballu shows to much better advantage in his drawings of the characteristic "Tour Solidor" at St. Servan, an old fort with tall angle turrets standing picturesquely on a promontory of rock by the sea; a drawing in Indian ink shows the parapet and conical roofs restored, and a charming coloured perspective shows the actual state of the old fort, as picturesque a bit of Medieval engineering, in character and position, as one could wish to see. The same architect fills a whole bay of the gallery with a set of large drawings of the Palais de Justice at Bucharest, we surmise competition drawings, but this is not stated. There is a good deal of originality in the details of this; in the centre block the windows are divided by massive square piers or buttresses, treated at the top with capitals as if they were pilasters, and broken half way up by pedimented niches; the general result is Classic with a bold and free treatment; but the details, shown in immense drawings shaded with Indian ink, have by no means a corresponding originality or vigour.

M. Aubry's drawings of the restoration of the château of Sully-sur-Loire are noteworthy for the force and vigour of the water-colour drawings of the old moss-grown circular turrets, drawings with more of the picturesque element about them than is usual in French architectural drawing; and the sketches of the strange and uncouth grotesque animals which form some of the adornments of the château are very spirited. Near this the succession of drawings is interrupted by a large model of a monument to the Republic, to commemorate the National Assembly of 1789; we believe by M. Formigé, as the only mention of a "maquette" in the catalogue refers to the design under his name, but neither name nor number were to be found on the model. This is a powerful though not very refined design: a great column in the middle with an immense square surbase with steps and an altar and statue on each face; three sides of the square in which the column stands are enclosed with a colonnade of Egyptian proportions and character but with original detail, on the fourth side is a flight of steps. The general effect is so striking that it is a pity the detail is not better.

M. Boudin exhibits a number of interesting details of the ancient woodwork of the church of Brou, a building to which an English poet has given a special interest. Next we come to M. Blondel's magnificent restoration drawings of the Temple of Concord at Rome; the sectional parts coloured light and showing the artist's idea as to the construction; the interior design coloured in the most minute manner to represent all the decorative detail. The exterior façade is left nearly white with the statues and doors and grilles put in in gold. The drawing of the "état actuel" seems to show every stone, and attains the perfection of realistic drawing of the kind.

Another class of work is illustrated in the gorgeously-coloured interiors and sections exhibited by M. Claude David, illustrating a restoration of interiors in the Château de Choisy, a perspective view of a richly-decorated room for a private mansion in Louis XIV. style, and a longitudinal section of the salle-à-manger of the "Hôtel Lyon d'Or," a sumptuous drawing exhibiting a perfect riot of colour in tapestry, gilding, and stained glass, somewhat too characteristic of the modern *hôtel de luxe*. More interesting are M. Boitte's drawings of the actual state and restoration of the curious "Château de Fère-en-Tardenois," a château on two sides of a ravine with a gallery of communication, looking somewhat like an aqueduct, crossing it on huge arches; some pretty water-colour sketches of the old château and the grounds are added to this illustration of a very curious bit of early Renaissance château architecture. M. Bouwens van der Boyen brings us back to modern architecture with his drawings of the "Hôtel du Crédit Lyonnais," a somewhat cold Classic design, but showing admirable treatment of plan for a very irregular site. A beautifully-executed little ink line perspective of one of

the interiors is shown, every line of the perspective curves as clean as can be drawn, and quite a study of draughtsmanship in its way.

We have referred before to the splendid character of M. Chipiez' drawings, of which there are a whole crowd together, restorations of various types of Persian and Assyrian temples, of the Temple at Jerusalem, &c. the consideration of the probability or improbability of which would be matter for various separate articles; of the splendour of the drawings there can be no question. M. Calnaud's "Hôtel de Ville, Vincennes," a modern building in course of execution, is a generally picturesque mélange of Gothic and Classic, but very bad in detail: his much more humble and simple building for a "Collège des Jeunes Filles" is however a success; one of those buildings in which a straightforward practical treatment is made also subservient to a certain degree of picturesque effect. M. Chancel is one of the few exhibitors who combines ancient illustration with modern design: his drawings of temples of Pæstum are exceedingly fine, and his design for a "Salle des Réunions Publiques" (one of the Duc prize subjects) has a great deal of merit and some originality. M. Depertthes exhibits some large rather washy-looking grey drawings of his design for Milau Cathedral façade, a general perspective and a detail elevation of one of the towers; but the design is more remarkable for ambition than success; the façade is on an immense scale, but it would have entirely killed the central lantern, and the outline of the spires of his proposed western towers is by no means agreeable or satisfactory.

The works heretofore referred to are on the north side of the gallery. The east wall is occupied by a rather miscellaneous collection, but among these are some full-size coloured drawings of the capital and entablature of the Temple of Antoninus and Faustina, as now existing, which are worth looking at as examples of realistic copying of old masonry and detail in colour; in this respect they are really remarkable; whether the result was worth the trouble expended may be another question.

M. Marie N. Lambert, an old "Prix de Rome" man, exhibits a splendid set of drawings of the Acropolis at Athens in its existing and its restored state. The latter drawing, with its brilliant colour on the temples and the Propylæe, and the crowd of brilliantly-coloured statues and shrines lining the road up to the Propylæe steps, is a most vivid conception, and perhaps nearer to the truth of general effect than many restorers have come. Certainly the application of colour to Greek architecture, once scouted as a heresy, is now, with some of the restorers, carried to the opposite and extravagant extreme. Look for instance at M. Loviot's restoration of the Parthenon, with an architrave and abacus painted a strong and flaring red, the architrave with a great flowering ornament over it; the ovolo of the capital with an egg-and-tongue ornament on it, painted in so strong as entirely to destroy the effect of the delicate sectional lines of the moulding. M. Loviot is the uncompromising champion of colour, as appears not only from his drawings but from his occasional literary controversies in the French architectural journals; but this kind of polychromatic restoration of Greek work seems to us more like a bid for notoriety and an attempt to astonish critics and compel their attention, than an expression of serious conviction founded on evidence. If the Parthenon was really coloured up in this violent fashion, there must surely have been more and stronger traces of colour left than have been found; and if the Greeks depended on such strong colour for their effects, it is contrary to all architectural analogy to suppose that they would have entered into so much refinement in the sections of their mouldings; and the Greeks were the very last people to have missed perceiving that æsthetic fact.

M. Loviot exhibits also his design for a monument to Victor Emanuel, a triumphal



arch with a quadrant colonnade flanking it on each side, and an equestrian statue in the centre of the composition. He does not, we observe, bestow on his own work that exuberance of colour without which he declares that the architecture of the Greeks was incomplete. M. Hermant's "Chapel of the Maison de Repression at Nanterre" has all the appearance of a "Maison de Repression" place of worship, in its stern Romanesque style; the expanse of white stone and red roof is rather glaring in effect, and the principal drawing is perhaps chiefly notable as an admirable example of the realistically coloured elevation style of drawing, with an indication of landscape added on each side, but still preserving the geometrical arrangement of the picture plane: this is a style of architectural drawing in which the French excel, and which has the important advantage of combining geometrical accuracy of elevation with a considerable indication of the pictorial effect of the finished building. As all designs for official buildings of this class must pass an official criticism, it is perhaps with the object of showing as much as possible of both the facts and the probable appearance of the structure that this method of drawing finds so much favour in France, where officialism exercises such a sway; it appears to us to have many recommendations as a method of representing architecture, and certainly it could not be better carried out than it is in this and others of the drawings here, which are quite a pleasure to look at for their mere technical workmanship in drawing, apart from any opinion in regard to the design.

M. Girault's drawings of Hadrian's Villa form another contribution to the class of restorations, and are a fine set of drawings with decorations somewhat too manifestly based on Pompeii, which however may be presumed to have illustrated on a small scale and in an incomplete manner the Roman style of its time. M. Leclerc's "Capitole de Toulouse; achèvement" is a rather curious affair, apparently consisting of the addition of a large modern Classic building to an old Gothic nucleus: old and new are at all events sufficiently distinct, but the result is rather awkward and incongruous looking.

M. le Begue's designs for "Manoirs" at Calmont and Etran, three altogether, are interesting to an English eye as representing the same kind of thing which is so much in favour with English architects at present in domestic architecture—the production of rather rich-looking and picturesque houses in red brick. Queen Anne, however, appears not in France, and these are red brick mansions of a busy and rather pretentious Gothic style. We have had nothing in England quite equal to the Francis I. style, for mansions at once picturesque and palatial; on the other hand, we have had an advantage over the French in having such a style as the Elizabethan, developed often very finely in mansions of the largest scale, but suitable also for houses on a smaller scale. The French seem to be in want of a manner of this kind for domestic buildings; an architecture rich in effect and yet quiet and unpretentious. In these houses of M. le Begue we certainly do not find this quality; they are meant to be picturesque but are in reality "fidgety" in style, and strike us as decidedly inferior to what an English architect of the present day would produce with the same object and on the same kind of scale; and if this is at all a fair representation of what the French architects of to-day can produce in domestic architecture, we are not surprised that M. Sédille, when he visited England to study our progress, reported so strongly in favour of the picturesque and charm of English domestic architecture.

In the class of picturesque domestic architecture M. Ruy makes a success with a small design for a villa for Algeria, a little white building with coloured tiles inlaid in the walls, a pretty house and suitable for the country and climate for which it is designed. M. Rigaud's design for "Le Poste Centrale des Télégraphes" for Paris, on the other hand, however well it may be and probably is

planned and constructed for its purpose, is as ugly a piece of engineering architecture as could well be. There is this to be said for French official buildings of this kind, that they do not attempt to make a utilitarian building architectural by patching on pilasters to it; the thing is genuine as far as it goes; but we should have expected that there would have been some attempt, in France, to make such buildings a little less like a barrack than this. M. Kidel's "Musée Laval" is a heavy Classic design relieved by some originality of treatment in the detail. A design for a "Chalet," not far from this, shows, like M. le Begue's "Manoirs," how completely the French are at sea in regard to what may be called "picturesque" architecture in the special sense in which we generally use the word. In the architecture of refinement and finish they are for the most part our masters; but a picturesque chalet in French simply means angles and elbows and wooden gimcracks of all kinds.

M. Trelat's design for the façade of Milan, with a dome on either side in place of towers, is not very good in itself and certainly utterly unsuitable to Milan; it is astonishing how any architect could have proposed such a thing. M. Wable's Algerian Palais for the exhibition of 1878 is well done; and M. Lucien Magne's illustrative studies of ancient stained glass are among the noticeable things of the south gallery. But here, as on the other side, the palm is carried off by the antique restoration studies. M. Paulin's great set of restored drawings of the Baths of Diocletian fill a whole bay; and of the drawings, as such, one can only say that they are beyond praise; they go as far as architectural drawing can go in brilliancy and splendour of effect and finish. The same architect shows a restoration of the Temple of Theseus, with colour; he is more reticent at all events than M. Loviot, and leaves the columns and capitals alone, giving the now orthodox blues and reds to the frieze, and showing the side walls of the *cella* red, which throws up the columns with good effect. The collection in the South Gallery is concluded brilliantly by the bay occupied by M. Laloux's magnificent studies of the restoration of the group of temples at Olympia, on which we commented when they were exhibited at the *Salon*. We can only remark now that the suggestions of polychromatic decoration made here are very good as far as effect goes, and show more reticence in regard to tones of colour than some other restorations in the room. The treatment of the *cella* walls, with a golden brown ground and red, black, and white ornamental design on it, looks more Egyptian than Greek in character, but has a good effect. The columns are left white. The colour treatment of the entablature is unusual; the triglyphs are kept a subdued grey-blue instead of the usual strong blue (much less barbaric in effect); the metopes are decorated with painted symbols in the centre surrounded by conventional ornament; a kind of band of painted ornament is shown along the centre line of architrave, continued between the shields on the front and brought round the angle and stopped suddenly at the sides, in a manner which looks rather awkward and not very Greek. A full-sized detail of the Order is given; the echinus of the capital is lightly decorated in colour, with an Egyptian-like alternating ornament, so far subdued as not to interfere with the effect of the modelling of the surface.

The drawings of this class alone, in the Paris Exhibition Gallery, would make a splendid collective exhibition of architectural drawing and historic study; and it is to be wished that we could have a collective exhibition in London, say at the Institute of Architects, of some of the finest of the French restoration studies of antique architecture, which, besides raising some interesting archaeological questions for discussion, would rather open the eyes of some of our students as to what is meant by architectural drawing on the other side of the water.

## THE VILLA OF NERO IN THE ANCIENT ANTIUM.

(BY AN ITALIAN ARCHITECT.)



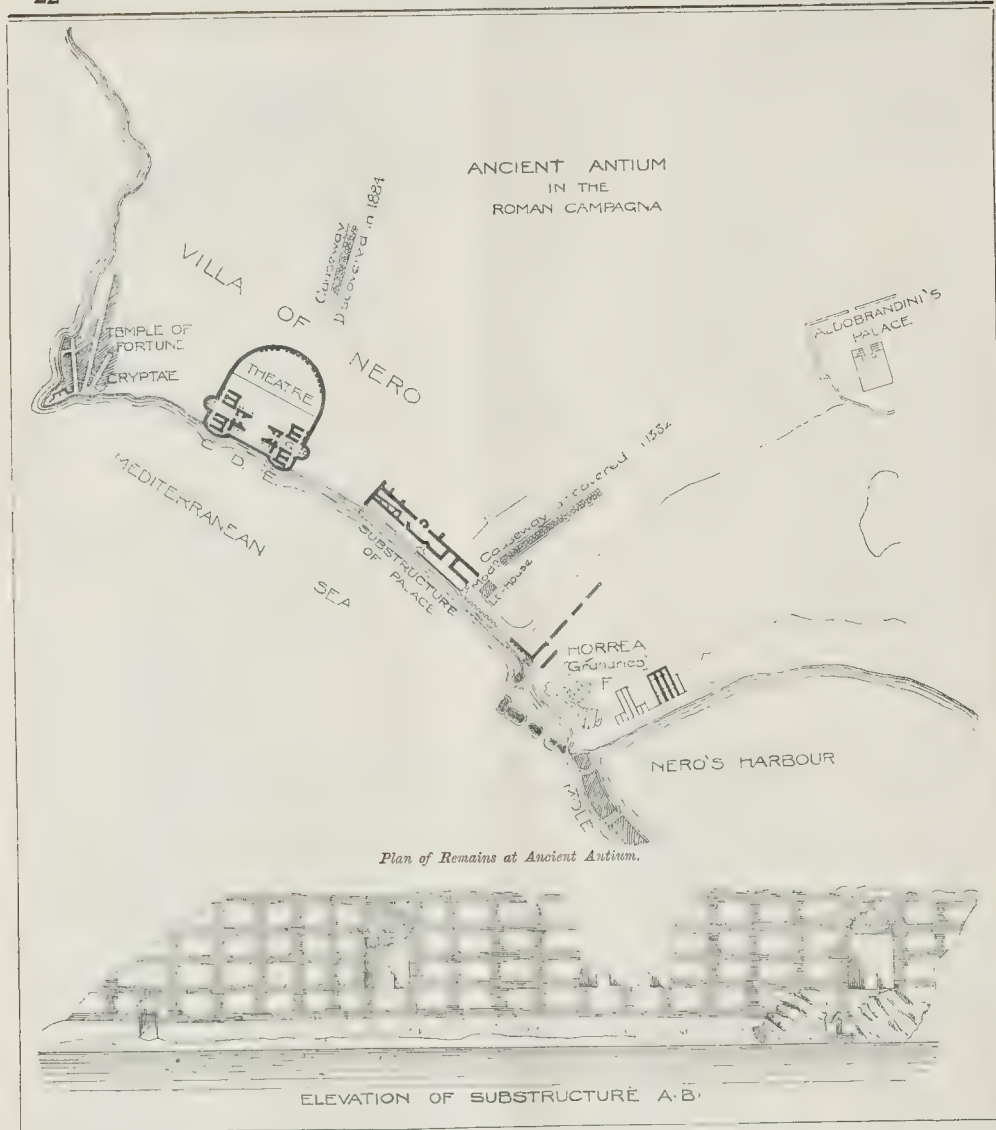
THE sea-coast between Antium and Astura was, in the period of the Republic and of the Empire, a place of amusement and resort of the ancient Roman patricians, who, in their sumptuous villas, built on the sandstone cliffs, recruited themselves after the toils and business of city life. In this now waste region ruins and other remains of buildings and villas are frequently to be met with, which attest the magnificence and taste of the Romans. Ancient writers tell us that Cicero had a villa in Astura; those of Caius Lucretius the Pretor, of Lepidus, of Atticus, of Brutus, of Cottius, and of Agrippina were also in the territory of Antium.

But what principally attract the admiration of visitors are the magnificent ruins of the imperial villa, south-west of Antium, on the spot known as the "Arco Mito." It was built by Nero, who, having been born at Antium, resolved, out of love for his native city, to ornament it with a splendid imperial residence.

He constructed in the first place the sumptuous harbour of which the remains, especially those of the western wing, are still to be seen, probably after the designs of the two celebrated architects, Severus and Celer, and which was a fine example of hydraulic engineering. The piers are about 30 ft. in thickness, built of large blocks of tufa united by pozzolana cement.

The Neronian constructions begin immediately after the northern extremity of the pier, and are easily recognised; they are admirably built of well-fitting and large bricks, and of courses of tufa, and can be compared with the other edifices of Nero in Rome. A different style of construction, that is, of irregular red clay bricks, thinner than the preceding, such as are seen in the Caracalla's *thermae*, proves that these buildings of Nero were repaired in the days of Severus.

In the walls of Neronian construction, the nucleus is always built of large local sandstone blocks, while in the repairs of Severus, the nucleus consists of tufa stone. The walls facing towards the sea were covered with a layer of plaster. The remains of the capacious warehouses and granaries for the use of the port are to be seen on the western branch of the harbour (see plan, F). A row of small rooms, or cells, still exists; they are well built of bricks, and in order to exclude all dampness they are covered with a layer of plaster. Behind these ruins begin the buildings of the palace, from what we see of its remains, and what we may conclude by comparison with many other Roman villas, it offered the appearance of two great terraces or storeys, supported by strong substructures of bricks and *opus reticulatum*, which once extended from the harbour to the promontory of Antium. Only a part of this magnificent building, 120 metres long, remains to this day (see plan, A, B); the rest was gradually washed away in recent centuries by the waves continually breaking upon it. The part still in existence is almost at the foot of the modern lighthouse; it is 120 metres in length, 14 metres in height, and is decorated with great niches, which, at the time of their discovery, were still covered with white stucco and statues. The first part of the substructure (see elevation A, B) was discovered in the beginning of January, 1879, when the waves washed away the earth and the debris, that had fallen from the hillock above it. A statue of white marble was found still in its place in the niche; it represented a Priestess of Fortune, as we can judge by the attributes that are sculptured on a small basin which she holds in her hands, viz., the lion, the olive-crown, &c. It is known that the Temple of *Fortuna Gemina* was famous in Antium. The second part of the substructure (see elevation B) was recently discovered in consequence of a fall of earth, also caused by the waves, and I was myself present at the discovery. A statue of Diana



was still preserved in its niche. The statues, now in the palace of Princess Aldobrandini at Antium, as well as the reticulated work with brick bindings (horizontal layers) carry us to the times of Hadrian, who, as we know, preferred Antium to any other place in Italy.

At the foot of the substructure there probably was a landing-place built on palisades, of which some remains, consisting of large oaken beams, are still to be seen. The late excavations, which I myself directed, have shown that the sub-structure was surmounted with columns of cipollino marble, with stuccoes of exquisite workmanship, representing ornaments and gorgon heads. At the northern end of the substructure I have found the spot on which the theatre belonging to the imperial villa stood, and in which it is known that Nero sang. It is at present entirely covered with earth, but we are perfectly well acquainted with its plan, as it was discovered in 1712, and was described by Bianchini in his work, "Dei Liberti della cosa di Augusto," etc. (see

plan). The wall that supported the *scena* (C.D.E.) having been washed away by the sea in 1884, it was seen that the *scena* and *orchestra* were built on subterranean vaults, and admirably constructed of bricks. As no remains of seats for the spectators have been found in the *cavea*, we may suppose they were made of wood. Only in the hall (G) a marble statue was discovered, besides a marble slab on which the names of six *magistri* of a college, formed to direct the games at the villa, were sculptured. The *cavea* looked towards the east, so that the spectators could contemplate across the *scena* the extensive and beautiful view of the sea, and all the coast that stretches before them to "Capo Circeo" to the south, and almost as far as the mouth of the Tiber to the north.

Little can be said in detail of the ruins between the theatre and the point of the promontory of Antium, as they are all covered with earth, and those looking towards the sea are in a deplorable state of ruin. Some rooms covered with a thick plaster, and in which traces of drains appear, show that

part of the building was used as a water-supply, maintained by the aqueduct which Antoninus Pius rebuilt.

Some caverns (*cryptae*) cut into the sandstone's cliff, are very interesting; they were intended to embellish the villa, and also to afford a pleasant temperature during the heat of the summer; moreover, these caverns being almost on the same level of the sea, offer a most charming view, especially when the waves in windy weather break at the foot of them. It has been suggested that these caverns were anciently stone quarries; but I do not share this opinion, as this sandstone (called by the inhabitants *macca*) is soft and wholly unfit for building purposes. (See plan, *cryptae*).

On this promontory, very near the Imperial Palace, we must place the famous Temple of Fortune, of which Horace sang:—

"O diva gratum quoniam regis Antium."

This position is also in accordance with what Martial says. He describes the temple as being outside the city, on the promontory, looking towards the sea, and visible, there-



fore, to navigators, and easily accessible. Could the above-mentioned caverns have been used as a mysterious spot where lots were cast (*antiaſine sortes*) as was the custom in the caverns of the mountain on which the Temple of Fortune of Praeneste stands to this very day?



This is all that remains of the imperial villa at Antium, whose fate it is, apparently, to be slowly engulfed by the sea. A barrier of natural or artificial rocks ought to be raised in order to save it, but this would necessitate no small expense.

The luxury and magnificence of this villa are attested not only by the existing ruins, but also by the master-pieces of sculpture found here, such as the famous Apollo Belvedere, which was discovered in the time of Julius II.; and the Borghese Gladiator, now in the Louvre. These two statues suffice to show the magnificence of the villa.

Rome, May 2, 1889.

L. B.

#### NOTES.

**D**R. DÖRPFELD'S interesting paper on the Choragic Monument of Nikias which has just appeared in the Athenian "Mittheilungen" (band xiv., sheet. i., 1889) goes far beyond the mere question of the exact position of that much-disputed monument. It serves him, however, as a starting point. In a previous number of the "Mittheilungen" (xiii. plate i.) he had given us a restoration of the facade, based, of course, on the fragments built into Beulé's Gate. He believes that the monument stood on the substantial  shaped foundations still to be seen to the north-east of the Odeion of Heracles Atticus. The original shape was  and half of the foundations of the building were, Dr. Dörpfeld believes, destroyed when the Odeion was built. The Odeion forced the old road out of its line, and when the new road was made the monument of Nikias had to give way. Dr. Dörpfeld gives in his paper his reasons for all this, but only the results that he arrives at can here be briefly summarised. The remains of the monument went to build Beulé's Gate, which, further, is to be dated as contemporary with the Odeion. And here comes in another combination. This new gate was rendered necessary by the alterations in the Pelasgic fortification wall of the Acropolis,—alterations caused by the building of the Odeion, which made a trench in the circuit. It will, indeed, be news to most people that the old Pelasgic wall existed as a fortification down to the time of Herodes. This is, perhaps, the most severe of all the shocks,—topographical and architectural,—that Dr. Dörpfeld has dealt to orthodox archaeology. That Perikles transformed the Acropolis from a citadel to a sanctuary had become a cherished commonplace of archaeological rhetoric. Not only does he settle the date down to which the Pelasgikon wall existed intact, but Dr. Dörpfeld is prepared to give us its precise limits, i.e., from the Klepsydra to the Asklepion. But here he declines to go into particulars; spade and pick, he says, will lend him in a few months unanswerable arguments. Never was the glove thrown down more boldly to fortune. The Pelasgikon has been for years a very nightmare to topographers. We can only hope it may at last be set at rest.

**T**HE same number of the "Mittheilungen" contains a paper by Dr. Brueckner on the poros sculptures of the Acropolis, which have excited so much attention lately. Hitherto individual heads have been commented on, and these are best known in general for their extraordinary colouring. Now that, bit by bit, the fragments have been put together, it comes out that they all form part of a pediment composition, and certainly the most curious one that has ever come to light. The three huge brilliantly-coloured heads belong to Typhon, whose curled tail fills the right-hand angle of

the pediment; with him Zeus, holding his thunderbolt, engages in combat. The left-hand side of the pediment is occupied with Herakles in combat with the Hydra, the Hydra's tail balancing very neatly that of Typhon. This is, so far as we are aware, the only instance in which a pediment is filled in with two separate subjects. [The pediment is so curious that we propose to give a sketch of it in a future number.] The question still remains wholly unanswered, to what building did this and the other curious archaic Hydra pediment belong.

**A** SET of statements comparing the proposed new railway rates with the existing maximum rates, and also with those at present in force, has been prepared by the Central Association of Master Builders of London in connexion with their notices of objection to the various classifications and schedules. These comparisons present some very noticeable features, not the least remarkable of which is that in the majority of cases quoted the actual rates at present charged for building material (which it is proposed shall be still further increased) are already largely in excess of the companies' existing statutory powers. This is particularly the case with short-distance traffic, and is especially noticeable in the schedules of the southern lines. The companies' explanation of this would probably be that the Association should have made some provision for station terminals in estimating the authorised rates,—which, of course, they did not. It is not likely that any body of objectors will recognise these charges until they are unquestionably legal; this point having been left in such a very unsatisfactory and uncertain state in the law courts. In the protest lodged by the Association, it is alluded to in the following terms:—"Your objectors submit that no terminal charges in respect of station services should be recognised. They are advised and believe that such charges, if made by the company at the present time, would be illegal, and that the amounts proposed to be authorised in respect of such charges, and also in respect of services at the stations, are indefinite, and, so far as they can be judged of, are unjust and unreasonable." The other proposals to which objection is taken are dealt with in a concise manner, and the interests of the trade have evidently been well looked after by the Association. A great amount of time must have been expended in the compilation of the comparative tables to which we have referred, and it is clear that such statistics as these, accompanying objections, must be of great assistance to the Board of Trade, and this should ensure careful consideration of the Association's protest at their hands.

#### THE Quarterly Statement of the Palestine

Exploration Fund contains plans of a large three-aisled columned cistern which has been lately found under the new Greek building east of the church of the Holy Sepulchre. The existence of this cistern, it is said, had been known of for some time, but it is only lately that it was cleared out and explored, when it was found to be no less than 102 ft. long, and 34 ft. 6 in. wide. The bases of the piers are round, but above the piers are rounded on the sides next the aisles and centre, the sides of the pillars facing the long way of the cistern being flat; or in other words, a portion of the periphery of each column is sliced off above on two opposite sides. The columns are connected by arches above. Further and more detailed drawings are in preparation.

**T**HE London County Council resolved on June 21, as we reported at the time, that, for the future, District Surveyors are to receive, daily, information furnished by the Fire Brigade with reference to serious and extensive fires,—in order that they may visit the localities and look after dangerous walls and buildings. The Committees of the Council seem to be getting well into their work, and such a resolution shows

good intentions. It is evident that buildings abutting on public thoroughfares, which are dangerous from any cause, should have immediate attention; but it may, perhaps, be well to make haste slowly about anything else. Anyone can call attention personally, or by letter, to any defect in any building, and the Council directs the District Surveyor to report on the subject. Thus the public have the matter in their own hands; and the District Surveyors, not being mere officials, hold the balance level,—and, while averting danger from the public, avoid undue interference with the discretion of owners as to repairs to their property. In cases of ownership, limited in degree or in time (and such limited ownerships exist everywhere in London), great hardship would result if all shabby parts of buildings were at once condemned. When a fire destroys a good deal of any building, the occupants leave, if possible, before danger from giving way of the building is developed. The firemen and salvage men can very well take care of themselves, and need no interference for their protection. Immediate condemnation of the unsatisfactory parts would inconvenience the surveyors to insurance companies, by destroying evidence as to the previous condition of the building, not to mention destroying evidence in case of suspected arson. Would it not be well to begin by instructing District Surveyors to survey walls and buildings abutting on public ways when the Fire Brigade suspect danger, and to instruct them to leave all other walls and buildings damaged by fire alone, at least for a few days? The power of not seeing defects officially, which will, in an ordinary way, be set right in a few days, is mightily convenient in this complicated world. If it is made part of the duty of a conscientious and prudent District Surveyor to condemn on the same day the back walls, floors, and roofs of a building which has been seriously damaged by fire, the innovation on the old practice will be great, and the gain doubtful.

**A**CCORDING to a recent report of the British Vice-Consul at Nisch, a curious survival of the Middle Ages exists in Servia, under the name of *Enafis*. "These are the Guilds of the various trades which regulate the conditions of apprentices and the privileges and rights of masters and workmen. They are independent of State support, being maintained by employers and workmen for mutual support in labour and sickness. Monthly contributions are paid by the members to their various *Enafis*, and the collections managed by an unpaid committee, elected at a general meeting. Foreigners are allowed to join these Guilds, but as the law confers upon them the power of preventing workmen who have not been enrolled from exercising their calling, possibilities of future oppression and tyranny may be said to exist. There is no general system of organisation among the *Enafis*, which exist independently of each other in the different towns of Servia, the most important being in Belgrade, where over fifty trades are represented."

**T**HE *St. James's Gazette* says that yet another playhouse will probably be established in, or near to, Shaftesbury-avenue, where Mr. R. D'Oyly Carte's theatre will soon be ready. A future generation may perhaps enquire whether the great philanthropist was not also a patron or votary of the stage. We read also that the Olympic is to be rebuilt, and upon a larger scale. This theatre was reopened on Dec. 26, 1849, on site of the Olympic Pavilion, which Philip Astley had opened as a circus in 1806.\* For its construction George III. gave to Astley the timbers and spars of a French man-of-war, *La Ville de Paris*, wherein William IV. had served as midshipman. The bigger portions of that woodwork stoutly resisted the fire of March 29, 1849. The Olympic is associated with

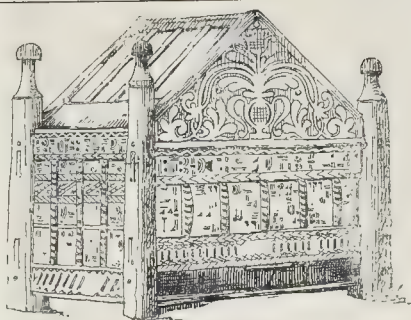
\* *Vide*, in the Crace collection, the water-colours by J. Winston. One, of 1805, shows Astley directing the workmen.



the careers of Elliston, Liston, Farren, Mrs. Keeley, Miss Foote (Countess of Harrington), Madame Vestris, lessee 1832-9; Charles Mathews, Robson, Horace Wigan, &c. Together with Craven-buildings, it stands on the ground of Craven, *prius* Drury House, which returned to the base uses of a public-house, by sign of "The Queen of Bohemia," in memory of our sovereign's ancestress Elizabeth, daughter to James I, who is supposed to have privately married William, first Earl of Craven. It was to her that Sir Henry Wotton addressed his verses—"You Meener Beauties of the Night." In Craven-buildings, too, lived Mrs. Bracegirdle, and after her, in the same house, Mrs. Pritchard; Madame Vestris; and, at 17, Thomas A. Arne, who there composed his music for "Comus," as revived at Drury Lane in 1738.

THE Office of Works have just completed the demolition of a modern house that stood against the southern wall of the Rolls Chapel. This opens out the hitherto private way between the Public Record Office and Rolls-yard. The removal of the house also lays bare most of the original walling,—as latterly cased in flint,—of this side of the chapel, together with the tower, square on plan, and with its coign-stones, much decayed, at the south-eastern angle. In this tower's western wall is a high, narrow, slit window that lights the newel staircase within. Moreover, one can now clearly trace the outline of one of the original windows, being that in the southern wall, nearest to the tower. One or two of its iron bars have been discovered, and we understand that it is proposed shortly to clear out the stones, and, if possible, renew the window after its former condition. The corresponding window (glazed) to the west is a later insertion; that between these two is quite blocked in. A chapel here appertained to Henry III.'s "Domus Conversorum." Pennant says Inigo Jones rebuilt it, at a cost of 2,000*l.*, in 1617. It certainly has many features in common with Jones's Gothic chapel in Lincoln's Inn. The window we speak of is, with three others, closed up from within. Its restoration would brighten the northern side, against which stand two fine monuments of past Masters of the Rolls,—Edward, Lord Bruce of Kinloss (1610); and Dr. John Young (1517); Vertue and Walpole attribute the latter to Torregiano.

ON Monday, 26th inst., will be put up for sale at the Mart, twenty lots of freehold building land, with a frontage along Fulham Palace-road, which form the old grounds of Brandenburg House. That house was built, at a then cost of nearly 23,000*l.*, by Sir Nicholas Crispe, Bart., merchant-adventurer, and the devoted adherent to King Charles I. Dying therein on July 28, 1665, he was buried in his family vault at St. Mildred's Church, Bread-street, London. But they deposited his heart, at his own request, in an urn beneath the black and white marble pedestal, surmounted by the king's bust, which he had caused to be erected in Laud's chapel of ease, Hammersmith. Bowack, writing in 1705, tells us that this chapel (since the parish church of St. Paul, and lately rebuilt, from the designs of Mr. H. R. Gough and Mr. J. P. Seddon) was erected in 1628-31, and that Crispe contributed one-third, or 700*l.* in money and materials, of the total expense. Sir Nicholas is further credited as being inventor of the method of making the bricks wherewith his own house was constructed. Brandenburg House was in turn occupied by Fairfax when the Parliamentarian forces took up quarters in Hammersmith; by Prince Rupert, who bought it of Sir Nicholas's successor, and the Prince's mistress, Peggy Hughes, the first actress, it is said, to take the part of *Desdemona*. George Bubb Doddington, Lord Melcombe of Melcombe Regis, came hither in 1748, and was visited upon one memorable occasion by Dr. Johnson. He styled it "La Trappe," and, besides entirely modernising it, had it



An Icelandic "Jár."

decorated in a very lavish, albeit tawdry, fashion. The garden, into which Dr. Johnson stepped on the night of the storm, is mentioned by Lady Lepel Hervey. Lord Melcombe demised this property to Thomas Wyndham. Christian, Margrave of Brandenburg-Anspach and Bayreuth, purchased it for 8,500*l.* from Mrs. Sturt, in 1792. His widow, Elizabeth, daughter of Augustus, fourth Earl of Berkeley, and whose first husband was William, sixth Lord Craven, lived here for several years. The next tenant was Queen Caroline, who was living here during her trial by the House of Lords. The house was pulled down within twelve months of her death therein on August 7, 1821, and its site taken, in part, for a private asylum.

THE sketch given above is another pencil memorandum from the exhibition of Icelandic work referred to in our "Notes" last week. It represents a wooden box, termed a "Jár," in which the Icelandic women keep the wools for their work. The lid is modern. The rest of the box is covered with runes slightly incised.

ST. BOTOLPH'S, Aldgate (not to be confounded with St. Botolph's, Bishopsgate), has been decorated internally under the direction of Mr. Bentley, with considerable success. From a statement made by the Rector, the Rev. R. H. Hadden, in his "Parish Magazine" which has been forwarded to us, it appears that there was a strong party in favour of pulling down the galleries and building a chancel on the churchyard. Under the advice of Mr. Bentley the Rector has resisted this, and contented himself with a general scheme of painting and decoration. As far as the galleries are concerned he is undoubtedly right; to have removed them would have been entirely altering the architectural design of the church. To the addition of a chancel we see no objection whatever as far as the church itself is concerned; the only argument against it is that trees are precious in East London, and there is a charming group of them east of the church, some of which would have to be removed in making such an addition. What has been done in the church is this: All architectural features remain *in statu quo*. The walls above the galleries are painted a warm delicate grey, "to give a sense of space," those beneath the galleries red, to give warmth. The galleries have an open balustrade in front, and the gallery fronts and balustrade have been painted in white enamel, along with the surbuses of the columns against which they are stopped; a bold experiment, but which has a very happy effect; instead of darkening the church, the galleries now seem to lighten it. Of course it may be a question how long they will preserve this whiteness in a London atmosphere, but as a new method of disposing of the gallery front this is worth attention. The shafts of the columns are painted of that delicate orange colour which is rather absurdly called Venetian or Italian Pink; they harmonise well with the back-

ground of the grey gallery walls against which they are mostly seen. The section of the church ceiling is a large cove over each gallery, rising to a flat between the colonnades. A very ambitious scheme of decoration has been evolved for the cove, which has at the springing a series of figures of boys supporting shields which bear the arms of many ecclesiastical persons and establishments in London history. This is well done, and will, as the Rector says, be susceptible of considerable effect in colour decoration when funds are forthcoming. The coves are divided by plaster ribs formed on the surface rising to the level of the centre ceiling, and continued on to it for a short space on the other side of the architrave over the columns, and then abruptly cut short. This is the only bad point about the treatment; it does not look well. The ribs should either have been confined to the coved ceilings, or the same design should have been carried out on the flat portion; which may still be done. Of the plaster rosettes on the soffits of the galleries also we are disposed to say, "something too much of this." But in general this is a very good piece of painting and decorating work.

THE articles and sketches illustrative of old Surrey cottages, by Mr. Ralph Nevill, which appeared in our columns last year, have been collected into a volume, with some additional matter, under the title "Old Cottage and Domestic Architecture (Surrey: South-west)" which will shortly be issued by the author to subscribers.

THE July number of the *Art Journal* includes an article by Mr. Loftie on St. James's Palace and the fragment of a Palace at Whitehall, illustrated by sketches, giving, besides a couple of views of the exterior of St. James's Palace, the Guard Chamber and Queen Anne's Room; the interior of the Chapel Royal at Whitehall is also given, and a reproduction of an old print of Whitehall by Hollar. An article on "East Anglia" by Mr. C. Lewis Hind, is illustrated by views of Clare Bridge at Cambridge, Peterborough and Ely Cathedrals, St. Margaret's Church and the Market-place, King's Lynn, and the Norman Tower at Bury St. Edmunds—all reproduced from photographs; so that architecture occupies a considerable place in this number. The same architectural tendency is seen in the July number of the *Portfolio*, where the indefatigable Mr. Loftie continues his articles on Westminster Abbey (which we hope will ultimately take a book form), illustrated by Mr. Raiton's beautiful drawings, and Mr. R. T. Blomfield contributes the third of a series of articles on Inigo Jones, with some illustrations from his drawings. "Perth Bridge" is the subject of an admirable etching by Mr. D. V. Cameron. The large place now filled by architectural subjects in our artistic periodicals, and the admirable way in which such subjects are often treated and illustrated, is a gratifying sign of the increased interest in this branch of art in the present day.



## LETTER FROM PARIS.\*

ALTHOUGH we are still four months from the time appointed for closing the Exhibition, the official world is already taking into consideration the ultimate disposition of the structures which have been raised on the Champ de Mars. The Municipal Council is strongly in favour of their preservation, and has brought its views before the Government, and M. Alphand has been heard on the subject before a Parliamentary Committee charged with the consideration of the question. M. Alphand himself is in favour of the preservation of the structures designed by M. Dutert and M. Formigé. He is convinced that the Galerie des Machines and those of the Beaux-Arts and Arts Libéraux are sufficiently solidly constructed to be regarded as permanent buildings. But their preservation raises some difficult questions, especially as to the formation of a new parade-ground for the garrison of Paris, and the partition of the Champ de Mars between the State and the Municipality.

The Committee of the Chamber is to hear the representatives of the Government at its next meeting, and the probable result will be that the Galerie des Machines will be transformed into an immense riding-school (*manège*), which could serve also, if required, as a magazine for provision stores; while the two palaces of M. Formigé may be appropriated for exhibitions of decorative art, for which there is no special habitation at present in Paris, and for some of the numerous exhibitions of art and industry for which there is not room in the Palais d'Industrie.

If this scheme is followed, the gallery which unites the central dome to the Galerie des Machines must be removed, as well as the central dome itself, which is much to be regretted, but as the galleries of the "Expositions Diverses," which are of a more temporary character, must be removed, the dome and its gallery, from which these open, could not well be left standing. The various constructions scattered about the Champ de Mars would also disappear, and the ground would be laid out as an immense square with trees, peopled with statues, and intersected by some wide roadways connecting the fifteenth and seventh arrondissements.

In the meantime, the Exhibition continues its success in point of attendance, the number of visitors averaging from 80,000 to 90,000 daily; and on Sundays it has been found necessary to raise the price of the lift traffic up the Eiffel Tower, as the only means of checking overcrowding and disorder; a measure which, though in fact in the interests of the people, is stigmatised as a "*peu démocratique*." The number of ascents on one Sunday has nevertheless amounted to as much as 30,000, in spite of this new restriction.

New attractions are still springing up in the grounds; one of the latest is the establishment, almost at the foot of the Eiffel Tower, and behind the Mexican pavilion, of an "International Theatre" projected by an Englishman, Mr. Seymour Wade, and which has been only thirty-five days in course of construction. This is entirely hung with tapestries of unflammable character, executed specially at Lille; it accommodates 2,500 spectators; the basis of the construction is wood. The opening was retarded longer than it should have been owing to the delay in the completion of the electric-light installation. The house is comfortable and well decorated, and does great credit to the energy of those who planned and carried out the work.

The Trocadéro, which formed one of the most important portions of the Exhibition of 1878, has been almost forgotten this year (though it forms part of the present Exhibition) for the superior attractions of the Champ de Mars. This is a pity, for it contains subjects of study well worthy of attention, such as the Horticultural Exhibition, the Pavillon des Forêts, and above all the Galleries of the Trocadéro itself, which contain a retrospective exhibition of fine arts illustrating the history of French art from the seventh century to the close of the eighteenth, the history being carried on by the retrospective exhibition of the last hundred years in the Palais des Beaux-Arts, already referred to. This exhibition has been arranged by M. Alfred Darcel, director of the Musée de Cluny, and is of great interest, as it includes

loans not only from private collectors but from some of the richest museums of France, from public libraries, and from the artistic treasures of some of the great ecclesiastical foundations of the country; besides including a great many models of architectural detail of the Mediæval and Renaissance periods.

The jury of Fine Arts in connexion with the Exhibition has made its award in regard to medals of honour, which, before being definitely accepted, has to be submitted to the superior jury composed of the Presidents of various departments. Among English artists the "médaillés d'honneur" has been awarded to Mr. Alma Tadema and Mr. H. Moore; in Austria, to M. Munkacsy; Spain, M. Jimenez; United States, Mr. Sargent and Mr. Melchers; Belgium, MM. Stevens, Wanhers, and Courtens; Holland, Herr Israels; Germany, Herr Liebermann and Herr Uhde; Denmark, M. Kroyer; Norway, M. Werenskjold; Sweden, M. R. Bergh; Finland, M. Edelfeldt; Italy, Signor Boldini; Russia, M. Chelmsky; France, MM. Delaunay, Jules Dupré, Benner, Detaille, Dagnan-Bouveret, Cormon, Gigoux, Aimé Morot, Hébert, Lhermitte, Jules Lefebvre, and Raphael Collin: in all, twelve medals for France and eighteen for foreign artists. It must be remembered, in regard to these proportions, that French exhibitors have been, naturally, far more numerous than those of any other country, and French art more completely represented accordingly.

In consequence of projected fêtes for which the Palais d'Industrie will be required, the Salon has had to close its doors eight days earlier than in previous years. As was foreseen, the annual picture exhibition has suffered very much commercially from the presence of the Universal Exhibition this year; its receipts having been 220,000 francs as against 329,687 in the preceding year: and the quality of the Exhibition also has to a certain extent been deteriorated by the counter attractions presented to artists wishing to be represented in the Champ de Mars galleries, though perhaps not so much as was feared. The medal of honour for sculpture has, however, been withheld this year by the jury, a decision which has caused great surprise, as everyone expected M. Mathurin-Moreau's noble work "Exilés" was sure of this recognition; and if the jury are not satisfied with such a piece of sculpture as that, they are certainly very hard to please. In painting, the medal has been awarded to M. Dagnan-Bouveret, for his "Madone" and "Bretannes au Pardon," by 217 votes, against 115 for M. Benjamin Constant. In engraving, M. Achille Jaques received the medal for a very fine engraving after a portrait by Cabanel. In architecture the medal of honour has not been given; but the greater part of the votes were divided between M. Lortet and M. Esquié, who obtained nevertheless a medal of the first class for his restoration of Hadrian's Villa, of which we have already spoken on a previous occasion. Among the other awards in the architectural department of the Salon, medals of the second class have been awarded to MM. Lucien Fournereau, Paul Wallon, and C. H. Cazaux. Honourable mentions have been awarded to a good many painters, and the Superior Council of the Beaux Arts have awarded the "Prix du Salon" to M. Friant, author of the very interesting picture entitled "La Toussaint."

At the École des Beaux-Arts, where by the way, M. Joseph Blanc the well-known historical painter has been appointed Professor of Drawing, the Jury of Architecture has decided a certain number of competitions. In the competition design (*Rendu*) of the first class, the subject of which was "Une École Nationale des Arts et Métiers," among fifty-six designs sent in, the first medal has been awarded to M. Berger, pupil of M. Guadet; second medals to MM. Lemaire, Eustache, and Dusart. In the competition in Architectural History, of which the subject was the main entrance of the court of a palace, the jury awarded a first medal to M. Clousson and second medals to MM. Malgras and Berger.

At the Hôtel de Ville, the second competition for the decoration of the Salle des Fêtes for the Mairie of the XIVth Arrondissement has been decided. M. M. Chabat has obtained the commission for a large painting symbolising The Family, treated in a style entirely modern. MM. Carroux and Roussel were the other two artists taking part in the second competition.

We can only repeat in regard to this what we have said before about other competitions

for these decorations of municipal buildings—either one class of artists exaggerate to an extreme the characteristics of the idyllic compositions of M. Pavis de Chavannes, or another school carry realism to an extreme and give to the most simple every-day doings the importance of a typical social action. Thus, with a certain amount of spirit and a feeling for colour, M. Chabat has made the mistake of giving the proportions of a large decorative painting to an open-air scene of *genre* which would have been charming if reduced to the scale of a cabinet picture.

There is to be in a few days a solemn inauguration of the reduced copy of Bartholdi's statue of Liberty presented to the city by the Americans in Paris. Though a reduction, this is still a colossal statue; it is executed in bronze, and is to be placed at the extremity of the Île de Cygnes, just below the Pont d'Iéna. The pedestal stands on a basement of masonry 17 metres high, resting on the bed of the river. The pedestal itself, of extremely simple design, is 7 metres high, and bears an inscription recording the services rendered by France to the United States, coupled with the phrase which Sallust has put into the mouth of the dying Micipsa: "Non exercitus neque thesauri presidia regni sunt, verum amici."

In reference to the statue of Leverrier of which an illustration was given in the *Builder* a short time since it may now be added that the statue, which was recently inaugurated in the court of the Observatory, stands on a pedestal designed by M. Lucien Magne, the architect, son-in-law of Leverrier, and that the pedestal is decorated with two bas-reliefs by M. Chapu, symbolising astronomy and meteorology.

The Secrétan picture sale, which has probably been reported pretty fully in English newspapers, has of course been one of the artistic sensations of the month in Paris, and the crowd on the occasion recalled the famous sales of the Galerie Demidoff. Reference was before made in the *Builder* to the remarkable character of the collection, and the details of prices have been everywhere reported. The most remarkable point in the sale was the contest between the French and American purchasers for the works of Millet and Courbet, which ended in the "Angelus" of Millet being purchased by the French Government for 553,000 francs, and the "Remise des Chevreuils" of Courbet for 76,000. The decline in the market value of Meissonnier's works was no less a remarkable revelation of this sale. It may be recorded also that this sale showed a decline in the value attributed to Delacroix, while Troyon and Diaz maintained a high place. It is sad to think of the pictures of Millet going for such an enormous sum now, and of their author dying in utter poverty.

Artistic criticism in Paris has suffered a loss by the death of M. Eugène Veron, editor of the journal *Art*. M. Veron was principal Inspector of Provincial Museums, and the Government has appointed M. Roger Marx, Inspector des Beaux Arts, to succeed him in this office.

We have also to record the death of the painter Mazerolle, who had made a considerable reputation in his art. Mazerolle was born in Paris in 1826, entered the École des Beaux-Arts in 1843 and made his début at the Salon in 1847. He obtained various medals in different years, and the Cross of the Legion of Honour in 1870 and the rank of "Officier" in 1879. Besides numerous works for private individuals, he had carried out a good many important decorative works for the State, especially at the Opera, the Théâtre Française (where he painted the ceiling of the auditorium), and the Conservatoire de Musique. The Gobelins Museum possesses many remarkable designs for tapestries by this artist, among them that of the "Filleule des fées" now exhibited at the Champ de Mars. He was a conscientious and indefatigable artist and a man much esteemed and respected by all who knew him.

We have also to record the death of M. Cernisson, Député de la Côte d'Or, and ex-president of the Municipal Council of Paris. After having studied architecture in the atelier of Constant Dufeux, Cernisson became an "architecte de la ville de Paris," and in that capacity was entrusted with the preparation of the plans of the new entrepôt of Bercy. He occupied himself much with the question of Art-education, and during the period when he

\* Delayed in transmission in the post, and consequently too late for last week's issue, in which it should have appeared.

\* "Not armies nor treasures, but friends, are the bulwark of a government."



took part in the municipal administration he rendered great services to the schools of drawing and to scholastic work in general. He was known as a contributor to the columns of the *Semaine des Constructeurs* and the *Revue Générale de l'Architecture*.

#### THE BRITISH SCHOOL AT ATHENS.

The annual meeting of subscribers to the British School at Athens, was held in the rooms of the Society of Arts on July 10, Lord Carnarvon in the chair. The following report was read by the Hon. Sec. (Mr. George Macmillan) on behalf of the Managing Committee:—"In the year which has passed since the last meeting of subscribers the School has done good work both in Athens and elsewhere. This third year of its existence has helped to establish its position among the other foreign institutes in Athens, and the Committee are confident that the work now in hand and in prospect will serve to convince Englishmen generally of the advantage of such a centre of English energy on Greek soil.

One recent incident deserves early mention as illustrating the value of such an institution as the School, not only to the country which it represents, but also to that in which it is established, and thus to the general cause of archaeology. The Director of the British School was invited by the Greek Government, together with the Directors of the French, German, and American Schools, to confer with M. Kavvadias the Superintendent of Antiquities, as to the course which further excavations should take upon the Athenian Acropolis.

In accordance with the terms of his appointment, Mr. Gardner has during the past session delivered a course of lectures at the School on early Greek vases. Papers have also been read at the School on archaeological subjects by two of the students, Mr. J. A. R. Munro, Fellow of Lincoln College, Oxford, and Mr. R. W. Schultz. Mr. Gardner has further prepared a valuable report upon recent archaeology in Greece, which will be published in the next volume of the Journal of Hellenic Studies.

The School has again undertaken the management of the excavations carried out in Cyprus on behalf of the Cyprus Exploration Fund. Two sites have been worked at, namely, Polites Chrysokhou, the supposed site of the ancient Arsinoe, and Limniti. Mr. Ernest Gardner, the Director of the School, superintended the early stages of the work at Polites, and then left it in the hands of two of the students, Mr. J. A. R. Munro and Mr. Arnold Tubbs, who succeeded Mr. Hogarth as Craven Travelling Fellow at Oxford. The results of the excavation have hardly been so striking as those that were obtained last year at Paphos, but taken as a whole the finds in Cypriot inscriptions and in works of art of various styles and periods—more especially in pottery and terra-cotta—are of very considerable interest. A detailed report will be submitted later on to the subscribers to the fund.

Meanwhile, in Athens, Mr. R. W. Schultz has spent his second session at the School partly in carrying forward his work on Byzantine architecture begun last year, partly in making full-size drawings of some of the more important mouldings in Greek architecture as exemplified in the temples and other remains in Athens. The committee can speak in the highest terms of the manner, at once artistic and scientifically accurate, in which Mr. Schultz is doing this important work and they are confident that the results will bring great credit to the school. The idea of reproducing the Greek mouldings to scale was first suggested by Mr. H. H. Statham,\* the editor of the *Builder*, and a small fund was raised through an appeal in that journal towards Mr. Schultz's expenses. Mr. Schultz has had the advantage of the constant encouragement and advice of Mr. Penrose, the republication of whose great work on the principles of Athenian architecture by the Society of Dilettanti in the course of the past year may here be recorded as an event of special interest to the School and its supporters. It is intended that the drawings should ultimately be issued by subscription. The work on Byzantine architecture in Greece, in which Mr. Schultz will be assisted by

Mr. Sidney Barnsley, will be of a more elaborate character, comprising a treatise on the subject, in addition to numerous illustrations, some of which may be reproduced in colour. For its completion the work of another session, at any rate, will be required. The ultimate publication will probably be by subscription. Mr. Schultz has also been able to be of use to the American School by preparing plans of the important excavations undertaken at Antheion, and in other ways. The Committee have great satisfaction in recording this instance of the cordial relations which exist between the two Schools, and which have been further exemplified in arrangements made for the occasional interchange of books between the two libraries.

From the above record it is evident that important work is being done by the School in various departments of archaeology. And there is no reason to doubt that even more is to be expected from it as the advantages which it offers to students become more widely known and appreciated. The one difficulty which the School has still to face is on the financial side. The new donations and subscriptions received during the past year have been insignificant. The annual subscriptions stand as before at about 460*l*. The grant of 100*l*. from the University of Oxford has this year been renewed for another term of three years, and it is probable that the similar grant from the Hellenic Society will be renewed also. But neither these grants nor the balance of about 200*l*. per annum contributed by individuals can be regarded as a permanent endowment. Until such an endowment has been secured the financial prospects of the School are obviously precarious, and, in the meantime, to allow for the risk of any of these subscriptions being withdrawn, it is of the utmost importance that the number of annual subscribers should be largely increased. The Committee earnestly recommend this point to the attention of all who are interested in Hellenic archaeology, and appeal for increased support, whether in the way of donations or of annual subscriptions.

One other point should be mentioned in the same connexion. It was pointed out last year that Mr. Gardner's tenure of the Craven Studentship at Cambridge was equivalent to a grant of 300*l*. towards the director's salary. It was this which enabled the Committee last year to contribute 150*l*. towards the Cyprus Exploration Fund. And so in the session now ended, the Committee were able, while making some addition to the capital of the school, to grant 75*l*. towards Mr. Schultz's expenses in Athens. For the ensuing session, they have offered a Studentship of 50*l*. to each of the Universities of Oxford and Cambridge. But although Mr. Gardner's appointment as Craven Student has been extended for another year, he is not again re-eligible. Unless, therefore, an income of at least 200*l*. a year can be secured from other sources, the director's salary will, after next year, absorb almost the entire income of the school, and seriously hamper its activity in other directions.

As the balance-sheet shows, there is now a balance of some 686*l*. in hand to capital account. The Committee propose to devote some part of this sum next session to excavation on some suitable site in Greece itself. The valuable results obtained by the French, German, and American schools by such researches on Greek soil may well inspire English students with generous emulation. And the Committee feel no doubt that the subscribers will approve of this scheme, even though the products of the excavation must go to enrich the museums of Athens. Where other nations are content to devote money and labour to disinterested research, it is not to be supposed that Englishmen will show a less generous spirit. Indeed, the obligation upon them to assist in the noble work of unearthing the buried treasures of Greece is all the greater that they have, at an earlier epoch, become the possessors of such priceless relics as the Elgin marbles and the Phigalian frieze. The right of publication of the results would, of course, be reserved to the excavators, and should in itself be sufficient reward.

In conclusion, the Committee hope that enough has been said to show that the establishment of the British School at Athens has been abundantly justified both by the work that has already been accomplished and by that which still offers itself to be done in various departments of research. And more they would urge upon all who desire that England should hold her own in the generous rivalries of learning to

take care that so promising an enterprise should not be brought to an end for want of pecuniary support."

In moving the adoption of the report, Lord Carnarvon spoke in warm approval of the work done by the School so far, and urged his hearers to use their utmost efforts to secure the funds which were so sorely needed to place it upon a permanent basis.

Sir Charles Newton, in seconding the motion, said he was pleased to find that the School had taken up the collection of Greek architectural mouldings. He had long hoped to see this done, and had mentioned it only the other day at the Institute of Architects.

The motion was then put and carried unanimously.

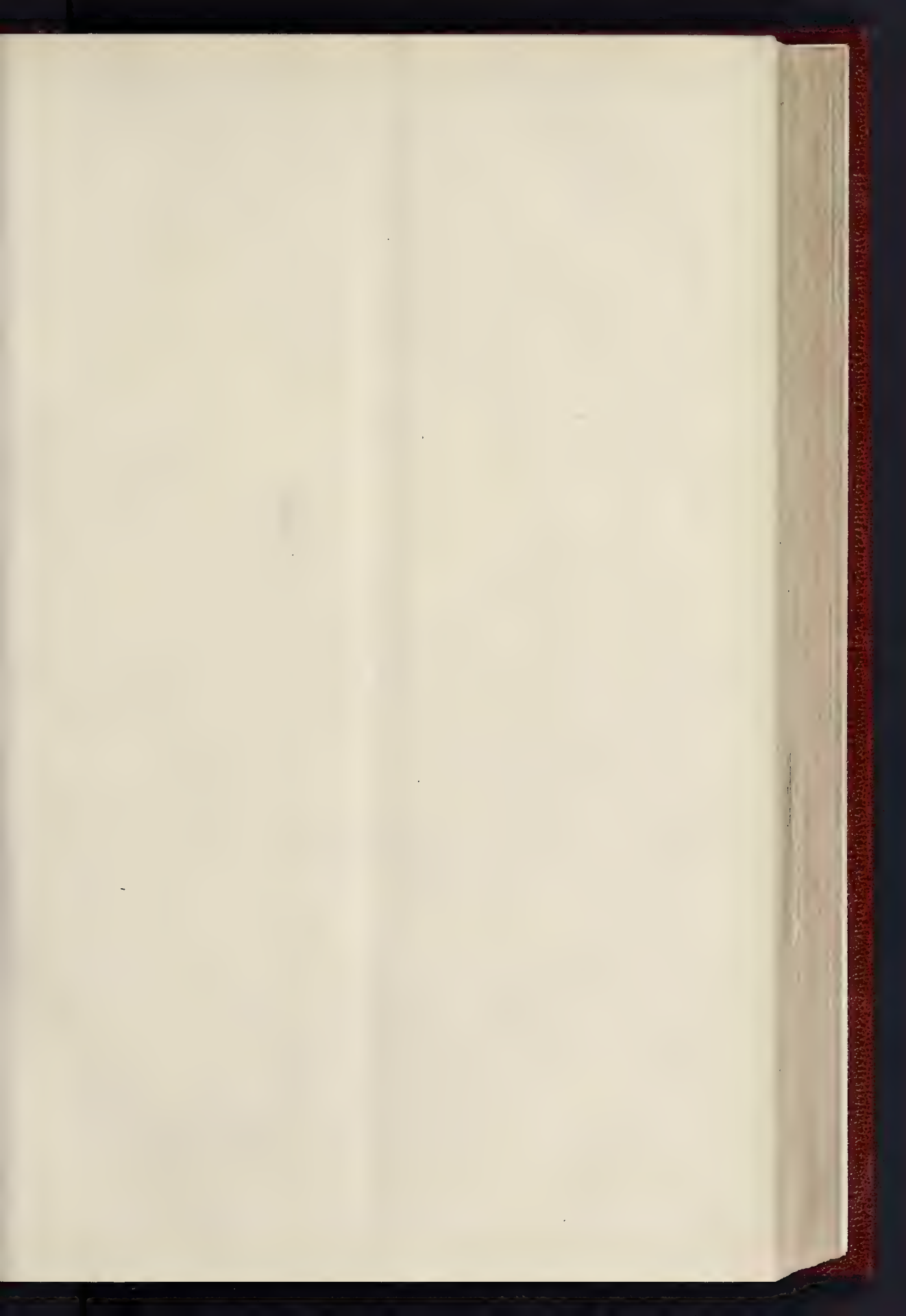
After the usual election of officers, Mr. Ernest Gardner, the Director of the School, made a detailed statement of the work done by himself and the students during the past session, both at Athens and in Cyprus. The meetings for the reading of papers had been numerous attended, not only by English travellers and residents, but by representatives of the foreign Schools and native archaeologists. So many English travellers had in one way or another availed themselves of the advantages of the School during the year, that one of its objects, that of serving as a centre of information and study for English travellers in Greece, had been amply fulfilled. If it was to be regretted that the supply of regular students was small,—only three in the year,—it was at any rate a satisfaction to notice that these students had all done excellent work. Special mention was made of a paper read by Mr. Munro on the works of Scopas, and of the very valuable series of drawings made by Mr. R. W. Schultz (1) of the mouldings in Greek architecture, and (2) of Byzantine Churches in and about Athens.

Mr. Schultz, in the course of a few words on the work on which he had been engaged, referred to the diagrams of the mouldings which were exhibited on the wall. These were the actual outlines drawn from the stones on the spot. He alluded to the care which had to be taken with every point to ensure accuracy of measurement, and described the way in which the curves and outlines of the mouldings were obtained either through the use of the cinematograph or by means of tough modelling clay pressed into the crevices and carefully transferred to paper. Most of the mouldings of the Parthenon and Propylaea were measured from the fallen blocks. Recourse was had to the use of ladders for the other buildings, the details of which were not so easily accessible. While the work was principally confined for this session to Athenian buildings, a visit was also paid to the Temple at Sunium, and although the remains there are very much weathered, he was able to obtain satisfactory outlines of several important members. A collection was also made of the various fragments of early work lying on the Acropolis or collected in the museums, such as capitals and cornices in porous stone and pedestals and gutters in marble. He hoped to be able to continue the work next session and visit such important sites as Egina, Rhamnus, Bassae, Corinth, &c. Mr. Schultz also alluded to the Byzantine work to which he had again devoted a little time. Mr. Barnsley's drawings of the Athenian churches, the work of a former session, were shown, and he mentioned that a similar series had been exhibited at a largely attended meeting in the School at Athens during the winter, and had attracted considerable attention. He also referred to the work which the Germans and others are doing in connexion with the history of Medieval art in Greece, and pointed out that there was scope for a work on the architecture of this period, the only book hitherto published being that by Couchaud, nearly fifty years ago, the drawings in which are very slight and have been proved unreliable. He hoped they would be able to get together, during another session, a collection of drawings which would enable the school to do for the Byzantine architecture of Greece what had been done by Texier and Pullan for the churches of Salonika.

Mr. Penrose expressed his satisfaction with the drawings before them. He had examined them, and could testify to the care and accuracy with which they had been done. He was especially interested in the outlines of the early capitals, of which Mr. Schultz had sent him copies. He found that these were all worked out geometrically, like the mouldings of the best period.

\* This is not quite correct. The point of Mr. Statham's recommendation was that they should be reproduced full size. Plenty of Greek mouldings have been published to scale, i.e., reduced; but hardly any, in English publications, to full size.—Ed.









HOUSE AT RONDEBOSCH: CAPE TOWN:  
for W. H. STYVEN ESQ.



James Barks Architect  
LONDON







## THE LINCOLN AND NOTTS ARCHITECTURAL SOCIETY AT BOURNE.

The Architectural and Archaeological Society for the Counties of Lincoln and Notts held their annual meeting on Tuesday and Wednesday, June 25 and 26, at Bourne, in South Lincolnshire, under the presidency of the Bishop of Lincoln. The Bishop of Nottingham, with his customary geniality and fulness of information, acted, as he has done for very many years past, as the director of the excursions, reading a clear, brief account of each church visited during the two days.

The Parish Church of Bourne, a remnant of the Church of the Priory of Austin Canons, founded at the beginning of Stephen's reign by Baldwin FitzGilbert, we reserve for the fuller illustration which so curious and interesting an example deserves. The castle, which was in decay in Leland's time, has now completely disappeared. Only the moats of the outer and inner wards and the earthworks, themselves fast diminishing under the hands of the cultivator, remaining to mark the site.

On leaving Bourne, the first church visited was that of Eidenham. This is a fine building, with Early English arcades. A noble Perpendicular disengaged west tower of excellent masonry, with coupled belfry windows under one containing arch, and rich battlemented pinnacles, a Perpendicular chancel and south aisle and porch. The chancel, which is long, is choked with elaborate marble monuments, with busts and statues in Roman togas, in the taste of the last century, which entirely block the lofty side windows, and give the building the appearance of a sculptor's workshop. The sooner the noble owners of Grimsthorpe Castle erect a mausoleum for the reception of these incongruous encumbrances the better for the architectural and religious character of the church. The nave is of four bays, with richly-moulded Early English arches rising from clustered piers of banded shafts, with a heavy circular abacus, not broken over the shafts, an unpleasing form not unfrequent in Lincolnshire. There is a plain Perpendicular clearestory and good open roof. The windows of the north aisle are charming examples of very late Decorated, of two lights, with transoms, the recess of the window being carried down below the sill, forming a sunk panel in the wall. To the east of the door of the north aisle, a small shallow niche, resting on a string-course studded with large ball flowers, deserves notice. The Perpendicular south aisle and south porch are finished with a very elaborate frieze of shallow panels of great richness and variety. The Early English tubfont, set round with shafts bearing bi-cusped arches, is of singular interest. Beneath the tower are collected remains of altar tombs and sculptured effigies, and a fragment of a Celtic cup, with interlacing work rescued from the churchyard to which they had been banished to make room for the cumbersome and tasteless Willoughby memorials. On the south face of the arcade of the south aisle towards the west end is a circular stone with a curious interlaced pattern. The communion plate, gathered from various places by the father of the late Baroness Willoughby, is of unusual magnificence. It is all of gold and silver-gilt, and comprises among other pieces richly-wrought German and Italian chalices, a gold incense-bowl, a pair of tall candlesticks of Florentine workmanship, and, most curious of all, a piece of early sixteenth-century Spanish plate, bearing the castles of Castile round its upper rim, now used as a fagon.

Eidenham Church possesses a unique object of interest in the brass of an archbishop in the act of benediction on the western face of the tower, outside, about 20 feet from the ground. The singularity of its position evokes much curiosity, but no satisfactory theory was broached.

Grimsthorpe Castle, which was next visited, and where the Society lunched by the invitation of Lord Willoughby, is an interesting example of a sixteenth-century house, skillfully adapted by Vanbrugh and later architects to modern requirements. The original house was hastily erected by Charles Brandon, Duke of Suffolk, who had married the heiress of the Willoughbys for his second wife, to receive his royal brother-in-law, Henry VIII., after the close of the Lincolnshire rebellion of 1536. Like all the great mansions of the time, it was built round an open courtyard, the entrance being to the north, and the hall and chief apartments facing east. In 1722

Vanbrugh, who had recently completed Blenheim and Castle Howard, built a new north entrance-front, with angular tower-like masses rising a story above the centre, skillfully breaking the monotony of its long line, with its heavy parts and coarse details. The order employed is Doric, with a ponderous cornice and huge triglyphs, running the whole length of the centre, and enormous rusticated Doric columns, with small round-towers at each angle. The design, though stately, cannot be regarded as a favourable example of Vanbrugh's style. The eastern tower contains the great dining-room, hung with French tapestry, once belonging to Suffolk's second wife, Mary, the sister of Henry VIII., the Dowager Queen of France. The western contains the chapel, occupying two stories. It is a stately room, with Corinthian pillars and pilasters, but very cheerless, demanding stained-glass for its windows and gilding and colouring for its heavily-panelled ceiling and walls. The ritual arrangements are mean. The communion-table of a coffin shape, is we should hope, unique. The seating is of plain boards painted stone-colour. The chief feature is a huge, tall pulpit of the type familiar to us in London churches, with sprays of foliage, with the usual hour-glass base. The inconvenience of the rooms all communicating with one another without side passages was obviated by Vanbrugh, by the erection of heavily-vaulted corridors of two stories along the west and south sides. Useful as they are, they are clumsy in construction and coarse in detail. The entrance-hall is heavy and ugly, the centre of the ceiling being occupied by a plain elliptical dome, recalling the inside of a huge dish-cover. The state saloon and drawing-rooms on the east front were formed out of Suffolk's banqueting hall and withdrawing rooms by Lord Gwydyr in the latter part of the last century. They are handsome rooms, rich with historic pictures and gorgeous furniture. The old toilet, with its many projecting bay-windows, is preserved externally, but the effect is injured by cutting out the mullion and substituting modern sashes.

On entering the central courtyard it is interesting to trace amid modern alterations on the east side the outline of Suffolk's banqueting hall, with its lofty oriel and square entrance tower, projecting into the court. The south front preserves its gables and projecting chimney-stacks, which give it a picturesque air, but it suffers generally from the removal of the mullions from the windows. The west front, which contains the living-rooms in three storeys, has been completely modernised, and exhibits a meagre Gothic casing form, without a spark of Gothic spirit. At each corner of the south front stands one of the low square towers of the earlier castle. That to the east is the most considerable, and retains its newel staircase and plainly ground fifteenth century roof. We must entirely pass over the contents of the house, rich as they are in historic interest. The family of Willoughby being the hereditary Great Chamberlains of England, the paraphernalia of each successive coronation, from the clothes worn by the Sovereign down to the chairs on which they sat and the tables from which they ate, have become their perquisites, and are preserved with religious care. The violet velvet suit of James I. with capacious hemp hose, and the saddle and horse caparisons of his coronation progress, are perhaps the most noteworthy of this very remarkable series of objects of regal state.

Leaving Grimsthorpe, a lovely wooded hollow, humpy with mounds, marks the site of the Cistercian Abbey of Vauday, "de Valle Dei," one of the many daughters of Fountains, founded in 1147. A few years since excavations revealed the base of one of the clustered tower piers, a beautiful example of the Transition, and other fragments. Exposure to the weather has reduced the whole to a shapeless mass.

The next halt was at Little Bytham, the little church of which, with its Western tower, Norman below, capped with a low spire, is a conspicuous object from the Great Northern Railway. The features of various dates it exhibits give this little church much interest. The long-and-short work at the S.E. angle of the nave tells of a free Norman Church, of which, perhaps, the tower arch is also a remnant. Two very beautiful small Transition doorways on the north side of the nave and the south side of the chancel, and a single round-headed window near it, bear witness to rebuilding in the twelfth century; while the arcade of three bays on the south side, with cylindrical

piers and chamfered arches, speak of an addition in the thirteenth; and the perpendicular windows of alterations in the fifteenth. The Transition doorways well reward careful attention. They are very late in the style; that in the nave has both the dog-tooth and the zigzag, with the square abacus. Though not promising much at first, this proved a very rewarding little church. A fine founder's tomb of the fourteenth century, rich in ball-flower, must not be forgotten.

The next church, Coreby, has suffered much from a generous well-to-do incumbent, who unluckily has been his own architect. Among singularities due to this well-meaning gentleman is a groined ceiling in dark wood covering the nave, a wondrous gable cross capping the very curious stone-ribbed south porch, cut out of a square block of stone, and pointing four ways, and a very ornate but ill-designed font, its plain, but much worthier, predecessor being banished to a corner of the tower. The west tower is very like that of Little Bytham, but instead of a spire has a low pyramidal roof. The ashlar of the outside is excellent, with pine base-mouldings. The chancel is Transition Norman, with tall, plain, single lights, and a plain Priest's door. In the chancel is a very fine cross-legged effigy of a knight in chain-mail, and at the east end of the south aisle is a very curious monument of a knight and his lady, his chin covered with the barbe, the bodies covered with drapery, as if lying in bed.

On the west wall of a north chantry, now the vestry, is a very curious piece of carving, probably a heart reliquary: it is vesica-shaped, with a shield bearing three annulets on the lower part, with a small broken figure above. It is rather remarkable that there is zigzag on one side of the shield and stiff conventional foliage on the other.

The last church visited was that of Witham-on-the-Hill. This is cruciform in plan; a tower bearing a spire rebuilt, and by no means badly, in 1798, attached to the south aisle, corresponding to a transeptal chantry on the north side. It has north and south aisles, each of four bays; that to the south Transitional with cylindrical shafts and capitals displaying the Transitional volute, and semicircular arches, that to the north Decorated with octagonal shafts, pointed arches, and windows of flowing tracery. The west window, of five lights, is a fine example of Perpendicular, and that of the north transept an equally good specimen of the passage from flowing tracery to Perpendicular, filled with very good painted glass, representing the Parables, the work of Messrs. Burlison & Grylls. The octagonal tubfont, its sides covered with shallow, arabesque carving, is of much interest. The south porch also deserves notice for its outer and inner shafts and doorways of Transitional date. The church is a large one, and its interior has a bare look from its absence of fixed seats, the accommodation being provided by chairs.

**A London House, A.D. 1282.**—Mr. M. D. Davis writes to us as follows:—"Looking through the Exchequer Pleas of the Jews in the course of last week, I alighted upon a curious piece of information relative to a house built on the spot now occupied by the new City of London Court, close to Guildhall. The Jew mentioned in the record was the most conspicuous figure of his times. He is known in the Patent Rolls as Prince Edmund's Jew, having been allotted to that personage as his vassal. More than ordinary privileges were allowed him to carry on his money-lending avocation, the Prince exacting a large share of the proceeds. The record, translated from the Latin, reads as follows:—"London. Adam de Fulcham came before the Justiciar, and acknowledged that he had received from Aaron, the son of Vives, 20 marks on behalf of Master Radulph the mason, he undertaking to raise and construct a certain house for the said Aaron in Cattedrete, in the parish of St. Lawrence-in-the-Jewry by Christmas Day in the year 10 of the reign of King Edward. In accordance with certain covenants laid down on a certain writing, to which are attached the seals of the aforesaid Adam and Radulph. Unless the said house be entirely finished within the above-mentioned date, the said Adam concedes that the aforesaid 20 marks may be raised and exacted out of his lands and chattels, together with all damages that Aaron may have sustained by reason of the building not being constructed in due time."



## Illustrations.

## HOUSE, RONDEBOSCH, CAPE TOWN.

THIS is a reproduction from a drawing in the Royal Academy Exhibition, representing a house to be built near Cape Town, from the design of Mr. Jas. Brooks.

We regret that Mr. Brooks has been prevented by pressure of work from giving us this week some details in regard to the house, which he hopes to give for next week's issue.

## CHURCH OF SS. PETER AND PAUL, BOLINGROKE.

THIS church is associated with the names of John of Gaunt and Henry of Bolingbroke, and is thus connected in a direct line with that race of kings from which our present Queen is descended. It is the south aisle only of the original church, from which it was separated by an arcade of four arches; the whole of the nave, chancel, north aisle, &c., were swept away about 200 years ago, the east face of the tower then being rebuilt, but the foundations have recently been discovered, the present north aisle having been added in place of the old nave to open out the arcade. The church is about 59 ft. long by nearly 24 ft. wide, and the walls are of the same height. In the western bay on the south side is a good doorway, with quatrefoil niche over it, which at one time contained a statue, and on the east side is a canopied water-stoup. This doorway formed the access to the church from the Castle, which is only a few yards off. In the other three bays are good traceried windows of three lights each, and under the east one is a canopied sedilia. The east window is of five lights, the west one of four lights, all of good flowing decorated tracery, showing clearly that it was erected in the early part of the fourteenth century, when the Castle was the abode of Royalty, Henry IV. having been born here on the 3rd of April, 1366. The walls have been repaired, new buttresses erected, the gables rebuilt to their original pitch and re-roofed, with a panelled ceiling internally. The eastern bay is raised above the remaining portion to form a chancel, and the east bay of the aisle is screened off to form a vestry. The work has been carried out, under the direction of Mr. James Fowler, architect, Louth, by Messrs. Walter & Hensman, of Horncastle, builders.

## GLOUCESTER MUNICIPAL BUILDINGS COMPETITION.

We give illustrations of the perspective view, plans of two floors, and large scale elevation of the design by Mr. G. H. Hunt, of London, to which the first premium was awarded in the competition for the new Municipal Buildings to be erected at Gloucester.

We have commented so fully on the design in our article of last week, that it is unnecessary to say more now, and we leave the drawings to speak for themselves.

## MERCHANT TAYLORS' HALL.\*

THIS ancient and interesting Hall stands on the site of some premises which were purchased by the Merchant Taylors' Company in 1331, from Cressin, the tenant at that time being Sir Oliver de Ingham, who died whilst defending Bordeaux against Philip of France in 1344.

The Great Fire of London destroyed the greater part of the Hall premises, and melted most of the plate, but the original walls remain in places.

The present Hall (which replaced Ingham's Hall in the fifteenth century) is 82 ft. in length and 45 ft. in width and height, and has all the characteristics of a Hall of the fourteenth and fifteenth centuries, viz., the corridor or lady's chamber, the dais or raised platform, the recess for the buffet, the floor or marsh which was formerly strewn with rushes, the screen at the east end, and the minstrel's gallery over it. The stained-glass windows are filled with the arms of former members of the Company, including several of the kings of England from the year 1404 down to the present time.

Many noted political and social gatherings have taken place in this Hall. Henry VII.

attended the election of Master and Wardens in the year 1506, and was present at the annual feast, held on the Nativity of St. John the Baptist, the patron saint of the Company, the proper title being "The Worshipful Company of Merchant Taylors and Linen Armourers, of the Fraternity of St. John the Baptist."

In the year 1607 James I. and his son, Prince Henry, were entertained, and in the ancient records of the Company we read "at the upper end of the Hall was sett a chayre of state, where his Majestie sat and viewed the Hall, and a very proper child, well spoken, being clothed like an angel of gladness, with a taper of Frankincense burning in his hand, delivered a short speech, containing eighteen verses devised by Mr. Ben Johnson, the poet, which pleased his Majestie marvellously well; and upon either side of the Hall in the window neere the upper end were galleries or seats made for Musike, in either of which were seven singular choice musicians playing on their lutes and in the ship which did hang aloft in the Hall, three rare men and very skilful who sung to his Majestie."

The Master of the Company having presented the King with a purse of 100*l.* and the Prince one of 50*l.*, the guests departed, not, however, before they had partaken of the banquet which was provided for them.

We also find the following memorandum, which is highly amusing:—"Mem: That it was agreed that 50*l.* should have been given to the Queens, but by reason that she came not 50*l.* was saved."

The present kitchen, which is thought by some to have been the old Hall of the Company, measures 37 ft. by 31 ft., and is about 30 ft. high. What remains of the architecture is of sixteenth century type, the most noticeable feature being the arcade on the north side, which consists of three openings with low four-centred arches moulded with two sets of double ogees, divided by a hollow, and above there are three large windows, the south side has a window-like opening, now bricked up, the east side two doorways, the west side one doorway and a two-light window, with the remains of tracery, but now built up. There are some perpendicular corbels at a great height, which probably helped to support the wood-work of an open timber roof, no doubt destroyed at the Fire.

The crypt is, perhaps, the most ancient and interesting feature in the building. The walls are formed of chalk and ragstone. There are three bays groined with plain played ribs springing from corbels, moulded and carved with heads. The spandrels are filled with squared chalk. The style is of the fifteenth century, probably about the time of Henry VIII. This crypt is about 12 ft. below the street level, and may have been a cloister from the street to the chapel. Some of the earliest records of the Company take us back to the year 1267, when disputes arose between the Merchant Taylors and the Goldsmiths' Company, and in 1484 a series of street fights took place between the Merchant Taylors and the Skinner's Company for precedence, and Lord Mayor Billesden ordained that "for nourishing of peas and love," each Company should take precedence in alternate years, and feast each other annually, and this custom has been kept up for 400 years.

These riots are illustrated in the stained glass windows of the corridor on the south of the Hall, the three subjects being "The Controversy," "The Award," and "The Feast."

The general arrangement of the buildings is round a quadrangle, or garden as it has been called for many years, the banqueting hall being on the north, the library on the south, the Court-room on the east, and the Court dining and drawing-room on the west.

In the gallery over the Hall are two hearse-cloths, of Italian fabric, which were used in earlier days at the burial of a brother of the mystery. That to the left have dates about 1490 to 1612. In the centre is depicted the baptism of our Lord, with St. John the Baptist kneeling and baptising, and an angel holding the Saviour's robe. On each of the sides is an Agnus Dei, surrounded by rays, with the Baptist holding the Lamb and a scroll, "Ecce Agnus Dei," then angels bearing the Baptist's head in a dish, with another scroll on which is written "Caput Iohis Baptistæ disco." At each end is a pair of shears open.

On the shorter borders one exhibits the Baptist's entombment, his headless body being placed in the sarcophagus by three men in rich dresses, and the other the decollation, and in

the centre is the body, with the executioner holding up the head, and Salome holding the charger to receive it.

The costume of the figures is of that period, the swordsmen,—of a landknecht,—with a cap and feathers, a vest slashed, and tight-fitting hose. Salome is dressed in a long gown over which is a jacket trimmed with ermine.

The hearse-cloth to the right is of somewhat later date, 1520-30. The centre is cloth-of-gold velvet; the pattern is in purple and gold, and the borders are entirely covered with gold and silk embroidery, and the borders have subjects connected with the life of St. John the Baptist, the patron saint of the Company. Both these specimens of embroidery are of very fine workmanship, and were probably executed in England.

There are several interesting pictures in the various rooms and corridors,—viz., a portrait of Henry VIII., by Paris Bordone; a portrait of St. John the Baptist, in the style of Murillo; portraits of the Duke of Wellington, by Wilkie, Lord Eldon, and the Duke of York; and one of the younger Pitt, by Hoppner, given to the Company by the Pitt Club.

In the Drawing-room are two portraits by Kneller (Charles II. and James II.), and two by Thomas Murray of King William and Mary. Among the other portraits are Charles I., by Vandyke, Sir Thomas White, and portraits of former Masters of the Company, by Kneller.

In the Committee Room is a portrait of Sir A. Reynardson, a member of the Company, who was Lord Mayor in 1649, and refused to proclaim at Chertsey and the Exchange the order of the Commons of March 17 "for abolishing the King's office." When summoned to the bar of the House, he pleaded his oath of allegiance, and was degraded, fined, and imprisoned in the Tower for two months, but he adhered to his duty.

Unfortunately, the Fire destroyed a great portion of the Company's treasures in the way of plate, but some valuable specimens of the seventeenth and eighteenth centuries still exist, among which is a circular rose-water dish, about 18 in. in diameter, parcel gilt, engraved with flowers, scrolls, and strap-work of the Elizabethan period, and the date is probably 1575. The Company's Mace also was saved, and is recorded to have been made in 1597 at the cost of the bandle, who had lost the old one, and also the silver yard-measure by which for some centuries the London cloth measures were corrected. A pair of large frosted silver loving-cups, made in 1680, are very handsome, and have frequently been filled with the spiced drink called "sack," of which Sir John Falstaff was so fond.

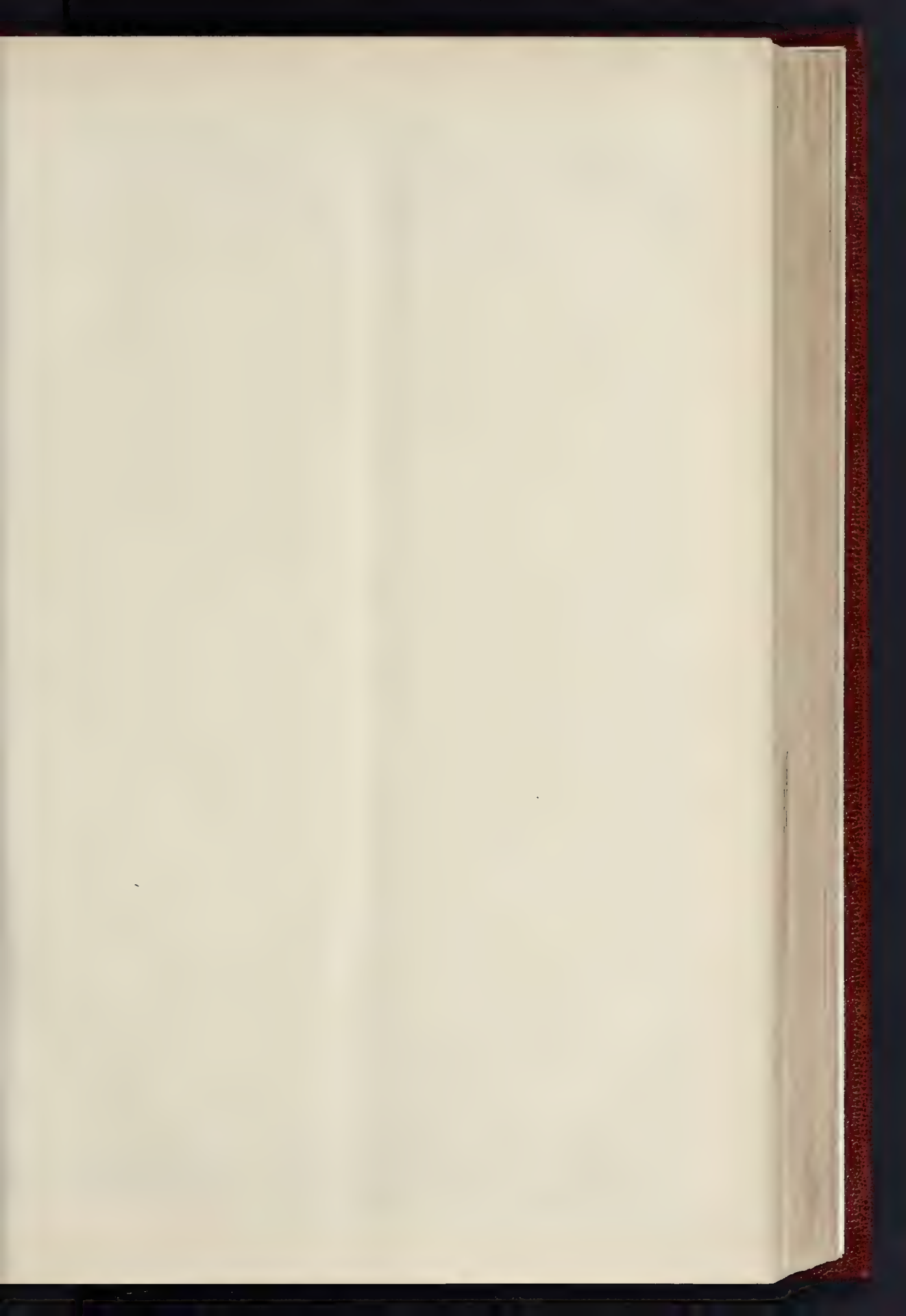
Let us glance for a moment at some of the charities and institutions which the Company support. First of all comes their great school at Charterhouse, where 500 boys are educated at a nominal cost in the best possible manner. Then follow the two schools for boys and girls at Great Crosby, near Liverpool, where about 100 more students are taught. Also schools at Walsall, Ashwell, and Wolverhampton, where scholarships are given by the Company.

Then they have almshouses at Lee, in Kent, where about 40 poor women, widows of freemen of the Company, are provided for. A convalescent home for men at Bognor, Sussex, where about 60 men are sent from the hospitals to gain health and strength, and a similar institution for ladies, where there are about 30 inmates. At both these homes no charge is made to the patients, the Company defraying all expenses. They also subscribe annually to over 100 other charitable institutions.

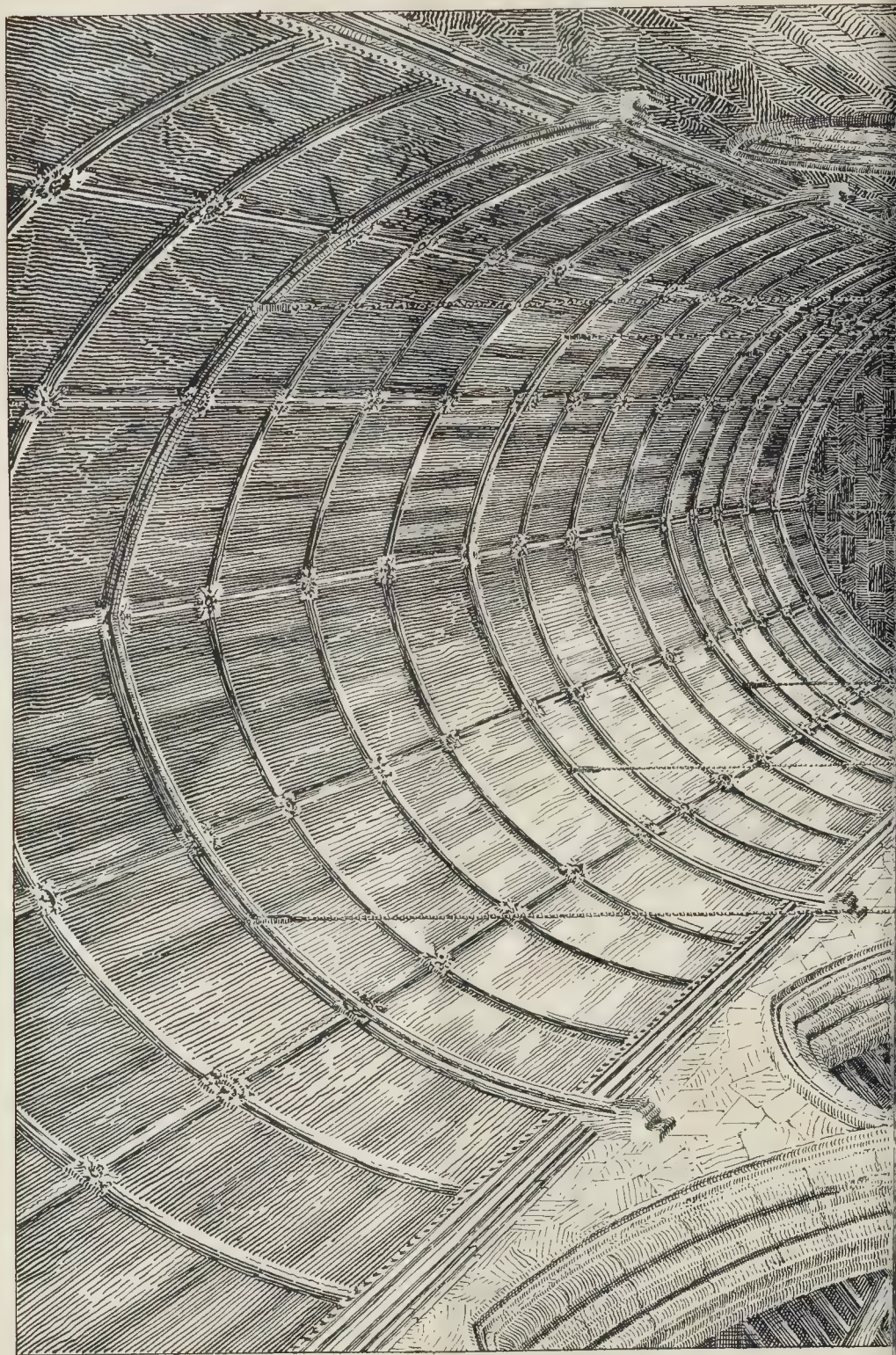
As Mr. C. M. Clode says in the preface to his valuable Memorials of the Merchant Taylors' Company, "All that the Crown ever ceded to the members of our fraternity was the right of free assembly for the purposes of self-government, the liberty to hold in an honest manner their feast of meat and drink on St. John Baptist's day, and to acquire real estate, and yet out of these elements what a fabric of social order have these citizens raised! How few institutions are now existent as they originated, for during the period under notice have not kingdoms been annihilated, thrones destroyed, dynasties changed, and the elements of religious strife let loose in Europe? and yet in each of these trials, so far as they have fallen upon England, the fraternity of St. John Baptist has been found acting in dutiful allegiance to the rulers of Church and State while no better evidence can be furnished that the citizens are averse to change

\* A paper by Mr. W. Hilton Nash: read on the occasion of the recent visit of the Architectural Association to the Hall, as mentioned in our last.

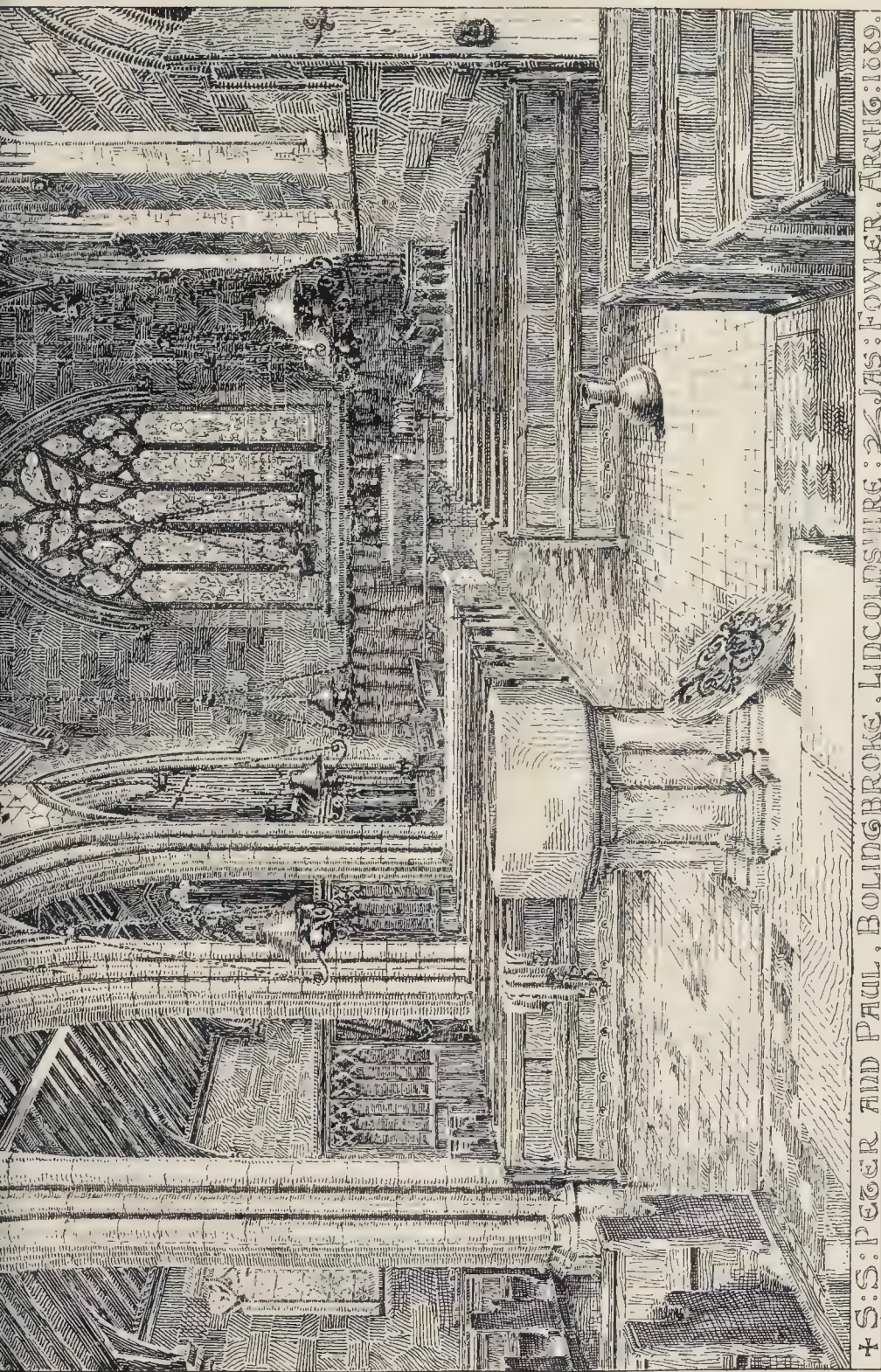




THE BUILDER, JULY 13, 1889.







+ S: S: PETER AND PAUL, BOLINGBROKE, LINCOLNSHIRE: 22 JAS: FOWLER, ARCHT: 1889.

DESIGNED BY JAS: FOWLER, ARCHT. AND PAUL, BOLINGBROKE, LINCOLNSHIRE.





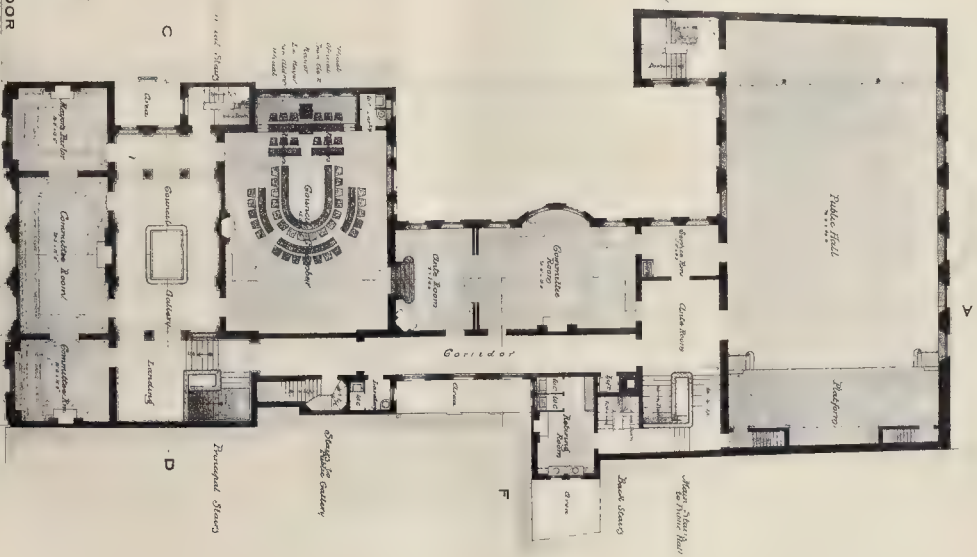
GLOUCESTER MUNICIPAL BUILDINGS COMPETITION: FIRST PREMIATED DESIGN.—MR. G. H. HUNT, ARCHITECT.  
PERSPECTIVE VIEW.





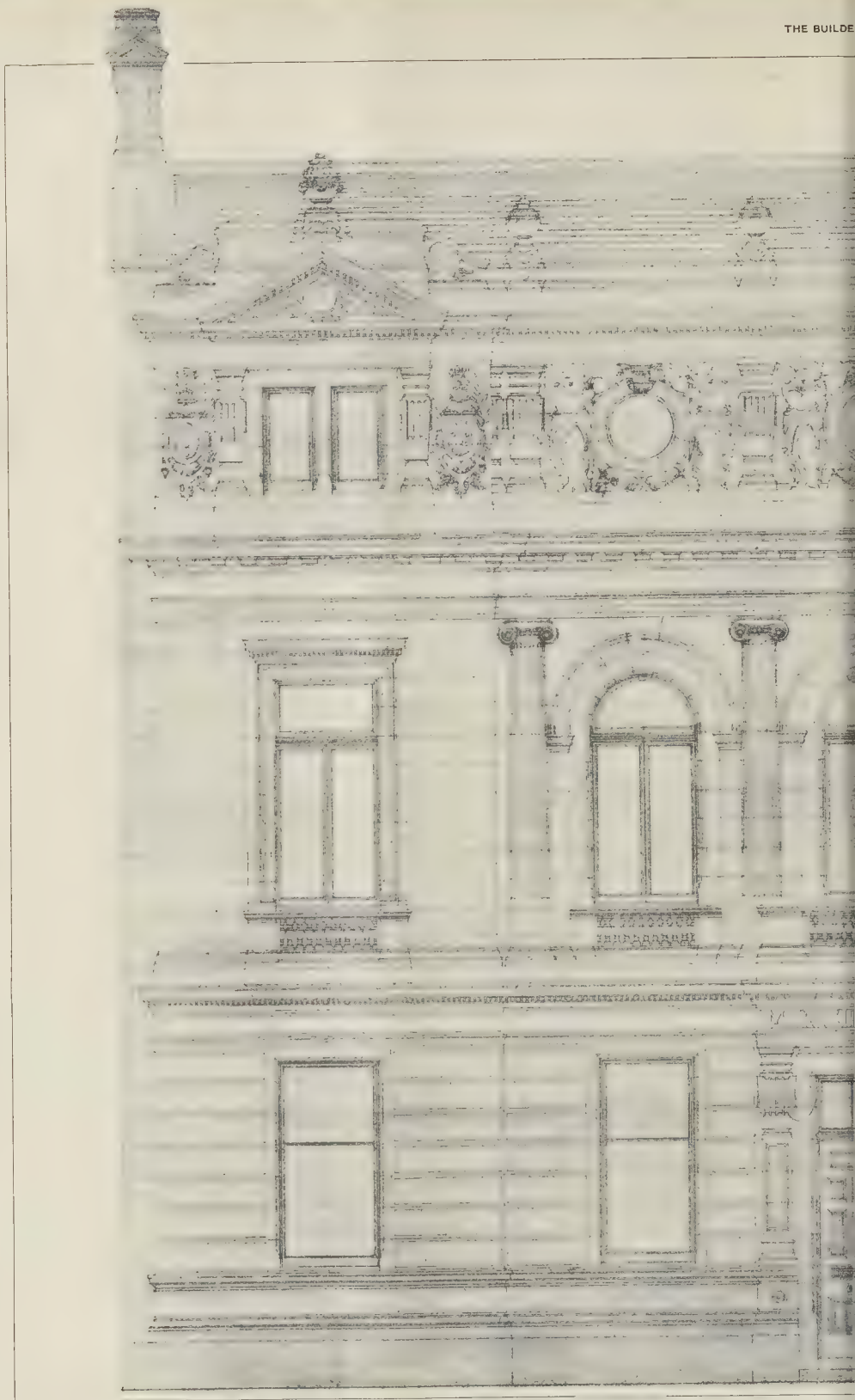
GROUND FLOOR

FIRST FLOOR



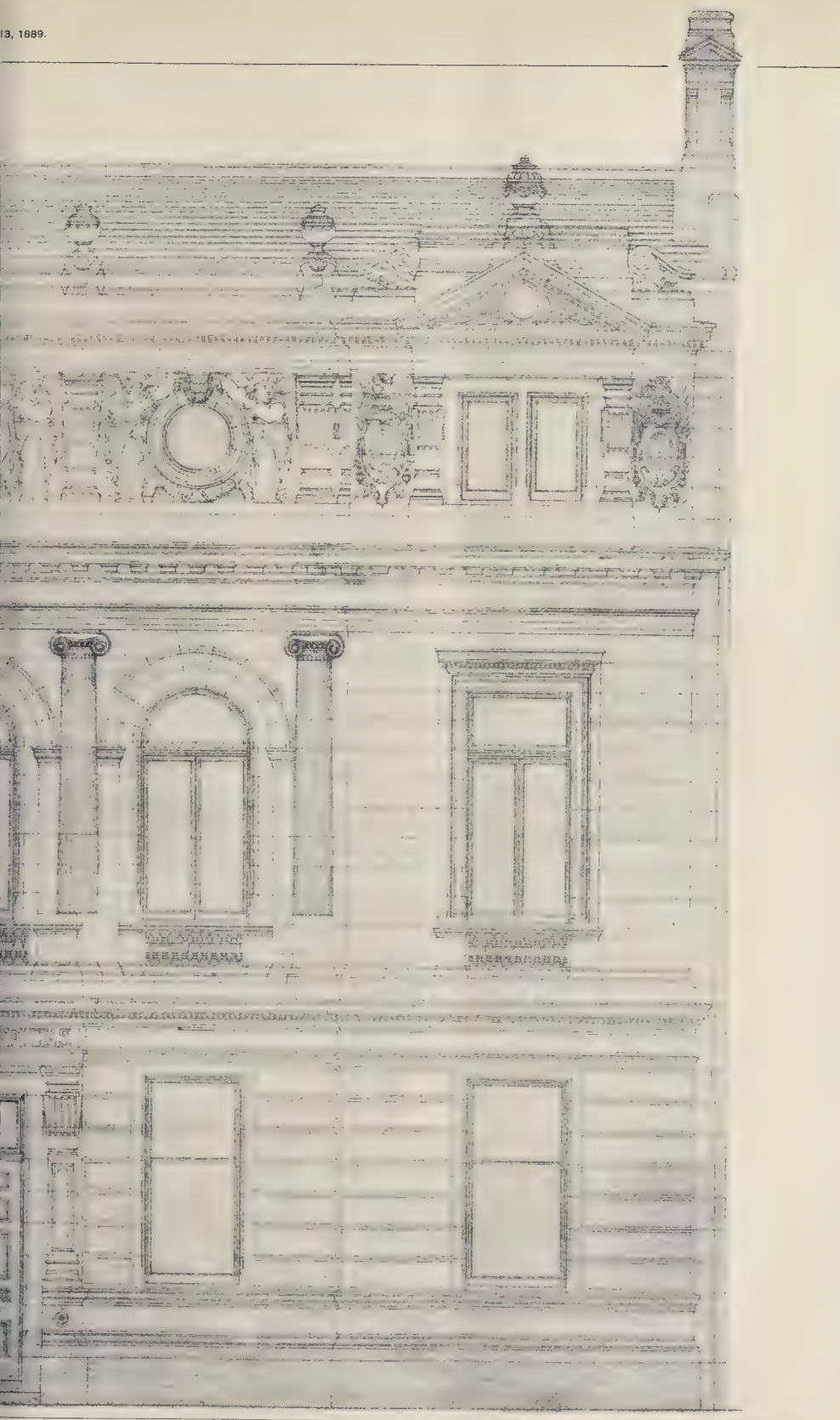
GROUND FLOOR

FIRST FLOOR



GLOUCESTER MUNICIPAL BUILDINGS COMPETITION  
DETAIL ELEVATION





PREMIATED DESIGN - Mr. G. H. HUNT, ARCHITECT.  
PRINCIPAL FRONT.

ARCHITECT: FRISQUE & J. MARTIN, LANE - BOSTON, MASS.





and cherish with something akin to reverence their early institutions."

As we stand within these ancient walls which for more than 500 years have witnessed the splendid hospitality and the charitable actions of each successive generation, and when we think of the many noble and illustrious men who have been enrolled among the members of this ancient guild, it makes one sad to contemplate the action of those who would destroy these relics of a long-forgotten past, relics which to strangers are a wonder and a joy; but to many who see them in their own land cause nothing but a spirit of discontent, simply because they happen to have no interest in their foundation and are ignorant of the many benefits and charities of which the City Guilds are the dispensers.\*

#### THE SAVOY HOTEL.

THIS building, the latest addition to the many monster caravanserais of London, is approaching completion, and will shortly be opened. It occupies a very prominent site on the Victoria Embankment, between Waterloo Bridge and the Adelphi, and the view eastward which is to be had from the upper floors is very striking, with the grand sweep of the river crossed by Waterloo, Blackfriars, Southwark, and London Bridges, and the dome of St. Paul's rising amidst the cluster of City spires.

But the new building, although it compares favourably with some recent hotel buildings, in that it has some individuality of its own, is not, architecturally speaking, worthy of its site. The south frontage, towards the river, with its heavy iron verandahs, is certainly the least satisfactory part of the building, architecturally considered. The building stands on a base of grey Aberdeen granite, unpolished. Above this, the walls are faced with ivory-tinted glazed bricks, with Winsley Ground stone mullions, transoms, and jambs to the windows and doors. The stonework is treated with two coats of boiled oil. The verandahs, although now gay with light-coloured paint, and consequently looking bright enough in the sunshine, will become heavy in appearance as well as in fact in the dull grey sombre weather which is the staple commodity of its kind in the latitude of London, to say nothing of the begriming action of London smoke. But perhaps the use of light-coloured enamelled bricks for facing the external walls implies that the building is to be kept clean and bright by periodical washings—down? Let us hope so, though we very seriously doubt whether the verandahs will be deemed an unmixt blessing. Grateful as will be the shelter which they will afford from the sun in the comparatively brief periods of bright and hot weather, they cannot but tend to make the rooms overshadowed by them somewhat gloomy for the greater part of the year. The verandahs, it should be said, are supported by columns, those carrying the two lowest being of red Peterhead granite, and the uppermost ones being carried by iron columns. These columns, both granite and iron, are arranged in couples.

The building stands isolated from all other buildings on three of its four sides. On the west it will be bounded by Carling-lane and by the new buildings now in progress of erection by Messrs. J. W. Hobbs & Co., Limited, from the designs of Messrs. Perry & Reed, architects, at the foot of and eventually on the site of Salisbury and Cecil streets. So that these two enterprises, when completed, will make a notable alteration in the aspect of the river front, and will almost eclipse Adelphi-terrace, which is immediately to the westward of the proposed new buildings on the Salisbury estate. Both blocks of buildings, it should be observed, will jut out considerably beyond the line of Adelphi-terrace, between which and the Embankment garden there is,—what would never be suspected by the promenade on the Embankment or in the gardens,—a considerable space devoted to use as a mews. Here the "dark arches" of the Adelphi debouch.

The verandahs on the south front of the building (seven in number) return for some distance along the eastern and western *façades*, the central portion of which projects and stops them. In the angle where they terminate is an external iron staircase, running through them from top to bottom; this is provided as an external means of descent in case of fire. The central

portion of this eastern *façade* is seven stories in height, and is, perhaps, the most satisfactory part of the design, architecturally. Four piers of masonry, of which two are at the angles of this central portion of the building, and two towards the centre (flanking the two-way *porte-cochère*), divide up this portion of the eastern *façade* into three bays, the central one being about twice the width of those at the sides. The wing of the building north of this central portion of the eastern *façade*, and extending to the corner of Somerset-street, is two stories lower in height (owing, we presume, to "light and air" difficulties), and is more plainly treated, but the corner is corbelled out above the second story, and there are thus obtained oriel windows on the third, fourth, and fifth stories.

Through the polished red Peterhead granite archways of the double *porte-cochère* on the eastern side of the building entrance is gained to a quadrangle, measuring about 90 ft. by 64 ft., in the centre of which is a large fountain. Although the buildings surrounding this quadrangle are lofty, it is light and cheerful,—partly owing to its size, and partly owing to the fact that the walls here, again, are all faced with light-coloured glazed bricks. The window dressings and other architectural embellishments of the quadrangle are, however, of terracotta, fine in texture, and more than usually accurate in line, made and supplied by Messrs. Cliff & Sons, of Wortley, near Leeds.

The basement floor will be, of course, chiefly appropriated for stores, machinery, and boilers, but on the south side there will be a series of large rooms, which will be devoted to public or semi-public purposes, as well as to the use of residents in the hotel. At the eastern end of this front part of the basement there will be a large ball-room (75 ft. long, 42 ft. wide, and 16 ft. high), or, rather, two rooms communicating by a large archway in the centre, so that the whole or half of the space can be used at one time, as may be desired. In the centre of this part of the basement are wine-cellars, lavatories, and other accommodation. The western portion of the front part of the basement is provided with two other large rooms,—one (43 ft. by 35 ft.) to be used as a smoking-room, the other (about the same size) as a billiard-room. These rooms, although they extend upwards through part of the ground-story, are not so lofty as could be desired for rooms of their size; but as they will be illuminated at night by the electric light, and will obtain cross-ventilation by means of windows opening on the south side towards the lowermost terrace or verandah, and on the north side towards the large quadrangle, their comparative want of height is not likely to seriously militate against their usefulness, although it detracts somewhat from their appearance. The rear part of the basement (which extends, it should be mentioned, beneath the whole area of the building, the quadrangle included) is appropriated to boilers, steam-engines, pumping and electric-lighting machinery, coal and other stores, sculleries, and other conveniences. Here there are four large boilers, two of Cornish and two of Lancashire type, supplying steam,—about 500 h.p. in all,—to four engines. The boilers have been supplied by Mr. Joseph Adamson, and the engines (which are of the Willans type) and dynamo-electric machines by Messrs. Siemens & Co. The boilers are set on Livett's principle. From this installation the hotel will be, and the Savoy Theatre is, lighted by electricity. The large public rooms in the basement are heated by steam on Messrs. Slater & Co.'s method. On the premises there is a well which has been sunk by Messrs. Baker & Son to a depth of about 420 ft.,—220 ft. in the circle, and 200 ft. bore. This well, we are informed, goes down into the chalk, and yields an unlimited supply of water, which is raised by Worthington pumps to tanks in the upper parts of the building, and is utilised for working the lifts and for general purposes. The greater part of the drainage has been laid in Messrs. Doulton's tested pipes with cement joints, and each section has been separately tested, after laying, with 15 ft. head of water. It has been found necessary, however, to hang portions of the drainage on account of their distance from the sewer. This has been done in heavy iron pipes coated with Dr. Angus Smith's solignum, and ample fall is obtained. On the ground-floor level is the large quadrangle before referred to. On the south side of this quadrangle are two external staircases, the

one in the south-east corner descending to the large "public" rooms in the basement, and the other, in the centre, ascending to the restaurant on the second-floor,—which, by the way, owing to the rapid fall of the ground towards the river, will be practically on a level with the Strand, and only a few steps above the level of the entrance in Beaufort-buildings, through Beaufort House. In the north-east angle of the court-yard or quadrangle there is a doorway giving access to the eastern staircase, by means of which, or by the elevator which passes up its centre or well, the sitting and bedrooms on the upper floors are reached. In the south-west corner of the quadrangle is a similar doorway, admitting to the western staircase and its accompanying elevator. These elevators are by the American Elevator Company, and the handsome wrought-iron staircase grilles which enclose them have been made, one by the Coalbrookdale Company, and the other by the St. Pancras Ironwork Company. There are also two large luggage lifts in close proximity to the passenger lifts, which will be capable of use by passengers during repairs to the passenger lifts. The lifts have been fitted with the Bostwick Company's gates. Here we may mention that Messrs. Waygood & Co. have supplied the kitchen lift, the descending cellar lift, and two service wine-lifts. In the centre of the south front of the building is what is nominally the main entrance to the hotel: we say "nominally," for, owing to the peculiarities of the site, with the narrow roadway between the hotel and the Embankment garden, it seems more than probable that the Beaufort-buildings entrance and the *porte-cochère* on the east side of the building will be much more largely used than the southern entrance. At any rate, this entrance, which consists of two arched doorways of polished red Peterhead granite, gives access first by a vestibule and then by a marble staircase to the entrance-hall, whence another staircase leads down to the public rooms in the basement. With the exception of the space occupied by the main entrance-hall and staircase, the whole of the space in the ground-story of the south or main block of the building is occupied by the upper parts of the "public" rooms in the basement. The north-western portions of the ground-floor story are taken up by the upper parts of the basement, and the eastern and north-eastern parts of the same story (north of the *porte-cochère*) are appropriated as sitting and bed rooms.

The first-floor level is reached from the main entrance by the continuation of the marble staircase before mentioned, as well as by way of the external staircase on the south side of the quadrangle, and *via* the Beaufort House entrance. The whole of the western portion of the first-floor level of the southern or main building is occupied by the banqueting-hall, 70 ft. long, 40 ft. wide, and about 16 ft. high. Here loftiness has again been sacrificed to what were deemed to be more pressing requirements, and here again electric lighting and readily-obtainable cross-ventilation will mitigate the inconveniences of an apartment so proportioned, though they cannot improve its appearance. The whole of the eastern portion of the south block on this floor is appropriated as a "*maisonette*," a self-contained dwelling or flat, containing kitchen, offices, two reception-rooms, and five bedrooms. This *maisonette* is intended as one "letting," and although it is approached from the main staircase, it is completely severed from the hotel in other ways, except that there is a tradesmen's and servants' entrance under the *porte-cochère*. The north-western portion of the buildings on the first-floor is devoted to kitchen offices, while the eastern and north-eastern portions of the same floor (again north of the *porte-cochère*) are appropriated as bed and sitting rooms.

On the second-floor (which, as we have said, is not much above the Strand level) is the restaurant, which is located at the western end of the south front of the building, over the banqueting-hall before mentioned, and is of about the same size. The eastern and south-eastern parts of this floor are occupied by several smaller dining-rooms,—most of them for private parties,—by a smoking-room, and by serving-rooms: one of these is at the south-eastern inner angle, communicating with the central corridors on the east and south-east, and also with the kitchen and offices by a well-designed hanging corridor of iron and glass running round the south and eastern and part of the northern sides of the quadrangle at this level.

\* We are not, of course, in any way responsible for these opinions.—Ed.



The kitchen, 40 ft. by 34 ft., is in the central portion of the western side of the building on this floor, and between it and the restaurant is another serving-room. The north-eastern portion of this story, including the space over the *porte-cochère*, is parcelled out into bed and sitting rooms. The restaurant and kitchen occupy the whole width of their respective portions of the building, but the hanging corridor at this level of the south and western sides of the quadrangle enable the central corridor in the south-eastern, eastern, and north-eastern portions of the building to be made practically continuous all round the building, with the main staircases and elevators at the north-eastern and south-western angles as before described.

The third, fourth, fifth, sixth, and seventh floors are entirely appropriated to bed and sitting rooms, bath-rooms, and other accommodation; the eighth floor, consisting exclusively of the rooms in the Mansard roof, being devoted to servants' bedrooms, linen-airing rooms, &c. Altogether there are more than 300 rooms in the building.

The walls are built (except the facings) with Ellistown bricks and blue lias mortar; we are informed that a sample block of the brickwork has been tested by Mr. Kirkaldy, and found to sustain 100 tons to the square foot without fracture.

The whole of the construction is as far as possible fireproof, the floors throughout being of steel joists embedded in concrete made with coke-breeze and cement, finished on top with neat cement, which really forms the floor-surface in all the rooms except the ball-room,—where there is, of course, a boarded floor,—and except in such rooms as are paved with marble mosaic. The joists are 6 in. by 2 in., placed about 2 ft. apart. The ceilings are plastered direct on to the concrete, without the use of any wood whatever. The roof is also of fireproof construction, being of framed steel-work embedded in concrete and covered with slate. All the iron columns are encased for protection from fire. The whole of the constructional iron and steel-work, including the verandahs, has been supplied by Messrs. Handyside & Co., of Derby. The wrought-iron balconettes to the windows in the quadrangle have been made by Messrs. Richardson, Elson, & Co., those to the windows on the external faces of the building being of cast-iron, by the Coalbrookdale Company. The staircases are of the same fireproof construction as those used by Mr. G. H. Holloway in the Grand Hotel and other buildings which he, either as clerk of works or builder, has carried out. There is little or no wood used, except for doors, &c., all the architraves, panellings, jambs, skirtings, &c., being admirably executed in Parian cement. This, when painted or decorated, is indistinguishable from woodwork,—not that "graining" has been resorted to; for, except in the servants' rooms, no "graining" or "marbling" has been done in the building. The use of Parian cement in this way is no doubt a very good thing as a precaution against fire and vermin, though a bad thing for the joiner. The electric lighting arrangements are in the hands of Messrs. Verity, of Covent-garden; the gas-piping has been supplied by Hulet & Co.; the iron rising mains from well by Messrs. Owens & Co.; and the electric bells by Messrs. Adams & Son; and the whole of the plumbing and sanitary work has been carried out on the newest and most approved principles by Messrs. Dent & Hellyer, of Newcastle-street, Strand, whose name is a guarantee for good work. This has been an important item in the cost of the buildings, consequent upon every two or three rooms being fitted up *en suite* with bath, lavatory-basin, and water-closets, besides sinks, &c. The lightning-conductors have been supplied and fixed by Messrs. Dixon, Corbett, & Newall. The whole of the granite work has been supplied by Mr. John Ryfe, of Aberdeen. Messrs. Burke & Co. have laid the marble mosaic floors.

The company who have built this hotel have been their own builders, in the same way as the proprietors of the Holborn Restaurant and the Hotel Métropole were their own builders. Mr. G. H. Holloway in those instances acted in the combined capacities of clerk of works and "working master-builder," if we may be allowed to use the phrase; but in this instance we understand that Mr. Holloway has superadded to those functions the rôle of architect, which is perhaps the reason why the building cannot be quoted as adding to the architectural

beauty of London, except so far that it makes the Physicians' and Surgeons' Examination Hall next to it look quite a respectable piece of architecture by comparison.

#### THE EAST LONDON WATERWORKS.

Few people are aware of the vast extent and importance of the East London Waterworks, or have any adequate idea of the sanitary influences of their constant and never-ceasing operations. The Society of Engineers, therefore, did well in their selection of these works for their visit a few days ago.

Commencing at Old Ford, in Essex, and extending to Sunbury, in Middlesex, the Company's territory and the amount of their water-supply may be said to be roughly, one-fourth the whole supply of London. The character of its supply also differs in this, that, whilst the West-end Companies get from the higher rentals of the houses an average of fifty shillings, the East London Company has, out of about a million and a quarter of population, over 600,000 which pay under fifteen shillings per house, the water used being much the same per family, whilst the waste is much greater, owing to the carelessness of the poorer classes in turning off, and the badness of the landlords' fittings in the tenements. In fact, the Company's engines never cease to pump, day or night, and from one year's end to another maintain a veritable constant supply. It would be impracticable to go over the whole field of the Company's operations in a single day, and, consequently, the Engineers' visit was limited to the new works in progress and to those portions of the water-supply with which they are associated. The original foundation of the present great system of works was at Old Ford, where there still exists, in excellent working order, the two engines erected eighty years ago by the memorable Boulton & Watt. Just as the Company formed in 1808 absorbed the earlier works at Shadwell, founded in 1669, and at West Ham in 1747, so it has unceasingly extended its powers until it has practically absorbed the River Lea, and is now adding to this source by wells driven into the chalk. Beyond this it has an auxiliary supply from the Thames, the water of which is pumped through twenty-one miles of main to a reservoir in Finsbury-park, whence it gravitates all over the Company's district.

In consequence of the sale of the Old Ford works to the Midland Railway for a goods depot, the Company's works at Lea Bridge are being increased to meet the displacement of the pumping power there, amounting to 40,000,000 gallons per day. The existing engines at Lea Bridge are the "Victoria," with a capacity of 2,160,000 cubic feet per day; the "Prince" and "Princess," each 1,728,000; a horizontal compound of 553,000; and the "Duke" and "Duchess," each with a capacity of 415,000 cubic feet per day, and also a new compound horizontal engine, built for the new well which has been sunk into the chalk by Messrs. Dowra. This well is 12 ft. 8 in. in diameter, and the sinking passed through 81 ft. of quicksand before it pierced the chalk, which at this spot makes a sudden rise amounting to 76 ft. In all the well is 204 ft. deep, and horizontal tunnels, about 8 ft. by 6 ft., are being driven out from the bottom in various directions for gathering the water.

Very massive concrete foundations are also being put in at Lea Bridge for the engines which are to drive water from this station to Old Ford. These will be triple expansion engines of inverted marine type, with cylinders respectively 20, 34, and 57 in. in diameter. Each engine will have three pumps, 30 in. in diameter, and they will be collectively capable of lifting 40,000,000 gallons of water per day to a height of 130 ft. The supply for Old Ford is from the filter beds at Lea Bridge, gravitating to Old Ford, where it is lifted; but the future supply will be forced through a special conduit 42 in. in diameter from Lea Bridge to the existing mains at Old Ford.

The next station visited was Walthamstow. Here a new well has been in process of sinking for nearly three years. Its depth is at present 160 ft., and the work is still going on. The first 90 ft. was done in three months, but the quicksand was then entered, and the difficulty of progress has since been very great, being accomplished by weighting the iron cylinder, and grabbing out the core within, the cutting edges of the cylinder being kept clear by divers. The

existing well-pumps are worked by a wire rope in two sections, driven by a turbine placed in the continuous flow of water between the reservoirs and the filter-beds. The turbine has a power of 60-horse-power, and will run the rope at a speed of thirty miles an hour. It may be well to note that turbines and water-wheels are used at several places along the Company's water system, notably at Chingford Mills, near by, where the water from the intake has a fall of 7 ft. 9 in. in going to the reservoirs, and 78-horse-power is thus used for pumping from a well 450 ft. deep.

It is the reservoirs, however, that give to Walthamstow its most charming features. Their vast extent, their freshness, the verdure of their slopes and islets, and the luxuriance of the surrounding trees and meadows, are comparable only to the Broads in Norfolk. There are eight of these enormous reservoirs, which do not come all into sight at once, but follow and intervene in the widespread landscape. These reservoirs cover an area of 236 acres, and have a capacity of 910,000,000 gallons, being commonly used for the storage of 610,000,000 gallons.

At Woodford there are two covered reservoirs, into which water is pumped by the "Duke" and "Duchess" engines at Lea Bridge. This water is again lifted here by a pair of horizontal high-pressure engines to High Beech, for supplying the high-level districts of Loughton, Buckhurst Hill, and Chigwell.

The final visit for the day was to the new pumping-station at Waltham Abbey. The historic series of enterprises is there completed. Beginning at Old Ford with Boulton & Watt and Cornish engines, and as the route was completed stage by stage, seeing the advances from pumping-engines at 7 lb. pressure to the Cornish at 20 lb.; thence by engines of other types reaching to higher pressures, at Waltham the party came upon the latest and most advanced revolution—a fine set of triple expansion-engines working at 160 lb. of steam for lifting the water from a new deep well to the surface and forcing it to the High Beech reservoir, the total lift being 550 ft. These engines are by Messrs. Richardson, of Hartlepool, and have cylinders of 18 in., 30½ in., and 51 in., and a stroke of 3 ft.

The whole of the journey was performed by road, from Westminster to Waltham, and back to the Holborn Restaurant, where the party dined in the evening, the President of the Society, Mr. Jonathan R. Baillie, presiding, and Mr. W. B. Bryan, the Engineer of the Water Works, who had conducted the party, being one of the guests.

#### NOTES FROM ABERDEEN:

##### ROSEMOUNT VIADUCT AND NEW FREE LIBRARY BUILDINGS.

THE eastern section of the Viaduct has now been completed, and the thoroughfare opened throughout for carriage and foot traffic. The Viaduct extends from Baker-street, opposite South Mount-street, to School-hill, beside the Art Gallery. The total length is 1,700 ft., with a uniform width of 60 ft., including a footway on each side 13 ft. in breadth. A considerable portion is embanked, and the rest of the roadway is supported on arches. In the west section there are nine brick arches, including that over Upper Denburn-street,—this last being a very acute skew, a single arch, faced with granite (rock ashlar) 37 ft. on the square and 55 ft. wide the skew. The east section is embanked, with the exception of a granite bridge, of three skew spans, crossing Middle Denburn-street, the Denburn Railway, and Denburn-road. This handsome bridge has on each side an open granite balustrade with turned balusters. The carriage-way of the viaduct is meantime macadamised only. The gradient from School-hill to Union-terrace is 1 in 137; thence it falls to Skene-street; beyond that it is 1 in 63; whence it rises to South Mount-street by a gradient of 1 in 25. The west portion is traversed by the new circular tramway route. This is the most important work executed under the recent local Improvements Act. In round figures, the properties acquired have cost 45,000, and the works about 17,000. Two blocks of building areas have been sold by way of lot, and lofty tenements with shops on the ground-floor erected by the fears. The annual feu-duty for the ground amounts to 2200. Further building is restrained by the heavy feu-duty and the amount of under-building required. The



viaduct crosses the Denburn valley at two points (the valley turning almost at right angles at the lower end of Skene-street), and will no doubt prove of immense convenience to the people of Aberdeen.

The new Free Library Buildings are to be erected on the north side of the Viaduct, opposite the end of Union-terrace. The Town Council invite competitive plans to be lodged on or before August 10. The competition is restricted to architects practising in Aberdeen. The cost of the building, exclusive of internal decoration, finishing, and architect's fees, is not to exceed 7,500*l.*, and the first and second floors of the building (which will consist of three floors) are to be of fireproof construction and the stairs are to be of stone. The building will have two exposed elevations—the principal elevation being to Rosemount-viaduct, and the other (which may be of a plain description) to Skene-street. The external façade to Rosemount-viaduct is to be of the best quality of dressed granite ashlar work; the façade to Skene-street is to be of hammer-blocked or rock-faced ashlar work, with dressed facings; and the other elevations are to be of square mock-pointed rubble masonry. The principal entrance to the reading-room is to be from Skene-street, and to the lending and reference libraries from Rosemount Viaduct. The vestibules and staircase are to be of ample dimensions, and all the rooms well lighted, heated, and ventilated; the methods of warming and ventilation to be indicated on the drawings. The chief features of the buildings will be—on ground-floor,—reading-room, with a floor area of about 3,000 square feet; on first-floor—lending library with a floor area of about 3,500 feet; on second-floor—reference library with an area of about 3,500 square feet. Competitors to indicate how these may be extended in future. In event of town council not being able to arrive at a unanimous decision Mr. G. Washington Browne, architect, Edinburgh, will be professional assessor. The sum required for the new buildings has been almost already entirely got by public subscription—the donors including the Town Council (from the Common Good of the Burgh), 1,000*l.*; Mr. F. Logie Pirie, paper manufacturer, 500*l.*; and Lord Provost Henderson, 250*l.*, while Mr. Andrew Carnegie, the American millionaire, will give the "last 1,000." On the completion of the new buildings the existing erection in Market-street will be sold.

#### THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday last, in the Council Chamber, Guildhall, Lord Rosebery in the chair.

**Election of Chief Engineer.**—The Standing Committee (of which Sir John Lubbock is Chairman), brought up the following report:—

"The Council, on May 14 last, resolved to appoint a Chief Engineer, at 1,500*l.* a year, and a Mechanical Engineer at 500*l.* a year, directing at the same time that advertisements should be issued inviting applications for the appointments, and that your Committee should, after conference, if necessary, with other Committees concerned, report to the Council the candidates whom they considered most suitable. Subsequently, on June 18, the Main Drainage Committee and the Bridges Committee were instructed each to appoint a Sub-Committee to form a Joint Committee to examine the applications, and to select a limited number of the candidates to submit to the Standing Committee. A Joint Committee, formed in accordance with the direction of the Council, have carefully examined the applications, proceeding first with the appointment of Chief Engineer, and have, after a personal interview with six of the candidates, submitted to your Committee, in the following order, the names of the three candidates whom they deem the most suitable—Mr. J. Gordon, Engineer and Surveyor to the Borough of Leicester; Mr. F. E. Duckham, Engineer to the Millwall Docks; Mr. A. R. Binnie, Engineer to the Bradford Corporation. Your Committee have seen these three gentlemen, and considered their respective qualifications, with the result that they concur in the opinion of the Joint Committee. They accordingly recommend:—

"That Mr. Joseph Gordon be appointed Chief Engineer of the Council, at a salary of 1,500*l.* a year, upon the following conditions:—That he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office, and be not allowed to take any private practice, and that on retirement he shall not be entitled to any superannuation or pension."

The Committee added that they hoped to bring up next week, or at an early meeting, a recommendation for the appointment of the Mechanical

Engineer,—for which post it was incidentally mentioned that there were 200 candidates.

After some discussion,—in the course of which it was stated by Mr. Firth, the Deputy-Chairman, that there were thirty-five candidates for the Chief Engineer'ship, and that from that number the Committee first selected seven [whose names were not mentioned, and whose names we have been unable to obtain on application to the Clerk of the Council], and from that number the three whose names are given above,—the Chairman proceeded to put the names to the vote, alphabetically. The voting was by show of hands. In the first voting the numbers were: Binnie, 13; Duckham, 27; Gordon, 55. Mr. Binnie's name being struck out, the voting was proceeded with for the second time, when nineteen members voted for Mr. Duckham, and a much larger number,—so much larger that the Chairman did not trouble to count them,—for Mr. Gordon. The motion that Mr. Gordon be elected was next put, and carried by 62 votes to 1. Mr. Gordon was therefore declared to be duly elected, and, a little later in the afternoon, he addressed a few words of thanks to the Council.

**A Valuer to be Appointed.**—The same Committee brought up a report recommending:—

"That the Council do appoint a Valuer, whose salary shall be 1,000*l.* a year; that his duties be those above set forth, with any others that may hereafter be prescribed by the Council; that he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office, and be not allowed to take any private practice; and that the appointment be in other respects subject to the conditions already laid down by the Council with regard to all appointments made in its service."

"That advertisements be issued inviting applications for the appointment, and that the applications, when received, do stand referred to the Standing Committee, with instructions to select (after conference, if necessary, with other Committees concerned), and report to the Council the person or persons whom it considers the most suitable for the appointment."

This was agreed to.

**The Temporary Council Chamber.**—The Council Chamber and Offices Committee presented the following report:—"Your Committee have to report that they have proceeded to act upon the resolution of the Council on May 10, approving of a sketch-plan showing how the present Council Chamber at Spring-gardens could be enlarged to accommodate the Council, and providing for two additional Committee-rooms. They have now to submit for the approval of the Council the working drawings which they have had prepared from the sketch plan referred to. These drawings show, in addition to the proposed alterations provided for in the sketch plan, complete lavatory accommodation on the ground-floor for the members of the Council, and a re-arrangement of the Accountant's department, by which the superficial area will be increased from 1,400 ft. to 2,534 ft. The cost in the Committee's previous report was roughly computed at 10,000*l.*, but the present proposition has reduced the cost to 7,500*l.*, leaving the same proportion of accommodation for the Council Chamber and two Committee-rooms. It was originally contemplated to make a new staircase, but this alteration has been laid aside. Your Committee recommend:—

"That in connection with the working drawings, now submitted, for the alteration of the Council Chamber and Offices at Spring-gardens, at an estimated cost of 7,500*l.*, the Committee be authorised to have quantities prepared, and to obtain tenders in the usual manner."

This recommendation was agreed to after a long discussion, and by only a narrow majority. Other recommendations providing for temporary accommodation in adjoining premises were also agreed to.

**Proposed New Park for South London.**—The Parks and Open Spaces Committee presented the following recommendation:—

"That the Council be recommended to contribute half the cost, not exceeding 61,000*l.*, towards the sum required for the purchase of Brockwell-park, subject to the payment to the Council of all the sums contributed and the completion of the purchase by it, and also to the promoters of the Raleigh-park scheme waiving their claim to the contribution of 15,000*l.* (which the Council are now bound to pay to them) as soon as all the money is raised for Brockwell-park; and that the Finance Committee be requested to give their sanction to the proposal, as required by the Act."

This was agreed to, after some discussion, and the Council adjourned shortly after seven o'clock.

#### THE BUILDERS' ACCIDENT INSURANCE, LIMITED.

The eighth ordinary general meeting of the above-named Company was held at the offices, 31 and 32, Bedford-street, Strand, on the 9th instant, and in the absence of the chairman, Mr. Stanley G. Bird, through indisposition, Mr. Joseph C. White, president. The minutes of July 5, 1888, were read and confirmed.

The Secretary (Mr. E. S. Henshaw) read the report and accounts for the year ending May 31, 1888. The report was as follows:—

"1. The Directors have to record, in presenting their Eighth Annual Report, that the Building Trade has not recovered from the depression which it has experienced for the past few years, and conse-

quently the Company, being entirely confined to that trade, has suffered accordingly.

2. The excess of wages incurred during the past year was about 400,000*l.*, involving the return of 890*l.*, but in spite of this the premium income came to within 200*l.* of that of the previous year.

3. Four hundred and sixty-one accidents were reported during the year. This number is considerably in excess of that mentioned in the previous report, though the amount of claims admitted is 706*l.* less.

4. After setting on one side 1,846*l.* for unsettled claims and unexpired risks, the reserve of 4,200*l.* remains untouched; and there is a balance of 688*l.*, from which the Members in General Meeting will be asked to remunerate the Directors for their services during the past year.

5. As the Employers' Liability Act (1880) has not yet been amended, the Directors think it better to keep as large funds in hand as possible, in view of the uncertain liabilities which may be incurred under the proposed new Bill.

6. In accordance with the Articles of Association, the following Directors retire, namely:—Messrs. T. Barnsley, J. T. Chappell, J. H. Colls, James Greenwood, R. Dennett, and J. H. Marsden, all of whom are eligible, and offer themselves for re-election."

The report and accounts, as presented to the meeting, were adopted unanimously, and the following directors, Messrs. T. Barnsley, J. T. Chappell, J. H. Colls, James Greenwood, R. Dennett, and J. H. Marsden, who retired from the Board in accordance with the articles of association, were re-elected.

The usual formal resolutions having been passed the meeting terminated with votes of thanks to Mr. Stanley G. Bird for his services as Chairman during the past year, and to Mr. Joseph C. White for presiding at the meeting.

#### THE ERECTION OF A BUILDING CALLED "FLATS."

HAMMERSMITH POLICE-COURT: KNIGHTLEY v. SHINGLETON.

SIR,—As the report of this case in the *Times* only partially reveals the points at issue, I shall esteem it a favour if you will allow me to more fully instruct the public. By sec. 27, sub-sec. 2, 18 and 19 Vict., cap. 122, separate sets of chambers tenanted by different persons shall, if contained in a building exceeding 3,600 square feet in area, be deemed to be separate buildings, but if the building is less, no matter how much less, the tenants have no such protection. To test this was the burden of my proceedings, as each flat is separately rated and confers both parliamentary and municipal franchise, and since the custom of building flats has become so general, fires and epidemics are sure, too, to occur. Rather than await the event, I thought it would be better to anticipate it. I first took exception to the notice, and contended that I was entitled to a separate notice for each flat. The summons was heard before Mr. Paget, who upheld my contention. I then summoned for a separate fee on each flat; Mr. Bennett's decision was, however, against me, as the area of the block was less than 3,600 square feet. Had I succeeded in establishing my point, I could have enforced rules of construction which the occupier of the meanest cottage enjoys, and protected life and property; but, as the law is against me, the public will have to run the risk of cremation or decimation by epidemics, and although I may not be pleased, at least I have done my best to safeguard the public, escaped censure, and, I hope, obtained protection.—I am, sir, yours truly,

T. E. KNIGHTLEY.

2, The Grove, Hammersmith, W.

#### "A COMPETITION INCIDENT"

SIR,—As the successful architect in the above competition, I am very pleased to give the explanation asked for by your correspondent "J."

It is simply this, that the tenders as published by you were for a different building altogether to that originally intended in the competition, a fresh set of plans entirely having been made from new instructions, giving much greater accommodation on the basement and third floors, and using more expensive materials, such as granite, basework, asial front, &c. The elevation alone is somewhat similar to the competitive plans, but even this has been altered, and the cost increased by six additional ornamental bay-windows and other work.

My experience in competitions is that in nine cases out of ten the competitive plans, although awarded the first premium, are never carried out without material alterations affecting the cost, but fresh drawings are invariably rendered necessary owing to incomplete description of requirements, or promoters not knowing exactly what they desire.

Sometimes the object of a competition is not to



select a design to be carried out, but to decide, from the merits of the designs submitted, whom to appoint as architect: that they may confer with him as to the best method of treating the site. This, of course, should always be stated in the instructions to competitors.

I think "J." has been rather hasty in assuming that the tenders which appear some months after a competition are the estimates of designs then submitted; but in this case, for my own satisfaction, a tender was also obtained and sent in, estimated from my competitive plans, which amounted to 7,985<sup>+</sup>, therefore, "the local professional gentleman was not so singularly wide in his estimate" as imagined by your correspondent.

My only regret is that this tender was not sent for publication with the other tenders, then, probably, this competition would not have been condemned so hastily or charged with fraud.

EDWARD H. BRUTON  
(Bruton & Williams, architects),  
Cardiff, July 9, 1889.

## The Student's Column.

### WATER-SUPPLY. II. RAINFALL.

**S**UPPLIES of potable water are obtained (1) by catching rain directly it has descended; (2) from drainage-areas or "gathering-grounds" as they are termed; (3) springs or wells; and (4) direct from rivers and lakes.

The amount of water available from either of these sources depends entirely on the rainfall, in which is included rain, snow, hail, dew, &c. All fresh water, no matter whether it be at or below the surface of the ground, formerly fell to the earth in one of these forms,—principally, of course, as rain. After it has fallen, one portion is evaporated and absorbed by vegetation, another sinks into the ground where favourable, and the remainder helps to form rivers, eventually finding its way to the sea or lake. From this it is clear that only a portion of the rainfall is utilisable for water-supply purposes, and the engineer must be able to estimate what this proportion actually is in each district comprised in his scheme, if he derives the supply from either source 1 or 2 mentioned above. In all cases the geological structure of the ground must be definitely ascertained, and it must be remembered that inasmuch as rivers, and often lakes, owe their origin to springs and rain drained from the surface of the land, that the abstraction of large quantities of water, either directly it has fallen, or from gathering grounds artificially drained, materially lessens the volume of rivers in that area. The water-level in wells is lowered from the same cause. Similarly the utilisation of a vast number of wells in a district lowers the underground water-level, and, as a consequence, springs which originally ran out above that level are dried up, whilst others become lessened in volume, and the rivers in their drainage-areas are robbed proportionately. A prolonged and abnormal drought has the same effect, only far more intensified, and it is on such occasions that we recognise the fact that supplies of water are not altogether inexhaustible, and that it requires considerable scientific forethought and skill to provide an adequate and suitable supply.

Hardly anything, perhaps, is more capricious in its distribution than rainfall. Thanks to the untiring energy of Mr. G. J. Symons and his numerous assistants in all parts of the country, we know much more about it than we did twenty years ago. Without entering into particulars as to why this distribution is so irregular, we may state that the mountainous parts of Wales, Cumberland, and the western counties generally, and the higher ground of Derbyshire, &c., receive a much greater quantity than the east and south-east of England. The amount of variation is considerable. For example, in 1866, at the Stye, Borrowdale, Cumberland, the rain-gauge showed that as much as 225 in. fell during the year, whilst only 18.7 in. were recorded during the year 1883 at Clacton-on-Sea. These, however, are extremes. Over 100 in. are recorded year after year from several places near and on the high ground of north-west England, but for the south-eastern portion, the average annual fall is only about 25 in., and in Wales about 75 in.

Such figures as these merely give one a general idea of rainfall, and they are quite accurate enough for this purpose. We never find, for example, that the eastern and south-eastern

counties are much more than one-third as wet as in the vicinity of the mountainous ground to the west, and the study of an "average rainfall" map will show the relative amounts in all parts. But, for practical purposes, this kind of knowledge is of very little use. Even in places a mile or two apart from each other, the amount of rain received during the year is frequently found to be very different; much less, then, can we depend on generalizations over a large area for accurate particulars. Although Mr. Symons has organised such a large number of stations where the rainfall is carefully observed, they are nothing like so numerous as they should be to enable us to get the minute detailed information required, as we shall see; and the engineer, at the very outset, having defined his catchment basin, must make direct observations, as far as possible, on the ground itself. The non-observance of this all-important condition has frequently caused the supply to be inadequate during a drought, and large towns have actually been reduced to a state of water-famine, in consequence, in times gone by. It must be pleaded, however, that the engineer is under considerable difficulties in estimating the quantity available. A large number of years are required to arrive at even an approximate amount of rain falling at any one place, and as a rule, the engineer has no time wherein to conduct observations over so long a period. Let us illustrate this. The average of twenty-two years at Windermere gave an annual fall of 79.85 inches; it sometimes reached as high as 116.26 inches, and at others descended to 47.24 inches. Consecutive dry years are often experienced, and these are the worst enemies to fear. To further emphasize this, we give the following table from Mr. Symons' "Report" of 1882:—

Annual Rainfall at Uckfield, in Sussex, for Forty-three Years.					
Years	Inches	Years	Inches	Years	Inches
1840	22.30	1855	23.80	1870	24.99
1841	36.30	1856	33.59	1871	25.64
1842	24.60	1857	31.74	1872	38.64
1843	30.09	1858	19.36	1873	30.06
1844	23.37	1859	33.48	1874	24.65
1845	23.03			1875	29.02
1846	25.11	1860	42.46	1876	33.37
1847	17.65*	1861	28.35	1877	39.58
1848	38.03	1862	30.01	1878	31.25
1849	29.33	1863	25.74	1879	33.00
		1864	23.48		
1850	28.62	1865	38.97	1880	31.79
1851	24.26	1866	33.79	1881	33.05
1852	50.55†	1867	30.48	1882	35.90
1853	31.70	1868	30.51		
1854	23.15	1869	28.57		

Mean of the forty-three years ..... 30.08

In face of such data as these, no man could safely estimate the quantity of water available from observations extended only over a year or two. Perhaps he may experience an abnormally wet period, in which case he would probably design his reservoir too small, when failure is sure to result in the long run. Referring to the table just given, Mr. Wm. Pole, F.R.S., says:—"Now, I have taken some trouble to get a rough notion what size of reservoir we ought to have to equalise the forty-three years' rainfall shown in the above table; and I find it would require a store of something like 900 days' supply. It is altogether unreasonable and impossible that a waterworks undertaking could be burdened with such a monstrous construction." We shall return to this question when dealing with reservoirs.

There are also many other difficulties to be encountered in reference to rainfall and gathering-grounds. The rainfall, as we well know, is not distributed evenly over the year,—some days are dry, others unusually wet,—and the capability of utilising the unabsorbed and unevaporated water largely depends on the amount falling at any one time. For instance, during the floods of England and Wales in 1875 between 4 in. and 5 in. and more fell at stations in Monmouthshire and Glamorganshire during one day, July 15; and heavy rains were experienced for some time after. In short, a very large proportion of the annual amount fell in a few days. It follows, therefore, that reservoirs constructed to hold a reasonable supply will rapidly fill and overflow, the surplus being waste that cannot, under the circumstances, be stored, though it might probably be assumed to be available in estimating the quantity the gathering-ground was capable of yielding at the

outset. This might be aggravated by the ground being highly inclined, allowing the water to run off too rapidly. Conversely, the fall may be spread so evenly over the wetter portions of the year, occurring as gentle rain, and the surface of the ground might be tolerably flat, so that unusual facilities are given to absorption and evaporation, and comparatively little can be collected. If the ground be previously saturated, nearly all that falls is available; but a shower in hot weather may not yield a drop of water to the drainage reservoir.

Mr. Symons, from a close consideration of his numerous tables, gives data which are practically the same as those laid down by Mr. Hawksley in 1868, as follows:—

"It is found that the wettest year will have a rainfall nearly half as much again as the mean.

The driest year will have one-third less than the mean.

The driest three consecutive years will each have one-fifth less than the mean."

### RECENT PATENTS.

#### ABSTRACTS OF SPECIFICATIONS.

8,300, Chimney and Ventilating Caps. J. Mulligan and C. Swindell.

At the outer end of the shaft or socket of the chimney which forms the subject of this patent, two dish or tapered shields are placed, leaving an opening between them proportioned to the amount of air required to be passed through the ventilator. Another shield is placed around and outside the opening so that it forms an overlap to the edges of the two shields, leaving a space between itself and them, and forming in combination the ventilating cap. The action is to set up suction from within the shaft, flue, or space to be ventilated during the prevalence of wind.

11,898, Paint-removing Compound. P. Bren-  
tini.

The compound, which is the subject of this invention, is composed of Irish moss, spirits, and Fullers' earth, to which is added, while being boiled up, caustic soda and potash in suitable proportions. The compound is applied with a brush to the painted surface, and after a lapse of time, varying from twenty minutes to an hour, the whole of the paint can be readily washed off, leaving the wood or ironwork in its original state.

11,483, Water-closets. H. G. Planner.

This invention consists of a concave lever, or arm, one end of which sinks into a vessel containing disinfecting-fluid, and by the use of a float, acted upon by the water into which it is placed, and being connected to the arm raises a portion of the fluid and causes it to flow along the arm into a water-waste preventer or water-container for flushing closets.

11,603, Ventilators. C. Darrah.

In this patent it is claimed that many improvements are introduced in the ordinary form of the flap ventilator, the principal being the means of indicating the position of the pivoted flap by an indicating plate marked "open" or "shut," actuated by the mechanism also moving the ventilator. The plate rises in a glazed orifice fitted in the casing of the ventilator. Another detail is the use of a sliding drawer or frame enclosing wool or other filtering or straining media.

6,348, Fire-proof Composition. J. G. Wolf.

This patent relates to a fire and weather proof material, which is termed "cessulite" by the inventor, and is made of sawdust and such material mixed with calcined magnesite; the main ingredient being wood. It has the appearance of bone or stone, and is useful both as a binding or a plastic medium, and can be produced in various degrees of porosity and hardness.

#### NEW APPLICATIONS FOR PATENTS.

June 24.—10,237, J. Deeley, Syphon Flushing Cisterns.—10,254, M. Finn, Cement Casks, &c.—10,257, C. Harding, and A. Hunt, Baker's Ovens.—10,258, H. Harris, Opening and Closing Doors.—June 25.—10,297, D. Knowles, Sash Lifts.—10,305, J. Preston, Composite Metal Sash Bars for Glazing, &c.—10,320, S. Porman and J. Heigh-ton, Chimney Terminals and Ventilating Tops.—10,333, A. Thornalley, Brick Kilns.—10,339, C. Fowke, Combination Lock and Latch for Doors.

June 26.—10,365, W. Cromack, Paints.—10,369, H. Girwood, Ventilation.—10,373, C. Coops, Paving.—10,386, R. Keer, Brick Walls, &c.

June 27.—10,409, C. Scott, Brick Kilns Fired by Gas.—10,469, W. Doussin, Cupboard Turn or Door Fastener.

June 28.—10,479, W. Baughan, Soldering Iron or Gun.—10,486, G. Sander, Sash Frame Ventilators.—10,498, E. Wright, Locks or Door Fastenings.—10,518, C. Hobbs, Distemper Brushes, &c.

June 29.—10,530, T. Widdowson, Door Springs.—10,531, T. Birnbaum, Gas Brackets, Chandeliers, &c.—10,562, H. Brockmann, Combined Garden Tile and Drain Pipe.—10,565, G. Hobson, Metal Floorings or Roofings for Bridges, &c.

\* Minimum. † Maximum.  
+ "The Theory and Practice of Hydro-Mechanics," 1865, p. 43.



## PROVISIONAL SPECIFICATIONS ACCEPTED.

6,863, R. Sharp, Lavatory Basin.—6,864, R. Sharp, Combined Waste and After-Rush to Lavatory Basins.—7,056, J. Pearson, Fastenings for Window Sashes.—7,076, F. Hargreaves, and F. Chippis, Window Fastenings.—7,197, S. Gosling, Flushing Cisterns.—7,223, J. Clayton & Co., Tindall Water Closets.—7,537, W. Congreve and R. Brownwood, Dry Earth Closets.—7,776, S. Worthington, Self-supporting Concrete Casing Iron or Timber Brackets.—7,777, A. Soames, Wash-out Water Closet Pans or Basins.—7,790, A. Cassard, Portable Water Closets.—7,898, H. Digginis, Dustbins.—7,915, J. Charlton and R. Hodges, Fastenings for Doors, &c.—8,111, W. Hassall, Fireplaces for Heating Kilns.—8,129, S. Ingham and others, Parquetry.—8,162, J. Rome, Metallic Trough Flooring for Bridges, &c.—8,199, F. Martin, Shop Fittings.—8,225, S. Smith, Cottage Ranges.—8,331, W. and B. Clarke, Tiling, Slabbing, and Paneling Surfaces.—8,563, C. Showell, Door Sash and other Handles.—8,623, J. Sykes and T. Cook, Securing Door Knobs to Spindles.—8,654, F. Davies, Fastenings for Doors, &c.—8,772, H. Le Mesurier, Emergency Exit Doors for Theatres.—8,863, Eadsale & Co. and L. Tavenor, Saw-sharpening Machines.—8,904, A. Hogan, Machines for Cutting Laths.—9,257, H. H. Holloway, Tile Linings to Walls, &c.—9,379, P. De la Sala, Construction and Decoration of Buildings.—9,404, H. Vick, Chimney Pots.—9,486, S. Wilson, Dies for Bricks.—9,490, V. Correll, Ventilation.—9,562, J. Mitchell, Corrugated Structures.—9,795, Sir C. Pennell, Stoves or Fire Grates.	
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## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to Opposition for Two Months.

7,717, G. & J. Allan, Opening Window-sashes.—9,646, J. Gregson, Clips or Hangers and Heads for Rain-water Pipes, &c.—10,219, R. Gamble, Door-spring and Alarm.—10,755, T. Normanton, Inlet and Outlet Ventilators.—10,805, T. Normanton and S. Major, Inlet Ventilators.—12,350, J. Elwell, Portable Roof, &c.—13,243, A. Turnbull and J. Mathieson, Stoves or Cooking-ranges.—14,491, W. Sayer, Bricks, Tiles, &c.—5,875, A. Clark, Leak Detectors for Pipes.	
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## RECENT SALES OF PROPERTY:

## ESTATE EXCHANGE REPORT.

JUNE 17.—By HUSSEY, WALCOTT, & BLACKWOOD (at Highbridge): Somerset—Moore Moor Farm, and 35 acres, f., 22,000	
JULY 1.—By WATERBURY & GREY: Keymer Junction—Stroud Farm, 17a, Or. 23p., f., 740 Four Endures of Land, 17a, Or. 23p., f., 600 Two Freehold Tenements ..... 450 Wanted—13 to 16, Sultan-rd., u.t. 77 yrs., g.r. 212, 10s., r. £30 p.a., u.t. 32 yrs., g.r. £4, 4s., r. £30 p.a. 200 Notting Hill—185, Lancaster-rd., u.t. 72 yrs., g.r. £7, r. £44, 4s. p.a. 200	
By GEORGE HEAD & CO. Portland-place—23, Devonshire-st., u.t. 38 yrs., g.r. £240, r. £160 p.a. 1,180 Fimlico—20, Union-st., u.t. 32 yrs., g.r. £4, 4s., r. £30 p.a. 350 15, Whitaker-st., u.t. 32 yrs., g.r. £3, r. £34 p.a. 345 Bedford Estate—7, Montague-pl., u.t. 12 yrs., g.r. £30, r. £140 p.a. 610 30 and 33, Montague-pl. and stabling, u.t. 12 yrs., g.r. £37, r. £235 p.a. 1,240 34, Montague-pl. and stabling, u.t. 12 yrs., g.r. £30, r. £130 p.a. 645 35, Montague-pl., u.t. 12 yrs., g.r. £12, r. £130 p.a. 545	
By Mr. ROTON. Upminster, Essex—Hacton Park Corner Farm, 140a, 2r. 39p., f. 5,200	
By GEATES & SON. Westbourne Park—4 and 10, Leinster-rd.-villas, u.t. 67 yrs., g.r. £20, r. £125 ..... 1,090 30, Cornwall-rd., u.t. 67 yrs., g.r. £10, r. £80 ..... 470 27, Tavistock-rd., u.t. 74 yrs., g.r. £10, r. £80 p.a. 450 Baywater—27, Cornwall-rd., u.t. 70 yrs., g.r. £2, r. £80 p.a. 410 Brookley—F.g.r. of £3, with reversion in 86 yrs. ... 115	
JULY 2.—By ROSEWORTH & STEVENS. Oxford-st.—15, Argyle-st., "The Argyle Restaurant," f., r. £60 p.a. 8,100	
By W. LIVERS. Beckenham—"Portea Villa," u.t. 85 yrs., g.r. £5, 6s., r. £45 p.a. 450	
By Mr. ROBERTSON. Totting—3 and 4, Cawthorne-villas, u.t. 95 yrs., g.r. £15 ..... 680 Clapham—16, Binfield-rd., u.t. 80 yrs., g.r. £12, r. £80 ..... 620 Westminster—2, 3, and 4, Old Rochester-row, u.t. 13 yrs., g.r. £12, r. £93, 12s. p.a. 310	
By WALTON & LEE. Bourne-end, Bucks.—The residence "Gerahelm," and 4a, Ir. 11p., f. 5,200	
By ROGERS, CHAPMAN, & THOMAS. Fimlico—104, Attorney-st., u.t. 38 yrs., g.r. £8, 10s., r. £80 p.a. 675 Hyde-park—20, Bryanston-sq., u.t. 19 yrs., g.r. £52, 10s. 1,980	
By MESSRS. & ROY. Upper Norwood—63, Belvedere-rd., f., r. £35 p.a. 430	
By DENBHAM, TAYLOR, & CO. Hanover-sq., &c.—F.g.r. of £1,400, with reversion in 88 yrs. to an o.r. of £2,000, &c. 37,000 Cranleigh, Surrey—"Barnham Farm," and 15a, Cr. 32p., f. 950	

By DAVIES & CO. Abingdon, near—"Radley Hall," and 633a, Or. 33p., f. £28,000 Enclosures of f. land, 7a, Ir. 4p., f. 532 F. woodland, 68a, Or. 32p., f. 1,950	
By WATKINS & SONS. Streatham—F. house and shop, r. £80 p.a. 610	
By MESSRS. CHADWICK. Harrow-rd.—2, Brindley-st., u.t. 65 yrs., g.r. 2a, r. £35 p.a. 350 11 and 13, Brindley-st., est. 55 yrs., g.r. 4s., r. £58 p.a. 640	
By CHENNOCK, GALSWORTHY, & CO. Rosherville, Her.-rd.—F.g.r.'s of £182, 18s., with reversion in 47 yrs., f.g.r. of £300, with reversion in 47 yrs., held at peppercorn, with reversion in 47 yrs. to £150 p.a. 4,785 Pier-rd.—F.g.r. of £27, with reversion in 63 and 12 yrs. 180 Landsdowne-sq.—F.g.r.'s of £80, with reversion in 47 yrs. 2,250 Burford—F.g.r. of £27, with reversion in 63 and 12 yrs. 860 London-rd.—F.g.r. of £25, 4s., with reversion in 47 yrs. 1,110 Burford—F.g.r. of £44, with reversion in 47 yrs. 1,130 F.g.r. of £35, with reversion in 63 yrs. 980 F.g.r. of £30, with reversion in 47 yrs., and 63 yrs. to o.r. of £1,300 p.a. 2,300 The Mount—F.g.r. of £8, with reversion in 47 yrs., o.r. of £120 p.a. 280 London-rd.—F.g.r. of £33, with reversion in 63 yrs. 1,830 "Elephant's Head" public-house, f., r. £100 p.a. 4,200 "The Sun Tavern," f., r. £20 p.a. 300 The Freehold Landing Quay ..... 750	
JULY 3.—By W. JENNINGS. Bermondsey—37, 40, and 42, Balcanala-rd., u.t. 40 yrs., g.r. £11, r. £97, 10s. 770 20, 22, and 24, Lynton-rd., u.t. 40 yrs., g.r. £11, r. £92, 8s. 680	
By E. ROBIN & HIS. Totting, Langley-rd.—"Athole House," f., r. £55 p.a. 1,000	
By DREW & SON. Bedford Estate—£1,050 Mortgage Bonds ..... 1,150 Camden Town, King's-rd.—L.g.r. of £17, term 34 yrs. 210 Little Randolph-st.—L.g.r. of £21, 6s., term 34 yrs. 275	
By W. HALL. Hornsey—F.g.r. of £24, 15s., with reversion in 98 yrs. 1,100 Piddington-rd., Woodchester-st., u.t. 63 yrs., g.r. £5, r. £40 p.a. 450 Haverstock Hill—10 and 11, Oakfield-cres., f., r. £80 p.a. 735	
By C. & H. WATTS. Camberwell—252 and 254, Southampton-st., f. 820 Westminster—5 to 14, Hide-pl., u.t. 17 yrs., no g.r., r. £256 2s. p.a. 970 16, Frederick-st., u.t. 17 yrs., no g.r., r. £52 p.a. 215	
JULY 4.—By BROWN, ROBERTS, & RADMALE. City of London—21, Milk-st., u.t. 28 yrs., g.r. £70, r. £870 p.a. 7,500	
By BRADLEY & CO. Wickham Bishops, Kent—"The Paragon Farm," 25a, Or. 6p., and a house, and 2a, Or. 27p., r. £37 p.a. 850 An enclosure of land, 5a, 2r. 26p., r. £4 p.a. 160 A plot of grass land, 1a, 1r. 34p., r. £1 p.a. 30	
By DREW, SON, & HILTON. Two freehold shares in the Ladbroke-sq. Gardens... 120	
By SAM'L B. CLARK & SON. Golden-wood—Nos. 41 to 45, Broad-st.; 62, Lexington-st.; and 17, Ingestre-pl., f., area 7,350 ft., r. £810 p.a. 11,000 Oxford-st.—1 and 2, Poland-st., f., r. £450 p.a. 8,400	
By OSOBY & MARSH. Fmces Ribston, Bucks—Lady Made and 13a, Or. 32p., f. 4,950	
By GLASIER & SON. Hever, Kent—Meechland Farm and 38a, 3r. 31p., f., r. £55 p.a. 1,050	
By NEWBORN & HARDING. Islington—48 and 49, Alfred-st., u.t. 37 yrs., g.r. £10, r. £78 p.a. 700 Chiswick—98 and 99, High-rd., c, r. £58 p.a. 1,220 Wandsworth—112, High-street, f., r. £48 p.a. 750 Westbourne-park—53, Worlington-rd., u.t. 43 yrs., g.r. £7, 10s., r. £10 p.a. 300 Slough—Two Villas in Chalvey-park, u.t. 53 yrs., g.r. £15, 10s., r. £80 p.a. 510 Putney-bridge-rd.—Nos. 14 and 16, f., r. £33 p.a. 520 Wandsworth—1 and 2, Alfaring-lane, f., r. £33, 10s. p.a. 425 Brentwood—17, and a house and shop in High-street, r. £32, 10s. p.a. 730 F. house in High-street, r. £23 p.a. 850 Holloway—14 and 16, Hope-st., f., r. £43, 4s. p.a. 420	
By WALTON & LEE. Maidenhead, near The Warren Estate—F. cottage and 12a, Cr. 32p., r. £83 ..... 1,200 F. orchard and pasture land, 15a, 3r. 22p., r. £30 p.a. 770 F. pasture and woodland, 17a, Cr. 38p., r. £13, 10s. p.a. 400	
JULY 5.—By T. G. WILKINSON. Forest-hill, Vancouver-rd.—"St. Erney," u.t. 97 yrs., g.r. £5, 10s., r. £35 p.a. 220 "Ecclesbourne," u.t. 97 yrs., g.r. £3, 10s., r. £37 p.a. 220	
By BILL, NORMAN, & HADLEY. Holloway—37 to 43, Mayton-rd., u.t. 71 yrs., g.r. £21, 0s., r. £14 p.a. 950 Shepherd's-bush—53, Elemeint-rd., u.t. 90 yrs., g.r. £5, 10s., r. £35 p.a. 280	

Fulham—2, Palace-ter., u.t. 98 yrs., g.r. £7, 10s., r. £36 p.a. £205 Chiswick—679, 689, and 693, High-rd., u.t. 79 yrs., g.r. £7, r. £39 p.a. 1,000	
By G. A. WILKINSON. Kilburn—42, Cambridge-rd., u.t. 69 yrs., g.r. £11, r. £50 p.a. 380 87 and 69, Cambridge-rd., u.t. 69 yrs., g.r. £25, r. £100 p.a. 810 3 to 6, Cambridge-gdns., u.t. 69 yrs., g.r. £40, r. £217 p.a. 1,570 36 and 37, Oxford-rd., u.t. 69 yrs., g.r. £22, r. £112, 10s. p.a. 690 27, 31 to 39, 47, 49 to 52, Chichester-rd., u.t. 68 yrs., g.r. £32, 10s., r. £298 p.a. 2,795 13 and 15, Chichester-rd., u.t. 68 yrs., g.r. £10, r. £70 p.a. 495	
By WAGSTAFF & WARMAN. Highbury—13, Hamlet-rd., u.t. 68 yrs., g.r. £7, r. £34 p.a. 250	
By A. & G. GAIVER. Ponder's-end, High-st.—F. house and cottage ..... 1,100 F. residence, r. £40 p.a. 750 F. land, 3a, Ir. 6p. 1,030 F. house and shop, and enclosure of land ..... 1,400 [Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]	

## MEETINGS.

## SATURDAY, JULY 13.

St. Paul's Ecclesiastical Society.—Visit to Wennington and Aveley.	
Architectural Association.—Fourth vacation visit to Professor Herkomer's House and Schools at Bushey (see advt. in last week's Builder).	
Glasgow Architectural Association.—Visit to Kelly House, Wemyss Bay.	
WEDNESDAY, JULY 17.	
Builders' Foremen and Clerks of Works' Institution.—Half-yearly meeting. 8.30 p.m.	
Artists' Benevolent Fund.—Anniversary dinner, Freemasons' Hall.	

## Miscellaneous.

Estates for Sale in Scotland.—Some extensive Scottish properties have been placed in the market. They comprise the Westerton, Pluscarden, and Kellas estates, in Morayshire, near to Elgin, watered by the rivers Lossie and Blackburn, and having therein Westerton mansion-house in Pluscarden Glen, near to the well-known Priory ruins. The total 9,800 acres yield rentals, for land and shooting, of about 2,750l. a year in the aggregate. On 31st July will be put up for public sale at Edinburgh the South Harris Estate, Inverness-shire, extending over 55,000 acres—a large portion whereof is deer forest—together with Rodol House, and the Obbe Lochs, famed for salmon and sea-trout. Also, by private contract, the domain of Benmore, with Bernice and Kilmun, near to Dunoon. These lie about the river Eachaig, which flows for two or three miles through the Cowal district of Argyllshire, from Loch Eck into the Holy Loch, over against the mouth of the Clyde. In Kilmun Kirk is the ancient place of sepulture of the Argyll Campbells. These three properties, which can be purchased separately if desired, cover, in all, 10,700 acres, with an estimated annual rental of nearly 3,300l. Also, by public roup, at Edinburgh, on July 24, the Logie Elphinstone estate, in Aberdeenshire, situated a few miles to the north-west of Inverurie. Logie House stands upon the river Ury, in the midst of a parcel of nearly 5,050 acres, of which about three-fourths are under the plough. The gross rental for the current year is stated to be 4,418l., subject to certain feu and crown duties, &c., amounting to 485l. The upset price is fixed at 90,000l.	
Rapid Artesian Well Boring.—We hear that for the Priory and Holroyd's Brewery Company, Guildford, a 250 ft. artesian-bored tube well has been completed in fourteen days by Messrs. C. Ialer & Co. of London. The well is 6 in. in diameter, and lined the greater part of the way. The supply obtained is over 12,000 gallons per hour.	
Memorial to Czar Alexander II.—Designs will shortly be invited for a memorial to the late Czar Alexander II., to be erected in St. Petersburg. The President of the Committee is Prince Dolgorouki, Governor-General, the funds at disposal amounting to 12,000l.	
Competition.—The plans of Messrs. Mercer & Allender, architects, Liverpool, have been accepted in a limited competition for Sunday school extensions and new vestry at the English Presbyterian Church, Breeze-hill, Walton, Liverpool.	



**Sale of Liscombe Park, Bucks.**—This old county property, extending over nearly 314 acres, will be put up for sale at the Corn Exchange, Leighton Buzzard, on Tuesday, 30th instant. Situated in Southbury Parish, Cottesloe Hundred, and three miles distant from Leighton Buzzard, it has been vested in the Lovett family for nearly 600 years past. A view of the house, which is an adaptation of "Old Liscombe," will be found in Dr. George Lipscomb's large folio work upon the history and antiquities of Buckinghamshire (vol. iii.), 1847. One side of the great court is formed by the chapel, of *circa* Richard II., which was originally the chantry licensed in 1501, by John d'Alberby, Bishop of Lincoln, to Robert Lovett, lord of Liscombe. Therein is preserved some ancient stained-glass. Many of the Lovetts, who are said to have held Eddystone Rock in fee, are buried in the chancel vault of All Saint's Church, which was restored, in 1863, by the late G. E. Street, R.A. Amongst the portraits at Liscombe may be mentioned those of John, first Earl of Bedford (1555); Sarah, Duchess of Marlborough, by Kneller; Wentworth, Earl Strafford; Charles Brandon, Duke of Suffolk, holding a nosegay (a half-length); the two famous royalists—Sir Nicholas Cresse and Sir Edward Verney, King Charles I.'s standard-bearer, who fell at Edgehill; Nell Gwynne, Miss Oates, and Saurcott. The sale will include thirty-eight lots, covering about 2,000 acres, all freehold, by way of various dairy farms, building sites, accommodation lands, cottages, and other small holdings.

**The New Croton Aqueduct.**—This aqueduct, which is to furnish New York with water in future, is on the point of completion. The aqueduct proper, save for a little brickwork, is finished, and a tunnel more than thirty miles in length extends from Croton Lake, five miles north-east of Sing Sing, to Central Park, New York. The tunnel is 14 ft. in diameter at Croton Lake, and 12 ft. 8 in. at Central Park. It is from 40 ft. to 400 ft. under the surface, and passes under the Harlem River at a depth of 300 ft. Thence it rises vertically to within about 100 ft. of the surface. The aqueduct will leave a great volume of water at the Jerome Park reservoir, the remainder passing on to the Central Park reservoir, the total capacity of the two reservoirs being 400,000,000 gallons in the twenty-four hours. As this is more than the summer output of the Croton River, New York will have for its water supply, as an engineer has happily observed, "a big spout and a small kettle." The aqueduct has been four years in building, and has cost about 15,000,000 dol.

**The English Iron Trade.**—The English iron market continues firm and in a rising tendency, although the actual business done is not very extensive. There is an evident desire on the part of consumers to place their orders, but makers are unwilling to pledge themselves for any length of time, owing to the uncertainty as to prices of raw materials and wages. Pig-iron has again become dearer to the extent of 6d. a ton in the North of England. Warrants have been very steady at Glasgow this week, and Scotch makers have put up their prices from 6d. to 1s. a ton. Pig-iron has further stiffened this week in Lancashire and the midland districts, while hematites in the north-west and elsewhere are very strong. The finished iron trade is more active in the south than in the north, but everywhere the tendency is upwards. Steel is in very brisk demand, late rates being firmly adhered to. Shipbuilding is unchanged. Engineers continue extremely busy.

**Competition for a New National Theatre at Christiania.**—The programme for the competition for a new National Theatre at Christiania has been issued, inviting Norwegian and foreign architects residing in Norway to compete. There will be one prize of 1400, and one of 850, and the Commission also reserves the right of purchasing any designs for 450. each. The house is to seat 1,200 persons, and cost 33,500*l.*, exclusive of heating, ventilating apparatus, and electrical installation. There is to be a sliding iron partition, and all modern safety improvements, &c.

**Surveyorships.**—Mr. C. F. Marston, Assistant Surveyor, Walsall, was on the 3rd inst., elected surveyor for the borough of Sutton Coldfield, at a salary of 200*l.* per annum.

—Mr. Henry Richards, C.E., of Kingston-on-Thames, has been unanimously elected Chief Surveyor to the Board, in place of the late Mr. J. G. Medworth, who died at the advanced age of 85 years.

**Progress in Auckland, N.Z.**—We take the following from the "Journal of Proceedings of the Institute of Architects":—"Referring to improvements in Auckland, Mr. W. F. Hammond, Associate, the Hon. Secretary of the Auckland Institute of Architects, writes as follows:—"I have been here twenty years, and have witnessed much progress. When I first came, a well-to-do man lived in a sort of packing-case, a house of timber construction, the studs 10 ft. high, and the rafters cut off close to the wall-plates. Many owners were astonished when projecting eaves were introduced. The first house I built in solid material was erected about thirteen years ago, opposite the Government House. Since then the Synagogue has been built near it, and many other good buildings also, including the Masonic Hall and the Grand Hotel. The Museum and Club-house, together with the Government House, grounds, and other buildings, form the most pleasant part of the city. It is on a rich volcanic hill overlooking the beautiful harbour. Near to the Government House is the Supreme Court, and on the eastern side are good villas and the Scotch Church, to which a tower has lately been added. The new Art Gallery adjoins on the western side. Queen-street, running north and south from the entrances to the harbour, has many new buildings, some in brick and stone, and some in white stone from a southern district. Facing the water on either side of the main wharf are large buildings, including the offices of the Harbour Board, the Sailors' Home, &c. The town is on the south side of the harbour; it is of considerable extent, and surrounded by a vast suburban area, which is dotted over with many pretty, and some very imposing, villas, and is rich in grass-land and gardens. On the north side of the harbour the largest dock in the Colonies has just been completed, and adjoining is an old marine suburb, forming a picturesque view to the approach by sea. To the north-west, on the same side, is a sugar refinery. Two other suburbs, Birkenhead and Northcote, are growing fast, and stand on bold cliffs between the sugar refinery and Devonport. On such a day as this, with our winter commencing, a light sea breeze, clear blue sky and sea, and with the thermometer about 65 deg., Auckland is well worth a visit."

**Saltash Water Supply.**—The scheme for the water-supply of the borough of Saltash, recently adopted by the Corporation, as prepared by Mr. H. Bertram Nichols, Assoc. M. Inst. C.E., of Birmingham, was the subject of an inquiry before Mr. S. J. Smith, C.E., of the Local Government Board, on Tuesday, the 18th ult., on the application of the Town Council for borrowing the sum of 6,000*l.* for carrying out the same. Two storage reservoirs are proposed at Trematon, about three miles from the borough boundary, of an aggregate capacity of two million gallons, which, in the event of drought, would provide the borough with seventy days' supply. A covered service-reservoir would be constructed within the borough, holding two days' full supply, and there would be nearly four miles of 5 in., 4 in., and 3 in. distribution mains, with service valves, hydrants, and appendages, supplying the consumers on the constant-service system. After the inquiry, the Inspector, accompanied by the Mayor (Alderman Shaddock), the Engineer, Town Clerk, and Borough Surveyor, with all the members of the Town Council, drove out to Trematon to inspect the sites of the reservoirs; the springs were gauged in the presence of the Inspector, and the yield found to be satisfactory.

**Fire at a Builder's.**—A fire broke out about seven o'clock of Sunday evening last at the premises of Messrs. W. H. and F. Croaker, builders and contractors, of Great Dover-street, Borough, completely gutting the whole of the workshops, machine-rooms, stores, stables, &c. We hear that Messrs. Croaker are erecting temporary premises, and will have all their hands at work again on Monday next. The buildings and plant were insured.

**Association of Municipal and Sanitary Engineers and Surveyors.**—The annual meeting of this Association was held at Portsmouth, on Thursday, Friday, and Saturday, July 4, 5, and 6 inst. We are compelled to hold over a report until our next issue.

**Statue to the Emperor Joseph II.**—A statue is to be raised at Brinn to the Emperor Joseph II., at a cost of 40,000 florins. For the two best designs prizes of 1,000 and 500 florins are offered.

**New Offices, Southwark and Vauxhall Water Co.**—A new building for the offices of this company has just been erected in the Southwark-bridge-road upon a portion of Messrs. Fotts' Vinegar Works. The façade is carried out in Portland stone, and the internal fittings and staircase are executed in Spanish mahogany. Messrs. Holloway Bros. of Battersea, were the contractors for the building and internal fittings at an outlay of 11,168*l.* Messrs. Jenks & Wood, of Berners-street, supplied the furniture and desks; Messrs. Statter & Co., the electric lighting; the two lifts by the American Elevator Company and Messrs. Stannah & Co. The building has been designed and carried out under the superintendence of the engineer to the Company, Mr. J. L. Restler.

#### PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	6	10	0	7	10	0
Teak, E.I.	load	11	0	0	15	0	0
Sesqui, U.S.	foot cube	0	2	8	0	3	0
Canada, 1st	load	10	0	0	10	0	0
Birch	"	3	10	0	6	0	0
Elm	"	4	0	0	5	0	0
Pir, Danisic, &c.	"	2	0	0	3	10	0
Oak	"	2	10	0	10	0	0
Canada	"	5	10	0	7	10	0
Pine, Canada red	"	3	5	0	4	0	0
Latb, Baltic	"	4	10	0	5	10	0
St. Petersburg	"	5	0	0	6	10	0
Waincoat, Riga, &c.	log	2	15	0	4	5	0
Dens, Finland, 2nd and 1st, std. 100	"	9	10	0	11	0	0
Riga	"	8	0	0	9	0	0
St. Petersburg, 1st yellow	"	10	0	0	15	0	0
" 2nd "	"	10	0	0	11	0	0
" white	"	7	10	0	10	0	0
Swedish	"	9	0	0	16	0	0
White Sea	"	10	0	0	17	0	0
Canada, Pine, 1st	"	16	0	0	26	0	0
" 2nd	"	11	0	0	17	0	0
" 3rd, &c.	"	8	0	0	10	0	0
" Spruce, 1st	"	9	0	0	11	0	0
" 3rd and 2nd	"	7	10	0	9	0	0
New Brunswick, &c.	"	6	15	0	8	15	0
Battens, all kinds	"	6	10	0	20	0	0
Flooring Boards, 4 1/2, 1 in. prepared, first	"	0	11	0	0	14	6
Second	"	0	8	0	0	10	9
Other qualities	"	0	6	0	7	0	0
Cedar, Cuba	"	0	0	4	0	0	4
Honduras, &c.	"	0	0	4	0	0	4
Mahogany, Cuba	"	0	0	4	0	0	4
St. Domingo, cargo average	"	0	0	4	0	0	4
Mexican	"	0	0	4	0	0	4
Tobacco	"	0	0	5	0	0	6
Honduras	"	0	0	5	0	0	6
Hox, Turkey	ton	4	0	0	12	0	0
Rose, Rio	"	15	0	0	20	0	0
Bahia	"	14	0	0	18	0	0
Salt, St. Domingo	foot	0	0	6	0	1	0
Porto Rico	"	0	0	9	0	1	3
Walnut, Italian	"	0	0	4	0	0	4

#### METALS.

Incor.—Bat, Welsh, in London	ton	5	5	0	5	10	0
" at works in Wales	"	4	15	0	5	0	0
" at Cardiff, in London	"	5	10	0	5	10	0
Copper	"	"	"	"	"	"	"
Best selected	ton	46	0	0	48	0	0
Best selected	"	47	0	0	47	0	0
Sheet, strong	"	43	0	0	43	0	0
Chili, bars	"	41	0	0	0	0	0
Yellow Metal	lb.	0	5	0	0	5	0
Lead	"	"	"	"	"	"	"
Spanish	ton	12	5	0	12	7	6
English, com. brands	"	12	10	0	0	0	0
Sheet, English	"	13	10	0	14	0	0
Spitzberg	"	"	"	"	"	"	"
Silesian, special	ton	19	2	6	19	7	6
Ordinary brand	"	19	0	0	19	2	6
Tin	"	"	"	"	"	"	"
Straits	ton	89	0	0	0	0	0
Australian	"	88	10	0	0	0	0
English Ingots	"	93	0	0	0	0	0
Zinc—English sheet	ton	21	0	0	22	0	0

#### OILS.

Linsced	ton	21	0	0	21	7	6
Cocount, Coochin	"	26	10	0	27	10	0
Ceylon	"	24	10	0	0	0	0
Palm, Lagos	"	24	0	0	0	0	0
Rapeseed, English pale	"	29	0	0	0	0	0
"	"	27	10	0	28	0	0
Cottonseed, refined	"	25	15	0	27	0	0
Tallow and Oleine	"	21	0	0	40	0	0
Lubricating, U.S.	"	6	0	0	8	0	0
" refined	"	7	0	0	13	0	0
Tar—Stockholm	barrel	1	3	6	1	4	0
Archeangel	"	0	15	9	0	18	0

#### TENDERS

[Communications for insertion under this heading must reach us not later than 12 Noon on Thursdays.]

ACPN.—New sorting-office, for the Commissioners of H.M. Works and Public Buildings:—

J. Longley & Co.	£1,470	0	0
T. R. Turner	1,402	15	0
G. L. & N. P.	1,393	0	0
Garlick & Horton	1,275	0	0
F. Martin	1,241	0	0
A. H. Hargreaves	1,210	0	0
J. O. Richardson	1,208	0	0
J. Dorey	1,200	0	0
W. Barnard	1,190	0	0
T. Anthony (accepted)	1,166	0	0



COMPETITION, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
otage Hospital, Sidcup, Kent	The Building Committee	Not stated	Not stated.	xii.

CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Granite Kerbstones	Reigate Council	Official	July 18th	xii.
Making-good Road	do.	do.	do.	xii.
New Sewer, &c., Old Jewry	Southern Local Board	P. Dodd	do.	xiii.
Wall-Sinking	London County Council	J. E. Worth	do.	xii.
Deal Depôts, Peckham, &c.	L. & N. W. Ry. Co.	Official	July 17th	xii.
tar-paving	Reigate Council	do.	do.	xii.
Brick Sewer, &c.	Lambeth Vestry	Hugh McIntosh	July 18th	xii.
Wall-Sinking	London County Council	Official	do.	xii.
Additions, &c., to Clerkenwell Police Court	Com. of H.M. Works	do.	July 23rd	i.
High Level Sewer, &c.	West Ham Council	J. C. Breland	July 23rd	ii.
Wood-Paving	Whitby Local Board	O. Claude Robson	do.	xii.
supplying, &c., Water-mains, Well-sinking, &c.	Hampshire County Lunatic Asylum	E. T. Hildred	do.	xii.
Branch Fiddle Trench	Thirsk Water Co.	A. E. Preston	July 24th	xii.
New Drainage System, Clissold Park	Poplar Union	Leasr. Clarkson	do.	xii.
Bridges	Hull Corporation	A. E. White	July 26th	xiii.
Pipe Sewers, Manholes, Gullies, &c.	Shirley and Fremantle Local Board	H. J. Weston	July 26th	xiii.
Broken Granite	Harrow Local Board	E. R. Capon	July 30th	xii.
Alteration to Passenger Station, Worcester	G. W. & M. Ry. Co.	Ward Armstrong	do.	xii.
Formation of Road, Sewers, Viaduct, &c.	London County Council	Official	Aug. 12th	xii.
New Schools, &c.	Dartford School Board	do.	do.	xii.
Machinery	Richmond Main Sewerage Board	J. C. Mellis	Sept. 4th	xii.
Alterations and Extension of Schools	Woodford School Board	E. Tidman	Not stated.	xii.
Iron Trussed Roof	1st Gros. Artill. Vol.	C. S. Leach	do.	xii.
External Painting, Tarring, &c., Clabchester	War Department	Official	do.	xii.
Cleaning and Painting Schools	School Bd. for London	do.	do.	xii.
Abacus Frames	do.	do.	do.	xii.
Annular Repairs to Buildings and Furniture	do.	do.	do.	xii.
Shifting Spanners and Cinder Sifters	do.	do.	do.	xii.
Cleaning and Repairs—Schools	do.	do.	do.	xii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor and Inspector of Nuisances	Mallock Local Board	Not stated	July 17th	xvi.
District Superintendent	Walsall Corporation	120l.	July 20th	xvi.
County Surveyors, Ireland	St. Marylebone Vestry	24. 10s. per week	July 26th	xvi.
	Civil Service Com.	Not stated	do.	xvi.

BANSTAD (Surrey).—For painting, &c., at Middlesex County Asylum. Mr. W. H. Culverhouse, Surveyor:—  
Franklin, Croydon ..... £725 0 0  
Deacon, West Norwood ..... 655 0 0  
Potter, Sutton ..... 592 0 0

CHALFONTST. GILES, BUCKS.—For pulling down and rebuilding the "Three Horse Shoes" Stear-gate, in the Salter & Co., Rickmansworth. Mr. C. F. Ayres, architect, 52, High-street, Watford:—  
Brown & Sons, Harfield ..... £230 0 0  
J. Bates, Chorley Wood ..... 610 0 0  
G. Darvall, Chorley Wood ..... 609 0 0  
G. Darlington, Amersham ..... 630 0 0

CROYDON.—For the supply of 1,000 yds. super of best York paving, no stone to be less than 4 ft. super, delivered free in truck at Croydon station, for the Corporation:—  
Skelton ..... 6 0 per yd. sup.  
Bondley ..... 6 0  
Furness ..... 6 0  
De Favior, Norman, & Co. .... 5 9  
Turner ..... 5 7  
Coope ..... 5 7  
Vint ..... 5 6  
Novell & Robson ..... 5 6  
Oakes ..... 5 3  
Brook & Son (accepted) ..... 5 3  
Gabriel ..... 5 3  
Vickerman ..... 5 3  
Bentley ..... 5 1  
Rhodes ..... 5 0

CROYDON.—For the supply of 1,040 yards of 8 by 12 edge curb of best Norway granite, well dressed, the exposed edges drafted round, and the top surface punched off between. Ends dressed full to the square 6 in. down; the top back edge of curb to rise 1 in. when set plumb, for the Corporation:—  
Skelton ..... 4 11 per yd. run.  
Turner ..... 3 10  
Novell & Robson ..... 3 5  
Blithfield ..... 3 4  
Brook & Son (accepted) ..... 3 4  
Goodchild ..... 3 4  
Gabriel (accepted) ..... 3 3  
De Favior, Norman, & Co. .... 3 3

DARENTH (Kent).—For the erection of six fire-escape staircases and other works at the Asylum for Imbeciles, Darenth, near Dartford, Kent, for the Metropolitan Asylum Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities supplied:—  
Jerrard ..... £2,649 0 0  
Gentry ..... 2,579 0 0  
Wall Bros. .... 2,536 0 0  
W. Johnson ..... 2,470 0 0  
Holliday & Greenwood (accepted) ... 2,077 0 0

HOMERTON.—For painting and repairs at the Eastern Ambulance Station, Brooksbys-walk, Homerton, for the Metropolitan Asylum Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities not supplied:—  
Baz ..... £136 9 0  
Wales & Co. .... 111 12 0  
Y. Ivory ..... 86 0 0  
Polley & Co. (accepted) ..... 82 0 0

ISLEWORTH.—For the erection of an off-licensed house, Walpole-road, Isleworth, for Mr. Montague Ballard. Mr. S. Woodbridge, jun., architect, Brentford:—  
J. Dorey, Brentford ..... £270 0 0  
T. Nye, Ealing (accepted) ..... 600 0 0

ISLEWORTH.—For alterations and additions to a villa residence on the Zion Estate, Isleworth, for the Duke of Northumberland, K.G. Mr. S. Woodbridge, jun., architect, Brentford:—  
Blomer (accepted) ..... £122 10 0  
Birnes (withdrawn) ..... —

KINGSTON.—For stabling for Hodgson's Kingston Brewery Co., Limited. Mr. W. M. Yetts, architect, 44, Finsbury-pavement. Quantities by Messrs. Curtis & Sons, 119, London-wall:—  
Lyle ..... £3,860 0 0  
Nightingale ..... 3,833 0 0  
Adamson ..... 3,382 0 0  
Collins ..... 3,562 0 0  
Wells ..... 3,008 0 0  
Oldridge ..... 3,494 0 0  
Gladden ..... 3,411 0 0  
Faulkner ..... 3,333 0 0  
Downs ..... 3,323 0 0  
Jarvis, Surbiton (accepted) ..... 3,346 0 0

LANELEY (Carmarthenshire).—For the erection of the Higher Grade school, for the Llanelli School Board. Mr. E. H. Langer Barker, architect:—  
D. Davies, Llanelli ..... £5,446 0 0  
J. Bassett, Llanelli ..... 5,361 0 0  
Jenkins Bros., Swansea ..... 5,019 0 0  
Thomas, Watkins, & Jenkins, Swan-sea ..... 5,000 0 0  
H. Smith, Kidderminster ..... 4,979 0 0  
Stephens, Basing, & Co., Bristol ..... 4,540 0 0  
T. D. Williams, Knighston ..... 4,840 0 0  
J. Hopkins, Cardiff ..... 4,817 0 0  
D. Hughes, Llanelli ..... 4,600 0 0  
G. Mercer, Llanelli ..... 4,700 0 0  
D. Williams, Llanelli ..... 4,477 12 0  
J. Inwood, Worcester ..... 4,350 0 0  
Brown, Thomas, & Johns, Llanelli\* ..... 4,350 0 0  
\* Accepted.

LONDON.—For reinstating the premises, 16, Harding-street, E. Mr. Hudson, architect, 89, Leaden-street, E.:—  
Eaton & Co. .... £137 0 0  
Consell Bros. .... 144 10 0  
G. Barker ..... 144 0 0  
W. Gladding ..... 139 0 0

LONDON.—For new Workmen's Institute, Upper Tulse-hill. Mr. W. M. Yetts, architect, 44, Finsbury-pavement. Quantities by Messrs. Curtis & Sons, 119, London-wall:—

Downs ..... £2,776 0 0  
Holland & Co. .... 2,769 0 0  
Faulkner ..... 2,735 0 0  
Wells ..... 2,730 0 0  
Higgs ..... 2,716 0 0  
Candler ..... 2,709 0 0  
Woodward & Co. .... 2,680 0 0  
Gladden ..... 2,624 0 0  
Jarvis, Surbiton (accepted) ..... 2,683 0 0

LONDON.—For new business premises for Mr. James Perriman. Mr. Robt. J. Beale, architect, Palace-chambers, Westminster. Quantities supplied:—

P. Hart, South Tottenham ..... £2,173 0 0  
P. Voller, Wood Green ..... 1,968 0 0  
Eaton & Co., Whitechapel (too late) ..... 1,955 0 0  
J. W. Dixon, Highgate ..... 1,840 0 0  
C. Killingback, Camden Town ..... 1,839 0 0  
W. Scrivener, Camden Town ..... 1,788 0 0  
A. Drew, Camden Town ..... 1,883 0 0  
Fatman & Fotheringham, Theobald's-road, W.C. .... 1,873 0 0  
Macfarlane Bros., Hoxsey-road ..... 1,869 0 0  
Gould & Brand, Camden Town ..... 1,847 0 0  
W. Goodman, Hoxsey-road, N. .... 1,843 0 0  
J. Beale, Westminster ..... 1,783 0 0  
E. Toms, Camden Town ..... 1,768 0 0  
W. M. Dabbs, Stamford-hill ..... 1,729 0 0  
S. H. Lambie, Kentish Town\* ..... 1,621 0 0  
\* Accepted.

LONDON.—For rebuilding "The Fleeco" public-house, Marham-street, Westminster, for Messrs. Watney & Co., Limited. Mr. J. G. Esau, architect. Quantities supplied by Savile & Martin, 86 and 87, Strand, W.C.:—

Nightingale ..... £2,109 0 0  
Oldrey & Co. .... 2,100 0 0  
Newell & Co. .... 2,081 0 0  
Frestige & Co. .... 1,967 0 0  
Chappell ..... 1,949 0 0  
Turtle & Appleton (accepted) ..... 1,883 0 0  
Fatman & Fotheringham ..... 1,873 0 0  
\* Withdrawn.

LONDON.—For works at No. 10, Adam and Eve-court, Oxford-street, for Mr. Buay. Mr. John Fowie, surveyor, 64, Finsbury-road, S.W.:—

J. B. Colwill ..... £239 0 0  
Pheps & Son (accepted) ..... 285 0 0  
Reeves ..... 279 0 0  
[Surveyor's estimate, £280.]

LONDON.—For alterations at the "Star and Garter" public-house, Caledonian-road, N. Messrs. Wilson, Son, & Aldwick, architects:—

E. Toms ..... £3,728 0 0  
Ashby & Horner ..... 3,444 0 0  
Hearle & Son ..... 3,130 0 0  
W. Shurman ..... 2,080 0 0  
J. Mills ..... 2,750 0 0

LONDON.—For the erection of eight shops, Old Kent-road, for Mr. H. Goddard:—  
W. & F. Croaker ..... £6,200 0 0  
Geo. Parker (accepted) ..... 4,900 0 0

LONDON.—For house and additions to shop, Old Kent-road, for Mr. H. Goddard:—  
Geo. Parker (accepted) ..... £650 0 0

LONDON.—For reinstating to several houses in and about Back-Church-lane, E., for Messrs. Hood & Son, 316, Commercial-road, E.:—  
Calman ..... £320 0 0  
Holliday ..... 395 0 0  
G. Barker ..... 294 0 0

LONDON.—For alterations and additions to Nos. 42 and 43, Upper-street, Islington, for Mr. Wm. Huntman. Mr. E. J. Harrison, 72, Chancery-lane, W.C., architect:—  
Drew & Calman (accepted) ..... £249 0 0

LONDON.—For the erection of houses at the rear of the "Jolly Butchers" public-house, Stoke Newington-road, Mr. J. C. Reynolds, architect:—  
J. & H. Cocks ..... £2,239 0 0  
Jackson & Todd ..... 2,168 0 0  
H. Parker ..... 1,950 0 0  
W. Shurman ..... 1,644 0 0

SOUTHAL (Middlesex).—For the erection of latrines, lavatories, &c., at the St. Marylebone Schools, Southall, for the Guardians of the Parish of St. Marylebone. Messrs. H. Saxon Snell & Son, architects, London:—  
Chas. Killingback ..... £2,670 0 0  
J. F. Collinson ..... 2,478 0 0  
W. Brown ..... 2,265 0 0  
Thos. Nye ..... 2,607 0 0  
Wall Bros. .... 1,572 0 0  
G. Gibson (accepted) ..... 1,565 0 0

SOUTHWICK (Sussex).—For subway extension South-wick Station, for the London, Brighton, and South Coast Railway. Mr. Fredk. Banister, Engineer:—  
Arthur M. Deacon, West Norwood, S.E. (accepted) ..... £469 0 0

STAINES.—For additions to house and sanitary work at "The Retreat," Penton-road, Staines, for Mrs. Bolton. Mr. Samuel Allen, 240, Lancaster-road, W., surveyor:—  
Langley & Finkham ..... £29 0 0  
Wheatley & Son ..... 585 0 0

UXBRIDGE.—For alterations and repairs to No. 132, High-street, Uxbridge. Mr. A. H. Heron, architect, Uxbridge:—  
Brown, Harefield ..... £235 0 0  
Reant, Uxbridge ..... 194 0 0  
Hardy, Cowley ..... 175 0 0

UXBRIDGE.—For alterations to front portion of No. 126, High-street, Uxbridge, for Mr. W. Coad. Mr. A. H. Heron, architect, Uxbridge:—  
Second Contract.  
Hardy, Cowley ..... £653 0 0  
Brown, Harefield ..... 345 0 0  
Kearley, Uxbridge (accepted) ..... 330 0 0

WATFORD.—For pulling down and rebuilding new banking premises for the Bucks and Oxon Union Bank, Limited. Mr. C. P. Ayres, 62, High-street, Watford, architect:—

G. & J. Waterford, Watford	£4,232	0	0
T. Turner, Limited, Watford	3,898	0	0
W. B. Neal, Watford	3,753	0	0
Webster & Cannon, Architects	3,550	0	0

\* Accepted.

WATFORD.—For pulling down old premises and erecting new cattle lairs, &c., for Mr. Francis Fisher. Mr. C. P. Ayres, architect, 62, High-street, Watford:—

Judge & Earnes	£385	0	0
T. Turner, Limited	816	0	0
G. & J. Waterman	812	0	0
W. B. Neal	795	0	0
H. M. Dove	792	0	0
T. & S. T. Bonnett	782	0	0
J. Brooks	782	0	0
Andrews & Sons	769	0	0
Clifford & Gough, Watford (accepted)	749	10	0

WATFORD.—For alterations to Keeton St. Andrew's, for Mr. Seaton F. Taylor. Mr. C. P. Ayres, architect, 62, High-street, Watford:—

H. M. Dove (accepted)	£225	0	0
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Daglish & Co.	9,990	0	0
Robertson & Co.	7,946	0	0
Tates & Co.	7,828	0	0
Glenfield Co.	6,415	0	0
Hunter & English	6,027	0	0
B. Goodfellow	6,380	0	0
Keston & Anderson	6,303	0	0
Kirk & Co.	6,290	0	0
Hathorn, Davey, & Co.	4,800	0	0
Jas. Watt & Co. (accepted)	4,831	0	0
Fred. Silvester	4,491	0	0

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Yarnshaw & Co.	1,290	0	0
R. Danks	1,080	0	0
Adamson & Co.	545	0	0

Contract No. 2.—Sewers.

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Holmes & King	14,404	10	5
Jackson	13,600	0	0
Dickson	13,740	0	0
Bottoms	12,516	0	0
Neave	12,507	0	0
Cooke & Co. (accepted)	12,092	0	0
G. Bell (withdrawn)	10,212	10	0

Contract No. 3.—Engine and Boiler House.			
Neave	£8,000	0	0
Reed	5,404	0	0
Gregor	5,237	0	0
Cooke & Co.	5,125	0	0
Perry & Co. (accepted)	5,000	0	0
Scotney	4,879	0	0

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# The Builder.

VOL. LVII. No. 2424.

SATURDAY, JULY 22, 1889.

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Dunstable Priory Church: Part of West Front.—Drawn by Mr. Worthington G. Smith	Double-Page Photo-Litho.
House, "The Kilm," Beasted, Kent.—Mr. J. Langham, Architect	Two Single-Page Photo-Litho's.
Municipal Buildings Competition, Gloucester: Views of Second Premiated Design (Medland & Son, Architects) and Third	Single-Page Ink-Photo.
Premiated Design (J. Fletcher Trow, Architect)	
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### The Working of an English Railway.



THE public of this country seem likely to have at least the opportunity of being stirred out of their general ignorance and indifference as to the great operations of railway working daily going on over the length and breadth of the land, by having information on the subject put within their reach in a readable and interesting form, from writers whose knowledge of the subject cannot be contested. Scarcely had Mr. Acworth's collected essays on "The Railways of England," which we noticed the other day, appeared in the form of a volume, than it was followed by a volume of a somewhat more technical but still essentially popular character, on the working of one particular railway treated more in detail.

This is the book, small in size, but containing much information very clearly arranged,\* by Mr. Findlay, the manager of the London and North-Western Railway. Mr. Acworth's book aimed at giving a comparative sketch of the various leading railways of England, their special history and characteristics, with incidental insight into railway working. Mr. Findlay's book gives an account of the working of the railway territory of a single company; and as manager of what we believe to be the best managed railway in the world, he ought certainly to have sufficient data for treating the subject satisfactorily. That the book should be permeated by a conviction of the excellence of London and North-Western methods is of course to be expected, since even railway managers are mortal; but it may be conceded that where the author speaks highly of the way things are done by his company he is a great deal more likely to be right than wrong.

Mr. Findlay wisely does not trouble the reader much with those curious details about the early history of railways and the contrast between former anticipations and present results, which are by this time in the way of becoming rather a bore to the more sensible of the reading public; but some practical

illustrations as to early railway construction, to be found in chapters devoted to special subjects, are of some interest. Among these are the diagrams of the road made with fish-bellied rails jointed on square stone blocks, laid at Loughborough in 1789, and that of the permanent way of the Liverpool and Manchester Railway in 1830 laid on stone blocks placed lozenge-wise, corner to corner; in each case with a chair pinned down on to the centre of the stone block. It is curious to note that the Sheffield Colliery tramroad of 1776, more than half-a-century earlier, shows the cross-sleeper system which has now approved itself as at once the simplest and most scientific manner of carrying the rail. Various other forms of rail, early and late, are shown in section, including Locke's double-headed rail with an equal flange top and bottom, which was intended to be reversible; a scheme frustrated by the discovery that the pressure of the chairs at the bearing-points indented the lower flange too much to allow of its being run on if reversed. A remarkable example of the wearing down of the upper flange of a rail after twenty years' use on a main line and five years on a siding is shown. On this subject of the wear of rails there is an interesting short paper and discussion in the last-issued number of the Transactions of the American Society of Civil Engineers, a body which the engineers of the old country will, we believe, admit to be well to the front in its theory and study of all engineering topics, even if America seems somewhat in the rear at present in actual railway working. The paper referred to, "On the Destruction of Rails by Excessive Weights," by Mr. J. T. Dodge, deals with what the writer of it calls, very expressively, the "flow of metal" in the rails under heavy weights. The most noteworthy point in this paper is that the writer's observations lead him to the conclusion that a much greater distortion or flow of the metal is caused by heavy weights at a low speed than at a high speed. He says "On the rails of a fast-speed tangent no lip is perceptible on either rail, but on like rails for slow speed the lip is clearly visible." He continues

"On the rails of a fast-speed curve there is a heavy lip on the outside of the inner rail, and only a very slight one on the outside of the outer rail. On a slow-speed curve the lip on the outer rail is more marked, and on the inner rail a little less so than on the fast-speed curve."

This is not very clearly put, but we pre-

sume that the expressions "outside" and "inner" are both used in reference to the direction of the curve, and its inner and outer side: though under that supposition it is not very easy to see why the pressure should be heavier on the inner rail. One would naturally expect that, in going quickly round a curve, the heaviest pressure of the wheels would have been against the inner side of the outer rail, and we here record a query as to whether the passage is correctly printed. However, Mr. Dodge appears to have established to his own satisfaction that slow speeds distort the rails most, a conclusion which is rather startling at first, and reminds one of the popular notion so often met with, that a train will be safer "if it runs very quickly" over a weak viaduct. A member of the American Society, in the discussion, in fact thought it worth while to tackle this point, and to show that "there is no discrepancy in theory between the increased flow of rails under slow loads and the increased load on a bridge under a fast train." The effect of a load suddenly brought on a bridge is twice the force of the static load; but this tries the structure not so much by pressure on parts in compression as by sudden strain on parts in tension, and on the mechanical connexions of parts. "The distortion of [the substance of] a plastic body results more from the length of time during which the force is applied, than from the amount of force." So Mr. Johnson, of the American Society of Engineers, puts it, and he instances as an illustration the laying of a small weight upon wax, which gradually sinks into it. The point as brought forward at the American Society of Engineers is certainly a curious one, and seems to deserve further attention. Two of the practical deductions made from its consideration at the American meeting were that the rails should be originally rolled with a slope inwards so as to give the wheels a wider bearing on them in the first instance (this also was Mr. Johnson's suggestion in discussion); and, Mr. Dodge's own conclusion at the close of his paper, that "the tendency to increase the weight of rolling-stock has passed its proper limits, and we should call a halt."

This communication from America coming into our hands at the moment of looking over Mr. Findlay's book has led us into a digression therefrom on the rail subject. To return thereto, many of the order of "nervous travellers" on our railways may read, we hope with interest and gratification, the account in the same chapter of the systematic

\* "The Working and Management of an English Railway." By George Findlay, Lieut.-Col. Engineer and Railway Volunteer Staff Corps; Associate Inst. C.E.; General Manager of the London and North-Western Railway. With numerous illustrations. London: Whitaker & Co. and G. Bell & Sons; 1889.



arrangement for inspection of the track, and will probably learn with surprise that every portion of the line of railway is inspected every day. The machinery for this vast and important daily inspection consists, at its lower stratum, of knots or "gangs" of four men, a foreman and three under him, each of which gangs has under its charge about two miles of double line railway, or about one man to every mile of single line. Every ten or twenty of these gangs are responsible to an inspector, who thus has charge of twenty to forty miles of railway. Seven or eight inspectors are under the control of a chief inspector responsible for 200 to 250 miles, and who has under him a small regiment of travelling workmen for all kinds of current repairs. All these men and the inspector are under the direction of a divisional engineer with a staff of surveyors, draughtsmen, and clerks, with offices and workshops at the most central portion of the district. Each such sub-section is a division, and there are eight such divisions on the London and North-Western Railway. The divisional engineers are responsible to two assistant engineers, and to the engineer in chief of the Company. And so a railway track of many hundreds of miles is kept in safe working order.

If this should be a satisfactory statement for the traveller, so should the chapter on "Management" generally, one of the first in the book, bring trust and confidence to the soul of the shareholder. For there he will read of the equally systematic arrangements for preventing his money being lavished. The Executive at head-quarters is daily inundated with suggestions for increased accommodation and other alterations involving expenditure; but these are not lightly accepted:—

"We will suppose for example, that a goods agent conceives it to be necessary for an additional siding to be laid down at a station. He makes a report to that effect to the manager of the district; the latter enquires into the facts on the spot, and, if he concurs in the necessity, reports his recommendation to the General Manager. The latter consults, in the first instance, the Chief Goods Manager or the Superintendent of the line, as the case may be, and, if his report be favourable, authorises the Engineer to prepare a plan and estimate. The plan, when ready, is subjected to the criticism of the District Officer, the Chief Officer, and of the General Manager, and, if all are satisfied, the Directors are next asked to authorise the necessary outlay. But even this is not all, for, finally, the plan has to be signed by the Chairman of the Company before the Engineer commences operations, and that gentleman, who keeps a watchful guard over the Company's purse-strings, has to be convinced that the expenditure is not only desirable, but actually unavoidable, before his signature is obtained."

And any one who has been in the way of knowing much of the Chairmen of large Railway Companies will probably have come to the conclusion that, as a class, they are not very easy people to impose upon.

Mr. Findlay's rules for the man who would undertake the efficient management of a line, or a large part of it, are very good reading, and will apply to many other forms of management. The final one is "always refuse to see chance callers," or any persons asking an interview merely because they think no one but the General Manager can give them a satisfactory answer. These are the caterpillars who prey upon one's precious time, and every one who has to manage anything important should turn a deaf ear to them.

The chapters on the signalling system and on the telegraph system of course do not pretend to go into full details, but the information requisite to enable the reader to understand the principle and working of the signalling system over 1,800 miles of railway is very clearly given, and will enable any reader of average sense to understand what to so many railway-travellers is still a kind of mysterious shorthand on a large scale. The short chapter on locomotives is of course merely a general statement of results, with a brief description and illustrations, reproduced from photographs, of some of the types of engines used on the London and North-Western system, of which there are eight different ones in all, of course each designed for a different class of work, just as different

leading companies each have their own type of engine built in accordance with the requirements and nature of their own line in regard to gradients and prevalent style of traffic. In regard to this point, we observe that another American engineer, Mr. Dorsey, in that same number of the transactions of the American Society previously quoted, remarks on the wide differences in the rolling stock on English lines, and says "this is especially true regarding the locomotive. It is not possible that these different varieties, differing so much, can all be equally good. It is strange that the best type has not been selected and generally adopted, especially on the same road." This seems a rather shallow remark; on the same road the same type is kept, for the same class of work; but on different roads the requirements are different. The type of Great Northern engine, for instance, is built especially for the requirements of their road. Of course there is a certain pride or fashion with each company about the get-up and character of its engines; but as long as this is not allowed to affect their practical suitability for their special work, why not indulge it? It is more picturesque to have a special design of engine (using the word "design" for the moment in a quasi-artistic sense) associated with each main line, than to have a dull unnecessary uniformity. The North-Western is, no doubt, running more than one type at present for express passenger trains, because of the innovation of the compound engine, which they have not yet entirely adopted. In regard to this engine, the utility of which has been much disputed outside the London and North-Western circle, Mr. Findlay asserts that it effects "a very considerable economy of fuel," and he ought to know. He does not give figures, certainly; but in spite of the natural affection people have for their own inventions, it does not seem likely that so practical a company as the North-Western would continue to build these engines (as we believe they are doing) for the mere pleasure of looking at and exhibiting them.

In the chapter on "The Working of the Trains" the most interesting feature is the chart of the working of the company's trains between Liverpool and Manchester, given as an example of the manner in which the give-and-take between fast and slow trains is studied and arranged. This amounts to a kind of graphic representation of the system of trains by lines on a sheet of paper, which is divided from side to side for the hours of the day, and from top to bottom for the stations en route. Fast passenger trains, represented by straight thick lines, run right through every hour from top to bottom; goods and slow trains which have to start earlier and finish later are shown by thin lines crossing the path of the thick ones at convenient stations, and the places of shunting or waiting can be marked, and the time for waiting graphically shown. Thus the time-table is actually planned out in a form in which the whole arrangement of trains, instead of having to be computed by figures, is visible to the eye at once, as on a map. The author observes that his company, "though not laying claim to the doubtful distinction of running the fastest trains in the world" (the only rap at rival companies that we have noticed in the book), can fairly claim the reputation of being the most punctual line in the kingdom. We believe it can, and if one or two other companies show at least an honourable rivalry in this respect now, we think our memory of past times is correct in saying that the first example of this virtue was set by the North-Western. The contrast with some railways in this respect is remarkable. A few days ago the writer had occasion to start by the 7.25 p.m. main line train from Waterloo station. A crowd of people with luggage were waiting on the platform, and at four minutes before the time named for starting the train was slowly backed into position; at five minutes

after the time a feint at a start was made; in two minutes more another feint; and at ten minutes after the hour we at last left. Imagine that happening at Euston!

The only point we disagree with in the chapter on train working is in regard to the author's serene contentment with the fog-signalling system, on which we have already expressed our opinion in noticing Mr. Acworth's book. Mr. Findlay no doubt shows that every trouble has been taken to make it as complete as possible, but we protest against regarding it as anything but a makeshift system. The care the company take of the men who have to go through this hard duty it is gratifying to read of; and other things in the book are interesting from the social point of view: the admirable system of wage-paying at Crewe, by which 2,000 men are paid and give receipts in half an hour and with military precision and method; and the manner in which Messrs. McCorquodale & Co., the stationery contractors, worked to find work for the daughters of the workmen congregated at Wolverhampton, by opening an envelope factory there; an example of making work for those who want it, which, though contrary to pure economic principles, seems in this case to have answered for both sides. Another passage in regard to employes (of whom by the way, all told, there are above 55,000) we will give ourselves the pleasure of quoting. Speaking of the various trains of all kinds and at so many varying rates of speed which have to be looked after and provided for all along the line in all weathers, the author says:

"Such a service cannot be carried on under all circumstances, whether by night or day, in fogs, in snowstorms, in wind or rain, and under all other adverse conditions, without entailing hardships and dangers upon the men engaged in the working; yet it is gratifying to be able to say that the vast army of men of all grades employed in the service of the various railway companies exhibit at all times a state of complete discipline and cheerful devotion to duty, which could not be exceeded by any body of men whatever, and which, although not perhaps so well understood or appreciated by the public as might be the case, reflects the highest credit on them as a class. Bearing in mind the vast importance of the interests committed to their charge, and the serious consequences that might easily arise from any carelessness or dereliction of duty on their part, it is a fact upon which the travelling public may well congratulate themselves, that their lives and limbs, their property and interests are confided to hands so trustworthy and reliable."

This praise, in regard to the great mass of English railway servants, we believe is fully deserved; that it should be so no doubt speaks much for the healthful effect of those two great moral stimulants, Responsibility and Discipline.

In his chapter on the relation of the State to railways, the author of course upholds (as he is almost bound to do) the flag of the companies against the Government in regard to recent legislation, though accepting the position; but he comments pretty fully, and with great sense and force, on the opinion which is every now and then aired by unpractical doctrinaires, in favour of the purchase of the railways by Government; and those woolly-brained patriots who are in favour of such a scheme should study Mr. Findlay's arguments, which they will find difficult to dispose of. We have always been quite content with the practical reason against any such policy, that the public will never be as well served or their interests as well cared for by a Government management as they are by at all events the best and largest railway companies at present, and that the life and vigour would all be taken out of our railway system by such a transfer, even if it were "within the region of practical politics," which we are inclined to think it is not. Those who want some other reasons against Government purchase, economical, political, and social, will find some forcible ones in the pages of Mr. Findlay's interesting and useful book.

**Builders' Benevolent Institution.**—The annual meeting of the subscribers and donors of this Institution will be held on Thursday, the 25th inst., at Willis's Rooms, St. James's.

\* It will surprise some of our readers to hear that no less than seventy-three of these three-cylinder compounds have been built since the first one was turned out as a novelty in 1881.



## ENGLISH ART AT THE PARIS EXHIBITION.

BY A FRENCH CRITIC.\*

**T**HE English school of painting—so justly glorious in the days of Reynolds and Gainsborough, of Constable, Turner, and Cattermole, offers to-day, for the French observer, a very attractive subject of study. Among some weak examples, the majority of the pictures in the British section of the Paris Exhibition show a power of style, an ability in execution, and a harmony of colour, which combine to render the collection one of great interest.

This assemblage of brilliant qualities is specially noticeable in the portraits. Among these I should not hesitate to place first the magnificent portrait of "J. C. Hook" by Sir John Millais, whose pictures of "an Whist à Trois," the three sisters, and his marvellous head of an old "Garde Royal," were so much admired in the Paris Exhibition of 1878. This picture of Mr. Hook, dressed in a brown suit and holding his palette in his left hand, is one of the *chefs d'œuvre* of the English section. What admirable expression in the meditative face with its network of wrinkles strongly indicated, but without the slightest hardness. The pose is simple but fine. It is to be regretted that the picture has not been hung at such an angle as to give it a better light (the lighting of the rooms being deficient) and get rid of some reflections which injure its effect.

The same remarkable impression of life, of power of modelling in the portrait, is seen in the same artist's portrait of Mr. Gladstone, which stands out vigorously from a dark background. The collection of pictures by Millais is sufficiently varied in style to give an idea of the versatility of his powers. "The Last Rose of Summer" is a magnificent portrait of a young brunette with her face shaded by a large feathered hat. Charming is the head of the child blowing "Soap-bubbles." The "Cinderella" is a pretty girl seated by the fire, the head and the bare legs modelled with great delicacy. The "Cherry-ripe" I do not like so much, a little child in white, of rather woolly texture, but pretty in colour.

Mr. Herkomer's "Cheleest Pensioners" exhibited in the 1878 Exhibition comes among our best recollections of the Exhibition of that year. This time the artist exhibits two remarkable portraits. That entitled—

"Entranced in some diviner mood  
Of self-oblivious solitude,"

is that of a blonde young woman whose white bosom is contrasted by a black satin dress garnished with lace. There is, in this expressive head with its deep eyes and fine and firm mouth, a real sentiment of disdain of the outer world. The folds of the dress are treated in a masterly manner, yet so as to leave in the figure itself the chief interest. This portrait forms a striking contrast to that of "Miss Grant." Here the tonality is absolutely the reverse. The brown head of the young girl in a white robe stands out from a background equally white: the flesh is in full light, the head very finely modelled; perhaps the draperies are a little careless in execution.

The head of a woman, in black satin, on a garnet ground, exhibited by Mr. Luke Fildes, is also of much interest; the hand, the arm, and the neck are all beautifully drawn. Two portraits of young girls by Mr. Gregory display brilliant qualities of execution, that of Miss Mabel Galloway especially.

The complaint I made about the bad lighting of the portrait of Mr. Hook applies equally to Mr. Watts's portrait of Sir F. Leighton (an inferior work, by the way, to Mr. Watts's other exhibits to be noticed just now). The practice, eminently English, of putting a glass over an oil painting, has the inconvenience of causing reflections, which

quite prevent the pictures being seen properly unless they are hung at a certain inclination.

Sir F. Leighton is an artist not only enjoying a great reputation in England, but well known in France, a corresponding member of the Institute of France, and Officer of the Legion of Honour. These are titles enough no doubt to overawe the critic, and yet may it be permitted to me not to like—not at all—the mannered portrait of "Lady Coleridge." The head is pretty, but totally wants expression. I prefer much to this head modelled in wax the "Lady Archibald Campbell" of Mr. Whistler, before seen in the Salon of 1885. That is nervous, fine, lifelike painting, though a little too *effacé* in tonality. Two portraits by Mr. Oulless please me very much, especially that of Cardinal Manning, whose ascetic head stands out powerfully above the red sacerdotal draperies.

Archæological painting occupies a great space in this Exhibition. Mr. Alma Tadema is always the incontestable master of scenes of antiquity. He excels in reviving under our eyes the costumes, the jewellery, the instruments and utensils of Greece and Rome. But his personages contrast woefully, in their modern aspect, with the archaism of his details. His "Expectation" is a charming little *genre* painting, but seems painted after nature at Cannes or Mentone or Nice. In "The Women of Amphissa" the sleeping Menads have no look of the wild and lascivious Bacchantes of the ancients. They all represent pretty and blooming types of English women. In spite of this anachronism, there is an exquisite charm in this composition, irproachable in drawing and which attracts one both by the composition of its lines and the harmony of the colour.

Nor are the personages any more Greek which Sir F. Leighton has painted in his large picture of "Andromache Captive": they are blond English women of an ideal type of beauty, grouped in a conventional Classic landscape devoid of real character. This pretentious painting, correctly drawn but smoothed and polished to excess, wants at once truth and simplicity. It recalls, under a different aspect, the conventional antiquities of which the late Gustave Boulanger made a specialty. The same approach may be made against the "Marianne" of Mr. Waterhouse, which has no antiquity but such as can be obtained from variegated tinsel dresses hired from a costumer.

I much prefer to these classical reminiscences the "Cophetua" of Mr. Burne Jones, which to a certain extent recalls the work of the early painters. The young "beggar maid" is beautiful, and the foreground group stands out boldly against an architectural background of very curious design. This scene, rather enigmatical no doubt to the public, presents a great harmony of line and composition.

The "Nymph" of Mr. William Stott is an Academy study, disagreeable in colour. With Mr. Watts we enter absolutely on the world of Dreams. His impalpable personages move in an ethereal fluid which seems to envelope their bodies with a soft and undulating light. In the "Judgment of Paris" the painter shows us three splendid women in opulent nudity. Then we come to "Love and Life," a graceful but somewhat playful (*mûre*) composition, to which I prefer the "Diana" leaning over the sleeping Endymion. The draped torso of the goddess is perfect in design. The same undulating line is seen in the female figure clad in pale blue and bathed in a celestial light, who personifies "Hope." The general tone of colour of these paintings, which takes one by surprise at first, is harmonious. This original and indefinable painting proceeds from a mood of poetic abstraction such as strikes the French mind, little accustomed to metaphysics in painting, with astonishment and bewilderment. One has to take time to get accustomed to it before realising its exceptional qualities in design and execution.

Historical pictures are not numerous, and I recall one only which really pleased me. This is a small picture by Mr. Andrew Gow, showing the French Garrison issuing from

Lille in 1708. The figures of the wounded soldiers marching in the midst of a devastated country are marvellous in their expression of resignation and of privations nobly borne. In the foreground a group of wounded English officers salutes the army as it marches out with the honours of war. The scene is laid in a landscape soberly treated, but where everything conduces to the general effect of a composition full of life and interest.

We in France, who are almost tempted to consider as a sign of decadence the intrusion of larger and larger-sized paintings of *genre* on to the walls of the annual *Salons*, may have a certain satisfaction in noticing that the same kind of movement is taking place in England. One must therefore recognise it as a general tendency of modern art to abandon "la grande peinture" and the pages of history, in order to reproduce in their reality scenes from every-day life. Certain painters, it is true, endeavour to escape this by means of costumes of another day, and thus to imagine themselves the historians of the life of past generations. But in spite of the three-cornered hats, silk stockings, and powdered wigs, is not the picture which Mr. Marcus Stone entitles "The Gambler's Wife" essentially modern? And Mr. Orchardson's "Her First Dance," is not that also, in spite of the accessories, a lively picture of bourgeois manners of the present day? Mr. Orchardson, whose palette is peculiarly original and his own, contrasts with the juvenile grace of the *débutante* the pretentious elegance of her partner. Around the principal group are seated here and there the relatives and friends, whose attitudes and expressions are full of life. This interior scene, simply rendered, is full of true observation. His "After" is the result of a "Mariage de convenance." The aged husband, married for his fortune alone, is seated in an attitude of deep despair before the fire. Grief has paled his complexion and reddened his eyes. Behind him is the luxuriously-furnished dinner table almost untouched in the deserted room, on the wall of which hangs the portrait of the faithless one to renew his grief and his regrets. In this scene, treated with the greatest simplicity and full of meaning, every detail combines to illustrate the moral drama which has been played. The same artist's "Master Baby" on a sofa, and amused with his mother's fan, is less successful; the child is charming, but the painting is rather careless, and the prevailing yellow tone is disagreeable.

There is a great charm in the "Intruders" of Mr. Gregory. Two young girls, one standing, the other seated in a boat, are looking at the swans; the sun sheds a bright light on the scene, on the clear water and the blue and pink dresses of the two women; a very fresh and bright landscape forms the framework of the scene. "The Penitent" of Mr. Luke Fildes, weeping on the threshold of her former home, has stirred the attention of the whole village; the women are grouped about her, the children look on with curiosity. There is much sentiment in this scene, which is full of well-treated detail, and which I prefer to the painter's "Venetians" seated at the edge of a canal.

The little picture by Mr. Whistler, "Harmony in flesh-colour and green," and which represents Chinese women grouped on a balcony, has the defect of being too sketchy in style; but though I may be accused of being an "Impressionist," this little picture attracts me much by its fine quality of colour. I note also here Mr. Leslie's "Thames Roses," a pretty young girl reclining by a window through which is seen the river and the green fields; "The Benediction," a mediæval scene by Sir J. D. Linton, well treated and full of interesting detail; and the "Homeless and Homeward" of Mr. John Reid, which recalls, with less of mere realism, the kind of scenes which Messrs. Gœuneutte, Geoffroy, and Pelez parade before our eyes in every Salon exhibition.

Landscape, and especially sea painting, is largely represented in the English collection. We meet Mr. Gregory here again with two

\* The principal pictures in the English section are all well known here, and have been noticed by us before. But we thought it would be of some interest for English readers to see how they appear to French eyes; hence this article, translated from the French of a Paris critic.



interesting landscapes, "A Scotch Hillside" and a luminous view of Venice, a little hard in texture, but showing great precision in the details of the architecture. This same precision in architectural detail is seen in Mr. Wyke Bayliss's "White Lady of Nuremberg," an essentially architectural picture far superior to those which Mr. Mansyer exhibits at the Salon.

Mr. Hook is *par excellence* the painter of fisher-folk and sailors, whose types he renders with the greatest spirit and with the picturesqueness of truth. Of the three pictures he exhibits, I should place first that entitled "The Day for the Lighthouse." Here is fine and solid painting; the air circulates in it and the light plays on this stretch of shore where the peasants with poultry and other provisions wait, at low tide, for the boat which is to take them to the lighthouse. The same power of touch, the same intensity of truthfulness, are seen in the composition entitled "It is an Ill Wind that Blows Nobody Good," where two fishers, a man and a woman, drag to the shore a piece of floating wreck. The sea has no secrets for such an observer as Mr. Hook, who knows how to render its numberless effects with the same surety of eye and hand. In "The Close of the Day" the sun is setting beyond the sea which it floods with light; in the foreground is a green solitude of cliffs.

Mr. H. Moore's "Newhaven Packet" is a fine sea-piece of great simplicity; the "Clearness after Rain" by the same artist is a little heavy in handling, but there is, in this immense stretch of sea which is almost blended with the sky in the distance, a powerful effect very finely rendered.

It is to be regretted that the hanging committee has placed Miss Montalba's "Piazza Inundated" so badly. This small picture merited better than to be hung so much too high. The sky is perhaps rather heavy, but it is a very pretty effect rendered in a very interesting manner.

Among other works, Mr. Knight's "Lifting Mist" is a pretty landscape showing an effect of storm. Mr. Leader's "At Evening Time there Shall be Light" is a fine scene very well treated in respect of light. As to Mr. Goodall's "Memphis," it is an Egyptian landscape displaying that kind of red effect of colour with which M. Théodore Frère has wearied us for so long. I note also good landscapes by Mr. Wyllie, Mr. Parsons and Mr. Mark Fisher. Mr. Vicat Cole's "Autumn Leaves" is a kind of *trompe-d'œil* painting, which looks as if it were made by squeezing real vegetation between two sheets of glass.

The English watercolours occupy the final room, one well worthy of attention. Among the best I should cite two charming drawings by Mr. Boyce, "The Porte Neuve at Vézelay" and "Bougham Castle"; "Magdalen Tower and Bridge, Oxford," by Mr. Fulleylove; the "Entry to the Port of Marseilles," by Mr. Callow; Mr. Collier's "Moors near Moel Siabod"; and Mr. Langley's "Among the Missing." Mr. Alma Tadema sends two fine watercolours, "Pleading" and "Music." There is a great deal of atmosphere in Mr. Aumonier's "From Hedsor Hill," and I like very much the "View from Mount Harry" by Mr. Hine. I should mention also especially Mr. Thorne Waite's "Dividing the Flock," and an amusing little *genre* scene by Mr. Wyllie, "Return of the Life Guards."

Among engravings and etchings are two reproductions made by Mr. Herkimer from his "Miss Grant" and "Entranced," that of the portrait of Mr. Gladstone by Mr. Barlow, and a number of pretty and amusing designs by Miss Kate Greenaway.

The works in sculpture are few and certainly inferior to the paintings. But special mention should be made of the "Perseus" of Mr. Gilbert, a young artist with a great future before him, who also exhibits a beautiful statuette "An offering to Venus," and some heads full of expression and feeling. Sir F. Leighton's "Needless Alarms" is rather trivial but pretty. The "Dryope" of Mr. Browning is a bronze figure, heavy and massive in proportions. Mr. Thornycroft's

"Medea" seems to me rather mediocre; and I meet here again, but not with much satisfaction, a figure of "Peace," exhibited in the Salon of 1888 by Mr. Onslow Ford, who however contributes a very good bust of the Lord Mayor of London, Mr. Whitehead.

In conclusion, the English Fine Art Exhibition at the Champ de Mars, which it is to be regretted is not nearly so full or representative as in the 1878 Exhibition, suffices nevertheless to prove that fine works are not wanting to-day on the English side of the Channel; that English art, which has produced some very great painters, continues to hold a considerable position in contemporary art; and that her modern school shows itself worthy of the great traditions left to it from some former generations.

#### NOTES.

SEVERAL important conferences have been held during the last week or two between the representatives of the railways and deputations of traders, in accordance with the Board of Trade circular relating to objections to the new rates. Mr. Courtenay Boyle, as representative of the Board, attended one of these meetings, and explained that anything they could do to facilitate the settlement of the questions in dispute would be done; but that 914 objections had been sent in by individual traders, and he hoped that many smaller matters might be settled by negotiation. The discussions at these conferences have been very much on lines now quite familiar to all who have followed the subject, but one or two important statements have been made by the railway officials as to their position and intentions. At the meeting we have already alluded to, Mr. Beale (Midland Railway) said that the railway officers had directed their minds to a working classification to submit to Parliament; but had come to the conclusion that such a course would inflict injury upon the traders. This was confirmed and amplified a few days later by the General Manager of the Great Northern at a conference with the Agricultural Engineers' Association. Mr. Oakley positively stated that they would continue to use their working classification independently of that to be authorised by Parliament, regarding the latter simply as a limit beyond which they could not advance. Rightly or wrongly, the traders have assumed that,—at least as far as the placing of articles in their respective classes is concerned,—the proposed Parliamentary classification was to be the working classification of the future. Seeing that the former is in so many respects identical with that at present in use at the Railway Clearing-house, we are inclined to think that this view is likely to prove correct; and that, as was remarked by one of the speakers at this Conference, the companies would soon find it inconvenient for articles to stand in different classes in the respective classifications. We think that the margin for contingencies to which we have always said that the companies are justly entitled, should be provided for in the mileage rates, and that it would be unwise and unreasonable to meet them by shifting goods into higher classes. The class should be definitely fixed, with some degree of elasticity in the rate applicable to it. Hence, all such objections as are founded upon the "moving up" of goods out of the class in which the Railway Clearing-house has been content to place them, are deserving of favourable consideration at the hands of the Board of Trade.

THE Scottish National Portrait Gallery, Queen-street, Edinburgh, was inaugurated on Monday, the 16th inst., by the Marquis of Lothian, Secretary for Scotland, in presence of a large and distinguished audience. As our readers are aware, the Gallery was erected from the funds of an anonymous donor, and much speculation existed as to who the patriotic Scotsman was to whom the country was indebted for the munificent gift.

This speculation was set at rest by the Lord Justice General, one of the Commissioners of the Board of Manufactures, who explained the circumstances under which the original donation was made, and the negotiations between the Board and the Government, under which the Government agreed to contribute 10,000*l.* The donor is Mr. John Ritchie Findlay, of the *Scotsman*, and his contribution to the undertaking was stated to be 50,000*l.* Mr. Findlay, who was present, was called upon by the Marquis of Lothian to address the meeting, and, in doing so, said that he was proud of the approbation bestowed upon him, and happy to be present at the inauguration of a project which had for him been, for a time, a mere day-dream, and which had taken concrete shape in the institution so handsomely housed in the building in which they were assembled. Lord Glencorse, in the course of his remarks, said that the style of architecture adopted by the architect (Dr. Rowand Anderson) was, in his own words, "the Secular Gothic of the latter half of the thirteenth century,—a style that lends itself readily to the purposes of the building, and secures the greatest amount of light to those rooms which must be lighted from one side only." There is one feature in connexion with the design to which he desired to call attention, namely, the niches which are left all around for statues. It would surely be most appropriate that these niches should be filled with statues of eminent Scotsmen of past times. The people of Scotland generally were looked to to provide the statues, and if one were obtained the rest would be sure to follow. As regards the external aspect of the building, a word of warning would not be out of place as to the judging of it before it is actually completed. The front of the building, as it originally stood before the wings now in course of erection were commenced, presented, undoubtedly, a somewhat bald outline, but when the wings with their towers are completed and these are connected with the central building by means of a parapet running round the whole, he ventured to say that there would not be a finer building in the City of Edinburgh,—or, perhaps, in Scotland. Lord Lothian suggested to the Board of Manufactures the desirableness of maintaining a high standard in regard to the portraits which should be admitted. We understand that the forthcoming Art Congress is to be accommodated in the new building.

THE model form of a Provisional Order under the Electric Lighting Acts, 1882 and 1889, for a Metropolitan area, will be carefully studied by all those who are financially or otherwise interested in the schemes now being pushed forward for the lighting of London and some of the more important provincial towns. This recent publication is largely based on material of a similar character, which has already been circulated and duly discussed; we do not propose, therefore, to venture upon any criticism of those clauses which deal with such matters as definition of area, of supply, security to be given for execution of works, revocation of order if mains are not laid down after due notice has been given, &c., but attention may be directed to certain new points which have a very important bearing upon the broad question of the supply of electricity to the metropolis. On a previous occasion we noted the desire of the County Council to become the controlling body of the electric light in the county of London, and, excepting the powers of purchase given by the General Statute to local authorities, the Council get practically all they asked for given them in the Order, by means of which the Board of Trade seek to transfer to the County Council the powers vested in this latter body by Parliament. Any possible difficulty is got over by a process called on the other side of the Atlantic "bull-dozing"; the Companies may voluntarily agree to submit themselves to the control of the Council, or they may go without their orders. That methods of this



nature would be resorted to was, to a certain extent, foreshadowed in Major Marindin's report; but such regulations as those relating to testing, or the appointment and duties of electric inspectors, must come as a disagreeable surprise to many. Electrical engineers will remember the kind of thing they had to contend with at the hands of inspectors, in the early days of the electric light, when the insurance companies were alarmed at certain fires, which had occurred entirely from bad workmanship, and looked upon the introduction of electricity into a building as a source of great risk. It was not until Mr. Musgrave Heaphy fully investigated the whole question, and drew up the now classical Phoenix Rules, that a scare which promised at one time to become a serious bar to the progress of the light eventually turned out a blessing by ensuring good workmanship. Under the Order electric inspectors are to be appointed whose duties will be to test mains, when directed to do so by the appointing authority; to test the service lines whenever a person supplied with electricity by the undertakers desires it; to test the instruments belonging to the undertakers; and to certify meters. On adding that the undertakers have no control at all over the performances of these gentlemen, unless we so regard the privilege of being obliged to pay the inspector's fees even should the plant of the undertaker prove perfect, it is needless to point out the hardships and possible abuses that will inevitably arise through such a system. The handling of technical details by untechnical, irresponsible bodies leads to but one result, and we look for any compensating advantages in vain.

ON Saturday last a number of persons interested in sanitary work, members of the medical profession, sanitary engineers and others, visited No. 5, Queen's-gate, by invitation, to inspect the sanitary arrangements just carried out there under the direction of Mr. Rowland Plumble. The house has recently become the property of Dr. Wakley, the editor of the *Lancet*, and by his wish has been laid out, at considerable cost, as an example of what a London house should be in its sanitary arrangements and fittings. The most notable feature in the house is the laying of the drains, which necessarily pass under the house. All the existing earthenware pipes and fittings have been removed, and cast-iron socketed water main pipes in 9 ft. lengths have been laid, the joints formed in molten lead; the pipes are coated with Dr. Angus Smith's solution. The intercepting and inspection chambers are lined with white-glazed bricks; there are three of them, one at the back, one in the house where the soil-pipes join the main drain, and a principal one in front; but as these latter two are actually in the house (unavoidably), the manholes have the protection of Broad's air-tight covers in stone frames, then six inches of prepared silver sand pressed down, and the whole covered with a Phillips's "Brontes" air-tight cover. Nothing can get through that; but it must not be concluded that it is as desirable to have intercepting chambers within the house, with this protection, as outside it, even with more ordinary protection. A perpetually-acting flushing system is provided from the sink waste at the head of the drain. This is altogether a splendid piece of house drainage work. The water-closets are Dent & Hellyer's "Optimus" closets, but we regret to see that the old-fashioned casings to the seats are retained in the principal closets. The water pipes are laid on to the fire-main, thus ensuring a constant high-pressure supply of water, but this can hardly be regarded as a model arrangement that can be generally followed in London. Among other convenient additions is the provision of a separate stop-cock to every pipe in the building, so that in case of an accident to any particular pipe the water can be shut off from it without stopping it off from the rest of the house. This is a great convenience, which might well be more largely adopted. The

floors, walls, and ceilings are nearly all treated so as to be washable (the drawing-room appears to be an exception); the wall and ceiling coverings are enaglypta, lincrusta and other pressed papers (somewhat too rough in surface for our idea of London wall-papers); the floors of reception-rooms are laid with parquet flooring and the passages with stone and mosaic paving, also with the object of being washed. Perhaps the idea of a model London sanitary house might have been more fully realised by discarding the use of papers altogether; but of course finishing the walls in any decorative manner without paper would mean abnormal expense. The construction of the drains, indeed, is at a cost that would be prohibitive in many cases; but where it can be afforded nothing can be better or more enduring than the way it is done here.\*

WE fear that the useful little Bill as to the names of railway-stations, which has recently been introduced into the House of Commons, will scarcely become law this session. It may, however, act as a hint to the railway companies that if they do not take this matter in hand, Parliament will make regulations for them. One provision in the Bill is that the letters which form the name of the station shall not be less in size than the largest of the letters in the advertisements fixed to the adjacent wall. It would be better, however, to lay down a distinct rule as to the size of the letters, for there will be no object in having them of the exaggerated size which is to be found in some advertisements. The clear space of 10 ft. all round the name of the station is very necessary, and some proviso should also be introduced to meet the case of stations on the underground lines, which are not properly lighted in the day-time. But it is not in some respects an anomaly that Parliament should have to deal with such a subject as this, which the Board of Trade ought to have jurisdiction to manage; together with various other details connected with the arrangements at stations?

THE case of Presland v. Bingham, which is reported in the current number of the "Law Reports," is not without interest in regard to the law of light. The obstructions there complained of were packing-cases which rose many feet from time to time above a wall. This wall was, after a time, raised above its former height, and it was contended that the defendant had a right to do so because the packing-cases were an interruption of the plaintiff's light within the meaning of the Prescription Act. Mr. Justice North took this view, but was overruled by the Court of Appeal, on the ground that having regard to the nature of the so-called interruption, it could not have been one which was continuous for a year. The most important point decided concerned the question of evidence, and as to this it will be best understood by a quotation from the judgment of Lord Justice Lindley, which lays down the law clearly and shortly:—"If," he says, "the plaintiff proves access of light, and, in the course of putting in his evidence, there is no sign of any interruption, he has done all that it is *prima facie* necessary for him to do. If in putting in his evidence it appears there is some material structure which has, more or less, obstructed his window, it is for him to show that it has not lasted a whole year. If he shows that there is something like this (the packing-cases), a fluctuating obstruction, sometimes high, sometimes low, sometimes none, then it is for the defendant to show he has been obstructing for the whole space of twelve months, and that the plaintiff has acquiesced in the obstruction."

WE have had to record, in another column, the death of an architect who had a rather remarkable career,—the

\* The contractor for the whole of the works, alterations, repairs, decorations, &c., is Mr. Herbert Hanks. The house is being fitted with electric lighting by Messrs. Laidlaw, Wharton, & Davis, under the direction of Mr. Rust. The hot-water and stove and range work are being fixed by Messrs. Ashton & Green (Limited). The mosaic work by Messrs. De Grelle, Houdret, & Co. The painted windows by Mr. Arthur J. Dix. The parquet flooring by Messrs. Bassant.

late Sir James Picton of Liverpool. Though Sir James was no doubt a man of considerable natural ability, his life may be said to be a prominent example of the success which may be attained by persistent hard work and perseverance, coupled with the blessing of vigorous health. He himself told us that he "married on 1201. a year"; he has ended his life as one of Liverpool's most prominent and successful men, and his success seems to have been continuous and unbroken during the greater portion of an unusually long life. Perhaps, too, his enjoyment of excellent health up to almost the day of his death in his eighty-fourth year, may be added to the many facts which seem to testify that there is no better receipt for long life and continuous health than hard work. When Sir James Picton practically retired from the practice of his profession, at an advanced period of his life, it was only to take up with equal energy various other studies. The buildings which were carried out from his designs in Liverpool, in his earlier days, the most prominent of which were large blocks of offices with architectural façades of considerable elaboration, form very favourable examples (especially for their period) of the application of Renaissance forms to modern street architecture; and he did not repeat himself in these various buildings of the same class, but aimed at giving originality and a special character to each.

THE *Antiquary* for the present month contains an interesting article by Mr. F. R. McClintock on the old Spanish town of Cuenca, now brought by a new railway within easy reach of Madrid. A grand bridge and the Cathedral are the principal architectural attractions; an interesting and tolerably detailed description is given of the latter, which appears to be a building possessing a good deal of interest of a curious and out-of-the-way kind.

WE mentioned some time ago a form of drain-pipe which Mr. Norman Shaw was employing, consisting of half or invert pipes only with flat top-slabs cemented on. The idea was afterwards claimed by Mr. T. L. Watson, in a friendly letter, as having been the subject of a prior patent of his. We have now received a circular announcing that this form of drain is offered to the public as "The Channel Drain-Pipe: R. Norman Shaw's and T. L. Watson's patents." Various advantages are claimed for this form of pipe, not all of which can be sustained. The great matter is that the whole invert of the drain can be seen when complete and laid down, before putting on the top slabs. With care, however, it is possible to leave circular drains perfectly smooth inside. The statements that the "channel drains" can be laid more accurately, used at less fall, and tested for tightness more accurately than ordinary pipe-drains, we can see no ground for. Nor is it the case that the joints can be more solidly and more tightly made than with round pipes; in view of some of the recent improvements in jointing round pipes in cement the statement is absurd. "The smoke test is less necessary than with ordinary pipes" (why?), "but the covers offer greater facilities for applying it." That is just what we fear may be the fact, though in a sense not contemplated by the promoters. The cement joints are where the smoke usually finds weak points in ordinary drains; and here the whole top is a cement joint. The claims made of superior economy, that the pipes are more easily handled, lighter in carriage and more commodious to pack, and that they "can be used with loose covers for carrying off surface and roof water while the building is in progress," are all quite valid. The experiment is worth trying, but the promoters have made the common mistake of claiming too much; and we certainly cannot regard a cement-jointed slab

\* Manufactured and supplied by the following makers:—J. C. Edwards, Basdon, North Wales; Henry Sharp, Jones & Co., Westminster and Poole, Dorset; Wenham & Walters (Limited), London and Croydon.



cover as likely to be equally impervious with a glazed stoneware culvert.

**T**HE sale at Salisbury on the 23rd inst. of the late Sir Robert Loder's Wiltshire property will comprise the Wilsford House (823 acres) and Heale House (719 acres) estates. To the latter belongs a historical residence, Heale House, lying within four or five miles from Salisbury. We take the following particulars from an account of his escape from "Sultan Oliver," after the fight at Worcester, as dictated by the King to Pepys, at Newmarket, in October, 1680,\* and from the scarce Boscobel Tracts, Parts I. and II., with the "Claustrum Regale Reseratum, or The King's Concealment at Trent," written at the time by Thomas Blount, author of "Fragmenta Antiquitatis," and other works. On Oct. 3 the King, under guise of William Jackson, "a poor tenant's son," and with Mrs. Julian, he calls her Judith, Coningsby seated on the pillion of his saddle, set forth from Colonel Francis Wyndham's manor-house at Trent, near to Yeovil and Sherbourne. He was accompanied by Colonel Philips, and attended by Henry Peters. Having halted in Mere, where they dined at the George Inn, the party in the evening gained Heale House, the home of Mary, widow to Lawrence Hyde, an elder brother of Sir Robert Hyde, Justice of the Court of Common Pleas. At Heale House the King abode for ten days, riding out each morning and returning when the servants were at supper. On one such day he and Philips visited Stonehenge, where, as the latter records, "they found that the King's arithmetic gave the lie to the fabulous tale that those stones cannot be told alike twice together." The closet which Charles mentions as forming his "hiding-hole" at Heale is still shown there. At two o'clock in the morning of Monday, October 13, he and Dr. Henchman (afterwards made Bishop of Salisbury; Charles calls him "Henshaw") started from Heale on foot, being soon joined by Lord Wilmot, Colonel George Gunter, and Mr. Thomas Gunter, for Mr. Thomas Symons's house at Hambledon, in Hampshire, where they arrived on that same night. On Wednesday, October 15, the King and Lord Wilmot sailed from Shoreham in Francis Mansel's 60-ton vessel, its master Nicholas Tettmarsh, which after the restoration lay moored awhile in the Thames off the Privy-stairs, Whitehall.

**W**E learn that a new attempt to adapt iron to the paving of streets is now being made in Sheffield. In this system, illustrated in the accompanying cut, the iron

heavy traffic. As is usual in other systems of pitching, a concrete foundation is the first requisite for this pavement. Upon this is laid a thin coat of asphalt, on which the irons are bedded. Between the irons are driven cubes of wood, each cube fitting into the angles of the irons, as shown in the cut. The interstices of the cubes are filled with pitch as in ordinary wood paving. About thirty-eight square yards has been laid down in Saville-street by Mr. G. Carr, contractor, who has had a smaller piece in use on his premises for above a year and a half. We are informed that the iron is not subjected to any anti-corrosive treatment, the pitch being depended on to keep it from rusting.

**I**N our report of the proceedings at the London County Council last week, we mentioned, in connexion with the election of Chief Engineer to the Council, that the names of the seven candidates first selected from the thirty-five applicants for the appointment did not transpire, and that we had not been able to obtain them on application to the officials. In reply to a second application for the names (which we made by letter), we received the following letter from the Clerk of the Council:—

"London County Council,  
Spring-gardens, S.W., July 11, 1889.

SIR,—In reply to your letter just received, I have to inform you that the lists of candidates for appointments are printed solely for the use of members of the Council, and are not in any way public. I regret, therefore, that I do not feel authorised to accede to your request.—Yours truly,

H. DE LA HOOKE."

What possible objection there can be to making known the names of the candidates, especially those of the seven gentlemen first selected, we are at a loss to conceive. We submit that the public have a right to know the names of the candidates for so important an appointment as that of Chief Engineer, who will have in his keeping, to a great extent, the health and comfort of the inhabitants of the metropolis, and who, in all probability, will be responsible for the expenditure of millions of money. The technical and engineering journals, we contend, have an especial right to information of the kind we sought, and the County Council,—which is as yet on its trial,—is certainly ill-advised in maintaining secrecy of this kind. Since we wrote last week, a correspondent has kindly furnished us with the names of the seven candidates first selected for the appointment in question. They were Messrs. Oswald Brown, M. Inst. C.E., Westminster; Mr. Clement Dunscombe, M. Inst. C.E.,

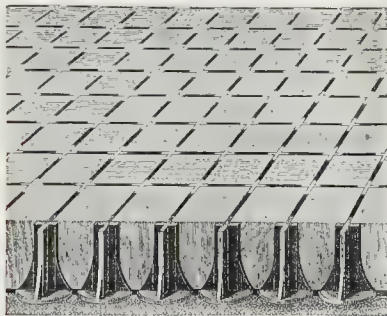
a good appointment; on the contrary, we think it is a very good appointment, Mr. Gordon having had large experience in carrying out important municipal engineering works both in England and in Germany. And we mean no disparagement of Mr. Gordon when we express our opinion that Mr. Dunscombe would have been a more formidable competitor for the appointment than either of the other two gentlemen who were selected with Mr. Gordon for the final voting.

**I**N reference to a "Note" in our number of the 6th inst. as to an alleged difficulty with "sprinklers" at a fire in the Victoria Flour Mills near Wellingborough, we have received an elaborate statement from a firm of fire engineers whose special form of sprinklers had been fitted there, to say that nothing of the kind happened, and a letter from the manager to say the same. As no names were mentioned and no maker blamed, the object of the communication is merely of course an advertisement, with which object similar letters have been got into some of the daily papers,—letters which would lead any reader to suppose that we had gone out of our way to make an attack on "sprinklers" in general and these special makers in particular. We simply commented on a published statement sent to us from a local paper, that there was difficulty in stopping the sprinklers; how, it was not said—it might have been the blundering of an employe; and we drew attention to this possible inconvenience as a thing to be guarded against. If country newspapers publish incorrect statements we cannot help it, but we have some reason to think that the account was not so entirely without foundation as is now represented. It is not to be supposed, however, that any firm of patentees would neglect so convenient an occasion for exercising the divine right of advertising themselves.

**C**ONSIDERING how few occasions we have in modern life (or how few we take) of making up beautiful spectacles of any kind, it seems a pity that London does not more often take advantage of her river for such spectacles of illuminated water fêtes as that which followed Moulsey Regatta last Saturday evening. There was no very elaborate or costly effort made after all, but the spectacle of the crowd of illuminated boats moving about, with the reflections from the water, and the display of rockets and set fireworks as a centrepiece, was something really beautiful and fairylike,\* and worth seeing in these degenerate days when there are so few pretty sights to see. Evelyn describes the water procession of Charles II. and his Queen from Hampton Court to London as not equalled even in Venice for picturesqueness and splendour. Why should not modern royalty set an example of reviving some of these splendours? Nothing is more easy than to get beautiful effects when a river is a main element in the scene.

**Civil and Mechanical Engineers' Society**—On the 11th inst., by permission of Mr. J. H. Greathead, Engineer to the City and Southwark Subway, a limited number of members of this society were enabled to visit the station works at the Kennington Oval shaft. Amongst those present was Prof. Henry Adams, President-elect of the Society, who, in thanking Mr. Greathead and his resident engineer, Mr. Mott, said he felt some confidence that his wish for the success of the undertaking would be fulfilled, when he considered the economical way in which the works had been designed and executed; in fact, he understood that the cost per mile for this railway was only one-fifth of that of the recent City extension of the Metropolitan Railway.

\* Those who enjoyed it must have been edified to read in the *Times* that "a heavy rain in the evening spoiled the illuminations." The weather looked threatening, and a slight shower fell at dusk; and seeing this no doubt the typical reporter, who wanted to get back to town, thought it would be safe to say "rain." The weather was perfectly fine during the illuminations, and the show a complete success.



Iron and Wood Street Paving, Sheffield.

is used in combination with wood, with pitch as an intervening material to bind them together. As each piece of iron has an independent foot or base there is no leverage action when the weight of traffic comes upon it. The trial piece has been in use about two months, and is said to have stood well so far, though laid in a street which carries very

Borough Engineer of Liverpool; Mr. J. W. Girdlestone, Bristol; Mr. Thomas Hewson, Borough Engineer, Leeds; and Messrs. Binnie, Duckham, and Gordon, whose names appeared in our last. We are certainly at a loss to comprehend on what grounds so eligible a candidate as Mr. Dunscombe was ruled out of the "final heat." We do not for a moment mean to say that by appointing Mr. Gordon to the high position of Chief Engineer the County Council have not made

\* The MS., preserved in the Pepysian Library at Magdalen, Cambridge, was first published by Sir David Dalrymple in 1766. It is both genuine and authentic.



## THE LINCOLN AND NOTTS ARCHITECTURAL SOCIETY AT BOURNE.\*

THE first church visited on the second day's excursion of the Lincoln and Notts Architectural Society at their recent Bourne meeting, June 26, was that of Thurlby, standing on the east bank of the Car Dyke, a navigable canal, cut by the Romans as a catch-water drain on the edge of the fens, running forty miles from the Welland at West Deeping to the Witham, a little east of Lincoln. The church is one of unusual interest, from the variety of styles exhibited. The angles of the western tower show long-and-short work. The nave arcades are Norman, and also the chancel walls, as proved by an internal string-course, and a zigzag arched sedilia. Tall side lancets show that the chancel was altered in Early English times, while its walls were heightened, and a fine east window added in the Perpendicular style. Transeptal chapels of good character, with squints into the chancel, were added in the thirteenth century, to which shafted wall arcades impart much dignity. It is interesting to notice the adaptations received by the eastern bays of the nave arcade to make them work in with these later chapels. Indeed, the whole church, from its interlacing of styles, affords a piece of architectural development of great interest. The western tower, with its traces of pre-Norman work, grows out of Early English into Decorated, and is capped by a spire of that style, of such stunted proportions that, as the Bishop of Nottingham pleasantly said, "it looked as if it would be the better for a little forcing." There are north and south porches, both Early English, the inner doorway of that to the south being Norman. There is a chapel to the south of the chancel, with a somewhat perplexing arrangement of windows. The original plan has been disturbed by a large late Perpendicular window in the centre of the wall space, to the east of which is an Early English lancet, very near the ground, and to the west a plain square opening, like a low side window, above which is a very pretty small, two-light, square-headed, transomed, decorated window, set high in the wall, perhaps intended to light a gallery on the top of a screen dividing this chapel from the aisle. On the north wall is a shallow blank arch, with a squint in the corner. An ambury in the chancel retains its doors. The piscina on the south wall is of very singular and rather clumsy design. The trifoliated arch is supported by four shafts, two on each side (i.e., like the four on a die), the abaci of which are of enormous projections, serving for the shelf. The rood-stair comes down awkwardly into the north chapel without any turret, the lower steps having been removed to give more room.

The next church, Banton, proved far less interesting. The disengaged western tower, of excellent masonry, with square battlemented pinnacles, as at Bourne and Edenham, is the best feature. The north and south arcades are of four bays, with Early English pointed arches springing from low octagonal piers. The most noticeable thing about this church is the arrangement of the west end of the south aisle. This appears to have formed a separate chantry of two bays, cut off from a similar chantry in the eastern two bays by a transverse wall, of which indications still exist. The position of this wall is marked internally by a much broader pier at this place in the south nave arcade, and a narrow bay on the south aisle wall, strengthened by two buttresses, with decorative panneling between them, which is also seen at the west end of the aisle. A small bell-cot, probably connected with this chantry, caps the western gable of the aisle. The whole arrangement is curious and unusual.

The church of Langtoft possesses a very noble tower of Early English date, surmounted with a Decorated spire, with two ranges of gabled spire-lights. The parapet is corbelled, and there are no pinnacles. It stands at the west end of the north aisle, disengaged on three sides, and springs at one bound from the ground into the sky, gradually lessening as it ascends, with plain flat buttresses rising on richly moulded basement, the whole being of clean, closely-jointed masonry. The whole design and execution is admirable. On the south side of the tower a blocked arch, with richly-carved Decorated capitals, indicates an annexed building, which has been destroyed greatly to the advantage of its proportions. Another remarkable feature is the Decorated

south chapel to the chancel, gabled, and with exquisite gabled buttresses, and tall, square-headed three-light windows, recalling those of the chancel of Tideswell. The arcade dividing this chapel from the chancel is of two dates—the western half Early English, marking the existence of a previous thirteenth-century chantry; the eastern of two bays, Decorated, of great richness, the capitals elaborately carved. There are two canopied piscinas of unusual size and magnificence in this chapel, one in the south-east corner, the other on the west face of the east respond on the north side; and some exquisite corbels of foliage. The contrast between the coarseness of the attempt at figure carving and the freedom and beauty of the foliage is very striking; the one almost as good and the other almost as bad as it can be. The nave arcade of four bays is Early English, with clustered shafts. Some of the capitals have been remodelled in Decorated and Perpendicular times. Under the embattled parapets of the aisles and clearstory are richly-sculptured cornices, showing the ball-flower, *fleur-de-lis*, and other conventional ornaments. The whole effect of the well-proportioned interior is light and pleasing. In singular contrast to the Mediæval architecture of the exterior, the south porch is a composition in Roman Doric, well designed and certainly costly, but sadly out of place.

The next halt was at Market-Deeping. The church is of considerable size, but of no special interest. The square western tower is dignified and well proportioned, and of excellent masonry, entirely Perpendicular, probably by the same builders as that of Edenham; the belfry windows are of the same design,—coupled two-lights under one containing arch. The external walls of the aisles are Decorated, with some good gabled buttresses and square-headed two-light windows. The chancel is Perpendicular, spacious and lofty, but unattractive. The nave arcades of three bays are Early English, with piers of clustered shafts. The arches are semi-circular on the north and pointed to the south. On the north side we have the heavy continuous circular abacus which has already been noticed. On the south, the abacus more gracefully breaks over the shafts. In the chancel are gabled sedilia of coarse workmanship, and the crockets painfully resembling snails, and a piscina with ogee canopy. There is a plain, low side-window in the south wall of the chancel. The window above it contains roundels of coloured glass depicting scenes in the life of St. Guthlac, the patron saint of Deeping, copied from a MS. in the British Museum. The Vicar (the Dean of Stamford) is anxious to continue the series. On the east wall are two large, but rather coarse, canopied niches, waiting for tenants. The Vicarage-house (well known from the illustrations in Parker's "Domestic Architecture," vol. ii., p. 242), when perfect, must have been one of the most interesting specimens of the Domestic architecture of the early part of the fourteenth century. The only part remaining is the hall, and this is so cut up by floors and divided by partitions, that its ancient character is much disguised. The fine tie-beam roof is visible in the upper chambers; and one of the side windows, of singular and beautiful tracery, remains in its place, and fragments of the others are carefully preserved. The house was probably a portion of the Priory established here by the monks of Crowland.

West Deeping has a good Decorated western tower with crocketed spire, opening into the church by a well-proportioned arch with un-moulded jambs. The church is generally Decorated of good character. In the west bay of each aisle is a charming small two-light window with an uncusped circle in the head. The tracery of the chancel windows is of rather unusual character. The nave arcades of three bays are good. The well-proportioned arches rise from cylindrical piers with well-moulded capitals. There is an old low stone chancel-screen of uncommon character, sadly spoiled by having its western face filled with poor modern mosaic work. The whole of the chancel has been subjected to a costly decorative process, with a very doubtful result. The walls of the sanctuary have been covered with gaudy tiles, and an elaborate tabernacled reredos of coloured marble and glass mosaics set up at the east end. The whole wants repose and harmony of colour, and one regretted to see so much money spent on an unsatisfactory scheme. The ancient gabled piscina and shafted sedilia, all three on the same level, and the blocked low side window are interesting features.

Talkington presented a horrifying example

of a scarified interior, the joints of the random masonry, picked out with dark red mortar, looking as if huge spiders had spun gigantic cobwebs over the walls. This proceeding, however, has had the merit of bringing to light a good deal of long-and-short work in the east walls of the transeptal chapels, from which we see that the original Saxon church was cruciform, with chapels opening eastward from the transepts. The south porch rather singularly occupies the west bay of the south aisle. It has a plain shafted Transition inner doorway. There is a bell-cot, too much covered with ivy, on the east gable of the nave. The spire on the west tower was destroyed by lightning in 1760, and has not been restored.

The church at Barholm is an interesting little building, preserving its steep roofs covered with grey Colley Weston slates, without a clearstory. The lower part of the western tower is Early English. The upper story on the south side bears the date of its reconstruction, 1648, shortly before the decapitation of Charles I., with the quaint inscription:—

Was ever such a thing seen since the creation,  
A new steeple built is the time of vexation?

The south aisle exhibits some very curious features. Within the south porch, which has a tall gable of much dignity, is a good rather late Norman doorway. Immediately to the east of this is another small blocked doorway of still earlier date, standing on a moulded plinth, on which the later Early English walls to the east have been built. In the wall above is what looks like a large plain, tall-shaped cross, but what is really probably a remnant of plaster work belonging to the original pre-Norman building, of which the blocked door and the plinth are also relics. There is also a north arcade of three bays, with richly zigzag moulded arches rising from cylindrical shafts. The chancel arch is of the same form.

Uffington is a large and stately church, which has suffered much from over-generous benefactors, whose liberality has tempted some modern architect to indulge a taste for meretricious ornament, at variance with the simplicity of the Early English arcade of semi-circular arches rising from plain cylinders, which gives its character to the interior. Small shafts of coloured marble, rising from huge, overdone carved corbels, support the beams of a cumbersome modern roof. The pulpit is entered by a hole in the wall, and, in place of a sounding-board, has a ridiculous overhanging, concave arched canopy, heavy with executed carving. The chief feature of the exterior is the stately western tower, with a very rich West door, elaborately carved with heraldic insignia, terminated by a graceful crocketed spire, united to the tower by rather feeble flying buttresses. The date 1639 carved upon it is rather staggering. It can hardly be said of its erection, but rather of its restoration,—perhaps after being struck by lightning.

The spacious chancel has fine chantry chapels on each side, filled with monuments of various date and great interest, which we cannot now particularise. The north chantry is a very fine perpendicular design, of great loftiness and excellent proportions. The tall windows, with battlemented transoms high up on the tracery, are admirable examples of the style. The richly-groined ceiling of the west tower, with a central bell-hole, must not be omitted.

The little Rutlandshire church of Essendine, the only church visited out of the county of Lincoln, is well known for its simple Norman aisleless nave, with north and south doorways of excellent character. The chancel has been lately carefully rebuilt, preserving the old Early English features. The chancel arch was evidently reconstructed when the Early English chancel was built. The old zig-zag mouldings of the arch were reset on the original Norman piers in a pointed form. The little Early English double-gabled bell-cot on the west gable is a very picturesque feature. The church has been carefully restored at the expense of the Marquis of Exeter.

The last church visited, Cartby, was the only one of which the condition was otherwise than reputable. It ought not to be long before it is subjected to the same wholesome process of cleansing and reparation which all the others seen in these excursions have undergone. The fabric is chiefly Early English, of very good character. The arcades have semi-circular arches rising from cylindrical shafts. The western tower is Early English, with a well-

\* Continued from last week's Builder, p. 27.



proportioned broach-spire, sadly wanting an appropriate cap-stone, rising from a corbelled parapet. In the south porch is a broken holy-water stoup, and an Early English piscina in the chancel. The west tower arch rises from conical corbels of enormous size. There is a very beautiful floriated coffin-lid in the north aisle, and the church possesses many other points of interest which we have not space to enumerate. It was to be regretted that the excursion of the Society should have ended with the only uncare-for church in the whole series.

#### THE ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

The annual meeting of this Association was held at Portsmouth on the 4th, 5th, and 6th of July, and was well attended by members from all parts of the kingdom, under the presidency of Mr. E. B. Ellice-Clarke, the retiring President.

The Mayor, in welcoming the members of the Association to Portsmouth, said that the pleasure of that function had been greatly enhanced by a whisper which had reached him since he had been in the room, to the effect that when the contents of the ballot-box became known his friend, Mr. H. P. Boulnois, the Borough Engineer of Portsmouth, would be elected as President for the ensuing year. He hoped that their visit would be one of great pleasure to themselves, as well as of great advantage to the public. The inhabitants of Portsmouth would be very glad to find that Mr. Boulnois had been elected President of such an important Association as that which they represented.

The annual report of the Council was then read by Mr. Charles Jones, the Honorary Secretary. In the course of it the Council again acknowledged the kind assistance accorded to the Association by the various municipal and other authorities. During the financial year ending April 30th thirty-one new members—twenty-nine ordinary members and two graduates—had joined the Association. The number on the roll of the Association at the close of the year was thirteen honorary members, 333 ordinary members, and twenty-five graduates, making a total of 371. The audited balance-sheet showed a balance in hand of £320. 11s. 5d.

On the motion of Mr. Lewis Angell the report was adopted.

The following officers were stated to have been elected by ballot to the Council: President, Mr. H. P. Boulnois; Vice-Presidents, Messrs. C. Duncombe, T. Hewson, T. De Meade; Ordinary Members of Council, Messrs. W. B. G. Bennett, S. Brown, J. Cartwright, J. H. Cox, W. S. Crisp, J. T. Kayes, E. R. S. Escott, S. M. Fowler, J. B. McCallum, H. U. McKie, A. W. Parry, T. Walker, C. Jones (hon. sec.), and L. Angell (hon. treasurer).

A vote of thanks having been accorded the retiring President, the latter made a modest reply, remarking that he felt that whatever professional success he might have obtained in his career had been largely due to his being a member of that Association. He then, amid applause, introduced the new President (Mr. H. P. Boulnois), as one who had distinguished himself as a municipal engineer, and who was well known by his "Hand-book to Municipal Engineering." He believed that Mr. Boulnois would do the Association a great honour by being its President, and that he would form one of the many eminent gentlemen representing the great towns of this country who had been their Presidents.

The President (Mr. H. P. Boulnois) then delivered his inaugural address, in which he expressed his appreciation of the honour conferred upon him by his election, and assured the members that his best endeavours during his year of office would be devoted to furthering the interests of the Association to the utmost of his energy and ability. Looking back upon the names of the gentlemen who preceded him during the sixteen years of the existence of the Association, he felt that the task he had undertaken was not easy of accomplishment. He should, however, by every exertion in his power endeavour to maintain the high position which the Association now held, and if it was possible by any efforts of his and by their assistance to still further raise it in the estimation of the public, they might rest as-

sured that he would strive to do so. Looking through the fourteen back volumes of the "Proceedings," he found that no fewer than fifty-six papers had been read and discussed upon the general subject of drainage and upon questions connected with the disposal of sewage. All the papers contained most important and valuable information, and in many cases were descriptions of works designed by and carried out under the superintendence of those members who had prepared and read the papers. Upon subjects connected with sanitary legislation, and the work of the Public Health and other Acts, so far as they affected the Town Engineer or Surveyor, twenty-seven papers had been read and thoroughly and ably discussed. Upon that very debatable and much-disputed question—the ventilation of sewers—five papers had been read, which contained some of the best and most reliable information ever published upon that most important subject. Fifteen papers had been read upon the question of the water supply of towns; the lighting of streets both by gas and electricity had been dealt with in ten papers. There had been fifteen papers upon streets and their construction; upon house drainage, and the sanitation generally of the dwelling-house, thirteen papers had been given to the Association. The construction of street tramway lines of numerous descriptions had been considered in seven papers, and there had been seventeen papers upon miscellaneous subjects of a most interesting character, in addition to sixteen papers giving minute descriptions of public works which had been visited by members of the Association. This was a most creditable record, but, at the same time, it fell far short of any adequate epitome of the real amount of useful work which was daily and hourly being carried out by members of the profession throughout the country. There were upwards of 1,000 gentlemen eligible for enrolment as members, and yet their actual number was only 371, and only seventy-one of that number contributed papers. There still remained a vast storehouse of knowledge, to be gained only by constant work and experience, upon most of the subjects which had been dealt with at their meetings. The question of the profitable disposal of water-carried town sewage still remained unsettled; the most effective method of sewer ventilation was still another active bone of contention; whether we should have public and private lighting by electricity or remain contented with gas, had by no means yet been settled either by experts or by the *vox populi*; it was still a debatable question whether wood or asphalt made the best surface wherewith to cover their roadways; the practical working of many of the clauses of the Public Health and other sanitary Acts, was not all that could be desired; and there were not many sections of the comprehensive Public Health Act (1875) which could not be well discussed at considerable length, and in fact there was no lack of subjects for papers. The abatement of the smoke nuisance and the consequent diminution of thick fogs was a very difficult problem to solve without a considerable alteration in the habits of the people. The avoidance of that irritating and injurious noise caused by the great traffic of their streets, whether it was to be cured by improved movements or improved wheels and horses' shoes, or both or neither, time would show. The better housing of the working classes had still a future, notwithstanding the great strides that had been made during recent years. That unostentatious but necessary work, the collection and disposal of house refuse, was at present by no means perfect, and was susceptible of improvement. The present arrangement for the laying of gas and water mains was by no means satisfactory, and the removal of the unsightly, and sometimes dangerous, overhead telegraph and telephone wires to beneath the roadways or footwalks, would not be satisfactory unless special means were provided to avoid the necessity of breaking up the surface for repairs or connections, &c. The rapid growth of these necessities of civilisation, and the addition of hydraulic pressure mains, steam-pipes from central stations, and the feasibility of gaseous fuel similarly laid on, would before long necessitate legislation in that direction. Speaking for a moment upon the subjects which would engage the attention of the Council during his year of office, an examination for pass-certificates was, he believed, daily growing in popular favour; and the proposed registration of the Association could but

add to the value of those certificates, which were only gained after a most rigid test. He hoped at some future time to welcome them again to Portsmouth, when he should be able to give them a paper setting forth the details of the working of this last departure. In conclusion, Mr. Boulnois said he believed that the Association of which he had had the honour that day of being elected President was daily increasing in strength and importance, and that the branch of the profession to which they belonged was daily growing in popular favour and esteem.

On the motion of Mr. Lemon, seconded by Mr. Angell, a vote of thanks was accorded the President for his address. It was resolved, on the motion of Mr. Angell, that the Association should be registered under the Companies' Act, and a committee of five members was appointed, with full powers to carry the aforesaid resolution into effect.

Mr. Francis Newman, C.E., Borough Engineer, Ryde, I.W., read a paper entitled "The Relation of Local Authorities and their Surveyors to Improvements in the Sanitary Arrangements of Existing Buildings." In the course of this paper the author said:—

"In new buildings the Surveyor can enforce a definite system of drainage, and particular arrangements for ventilation for water-closets, as well as specific apparatus for water-closets; he has not to convince any one that his opinion on sanitary principles is correct, but has merely to enforce the execution in a workmanlike manner of the work as described in the by-laws; on the other hand, in reference to existing buildings, we have to show that the arrangements provided 'are not sufficient' or that the premises, are, owing to such arrangements, 'in such a state as to be a nuisance or injurious to health,' and in the generality of cases to convince magistrates of the soundness of our conclusions. I presume the sections of the Public Health Act under which sanitary authorities most frequently deal with the arrangements of existing buildings are:—23, 'Power of local authority to enforce drainage of undrained houses,' 36, 'Power of local authority to enforce provision of private accommodation for houses,' 91 to 108. Dealing with nuisances. The work empowered to be done under sections 23 and 36 may, in default of compliance with notice, be executed by the sanitary authority, and the cost recovered from the owner; but proceedings in reference to the nuisance sections are more cumbersome, and defects that can only be dealt with by those sections are frequently of the greater importance. . . . I think, in dealing with existing houses, it will be found advantageous to treat them, as far as practicable, as we should new buildings, and I regret very much that a measure was not passed prior to the introduction of the County Government Bill, which would have enabled authorities to apply the same rules to both new and old buildings. Such a measure might have included the removal of other stumbling-blocks in the way of sanitary administration, and would not have occupied a tithe of the time devoted to the bill above named. There is, however, one way of helping ourselves in this matter, which I think has been lost sight of by many. Our excellent President told me some years ago that he had drafted a by-law, which had received the sanction of the Local Government Board, with reference to drains forming new connexions with the sewers, even although not intended for new buildings; and the Town Clerk of my borough drew my attention not long since to sub-section 4 of section 157, which enables a Sanitary Authority to make by-laws with reference to the drainage of buildings, the restriction of this power to make by-laws to new buildings only, which appears in the prior sub-sections, is omitted from this; this seems to have escaped the notice of the Local Government Board, as no model by-laws have been issued by them applicable to the drainage of existing buildings. And I think it would be well if localities would submit such by-laws to the central Board, and endeavour to obtain their sanction thereto; such by-laws might, with great advantage to the profession, be drafted by the Council of this Association. I have before alluded to variation in the practice in dealing with the sanitary arrangements of existing buildings. I think there is another way in which the practice in this department varies, and that is that the defects are often dealt with by the Medical Officer of Health and the sanitary inspector without the intervention of the Surveyor; and I suppose we should all be



strongly of opinion that all works of a structural character, or involving mechanical appliances, whether executed by a local authority or supervised by its officers, should be controlled by the Surveyor's department, and that if so controlled the practice in different towns would be more uniform. Now in dealing with defective houses I have found one difficulty which would not arise were it clearly laid down that what are good and reasonable precautions in new houses, built under some public supervision, with precautions against damp walls and damp floors, are also good and reasonable for existing buildings which may not have been built with such care; the difficulty I refer to is that magistrates will generally only make orders to do the minimum of work. In going before a Court, in order to ensure getting an order, it is often necessary that evidence should be given to show that the improvements are absolutely required, and that without such improvements the premises are injurious to health. In practice we are accustomed, in devising works of house drainage and arrangements connected therewith, to provide safeguards, which, although wise precautionary measures, it is sometimes difficult to prove that they are all absolutely necessary, and that injury to health will result from the omission of any part of them. Take, for instance, the disconnection of drain from sewer, and the provision of an air inlet on the house side of such disconnection. On a house which has the wastes disconnected, the inlets to drain all properly trapped, and the soil-pipe placed at the farthest point of the drain from the sewer, and carried a suitable height above the roof for ventilation, this drain might be trapped near its entrance to the premises, but without an air inlet on the house side of it. In this case the ventilation-pipe would relieve the traps from pressure, though there would not be a current of air through the drain and soil-pipe, which we think desirable to constantly change the air in the drain; or the drain may not be trapped from the sewer, in which case air will pass from the sewer through the drain and ventilation-pipe; still the latter will relieve the traps from pressure. The Local Government Board have recognised the value of this extra precaution and of the system of double disconnection generally; but can it be maintained that the absence of double disconnection causes a house to be in such a state as to be a nuisance and injurious to health? There then follows another question: If the greater perfection of sanitary arrangements cannot be enforced is it expedient to give notices requiring them, or simply to limit the notice to such works the omission of which there is no difficulty in proving are injurious to health? It appears to me that the drainage and other arrangements of existing buildings which need amendment may be divided into two clauses. 1. Those with drains of improper material or of such gradient as to cause deposit, or drains with the collars of the pipes broken off, and connexions made by cutting holes in the pipes, with inside soil-pipe or traps pierced with holes, soullery, and other sinks or cellar grating in direct connexion with the drain, water-closet cisterns supplying drinking-water, drain not ventilated, or some of these defects. 2. Those which, although having a fair drain, soullery, and other wastes disconnected, and the drain ventilated, have defective closet apparatus, the soil-pipe within the house, and the house-drain not disconnected from the sewer. With the first class it is comparatively easy to deal; with the second it is less simple, because, as before stated, it is difficult to prove the absolute necessity of perfection in such matters. I have before referred to the practice in some places of the authority taking action only on the report of the officer of health or the sanitary inspector, and I have known cases in my own borough where notices have been given, on the report of one of those officers, to disconnect the soullery-sink; those soullery-sinks have been disconnected, and I have afterwards had occasion to examine the buildings and open the drains, and have found that whereas prior to the disconnection, the soullery waste ran into a brick drain under the sink, which brick drain traversed the soullery and some other part of the building, disconnection, as carried out, simply meant that a trap was put outside for the waste discharge, such trap being disconnected with the old brick drain under the building. Now with reference to the designing the improvement of the sanitary arrangements in existing houses, it appears to me very advantageous that all these alterations should be done

under the Surveyor's direction; but I do not think it right that owners of property should expect the local Surveyor to design these alterations for them, but rather that they should submit a plan to him which he will examine and give his opinion on; and if satisfactory, they will carry out such a plan under his superintendence, as all such work should be superintended by a public officer. The difficulty that arises on this question seems to be this, that an owner of property who removes defects voluntarily is placed at a disadvantage as compared with he who waits until the authority compels him to make the improvement; as the former has to engage the services of a professional man, whilst in the latter case the Surveyor sets out in the notice what is required to be done. Having just referred to the subject of inspection of work in progress, I would say that it appears to me most advantageous to the public that every house drain should be inspected by a public officer before the joint-holes are filled in, its joints examined, gradients tested, and a plan taken, which plan should be put upon the town map, if that map is of not less scale than 1/250; but inasmuch as there is not sufficient space for the inspector to initial the map and place the date of the execution of the work, I have adopted the plan of having an inspection book, in which the portions of the drains inspected are entered day by day,—a tracing showing the plan of the drains being pasted in the book, and the initials of the inspector, together with description of the gradients and ventilation of the work, being attached to the plan renders the discovery of alterations comparatively easy. There is another point, and that is the disposition of tenants to seek the intervention of the authority to get something done by their landlords which they are unable to secure themselves; this, I think, is perfectly legitimate if defects arise after the tenancy has commenced, or if a state of things exists which was thought fairly good at the commencement of the tenancy, but which has become obsolete when the interference is sought; but I have known cases where persons, perfectly able to pay a fee for professional advice before taking a house, within six months after entering into occupation, call upon the local Surveyor to put pressure on the landlord, either by reporting to his committee, or by personal action, to induce such landlord to make improvements which the tenant should have required to be done before he entered into occupation. In some towns, particularly watering-places, the system of granting certificates when houses are in a good sanitary state has been put into practice. I have myself thought the system might be used as an inducement to owners to put their houses in order, but I confess I have found many difficulties connected with it; one conclusion I have arrived at is, that such certificate ought to give full particulars of the arrangements, so that alterations or defects subsequently introduced under bad advice may be easily detected. I have found that where a drainage system was provided with disconnecting trap and air inlet, and an exit for the air through the soil and ventilation-pipe which was outside the building, such exit had three years afterwards been stopped by a trap being introduced at the foot of the soil-pipe, because the owner complained of a smell from the water-closet, which, by the way, was of the old pan and iron container type, and which was removed before I saw the house the second time. There is one point to which I wish to refer,—one which I doubt not all those gentlemen whose sphere of duty lies in towns which have had drainage more than thirty years are too familiar with,—namely, those drains the responsibility of maintaining which is legally on the authorities, but morally on two or more owners: I mean joint-branch drains used by two or more houses, which, but for the interpreting clause of the Public Health Act, no one would deem public sewers. It appears to me it is for the interest of sanitary progress that Authorities should at once recognise and accept their responsibilities, treat these drains as sewers, and reconstruct them where necessary and provide means for their ventilation; that Authorities should, in fact, lead sanitary improvement. There is one other point of interest on the question of these drains to which I would refer: supposing a drain taking the drainage of two houses, and, therefore, legally a sewer repairable by the Authority, ceases to take the drainage of one of the houses, does it cease to be a sewer?

After some discussion the members adjourned

for luncheon, after which the following papers were read,—viz., on "Portland Cement," by Mr. W. Santo Crimp; on "Sewer Ventilation," by Mr. Archibald H. Ford; and on "Electric Lighting," by Mr. E. J. Silcock. To one or two of these we may possibly return on a future occasion.

The annual dinner of the Association was held on the evening of the first day.

The second and third days of the meeting were mainly devoted to visits to H.M. Dockyard and to the new Portsmouth Waterworks at Havant.

#### HOLY TRINITY CHURCH, CORK.

THIS, writes a correspondent, is the church referred to in Thackeray's "Irish Sketch Book":—

"On the road is a handsome Roman Catholic chapel, or a chapel which will be handsome so soon as the necessary funds are raised to complete it. But, as at Waterford, the chapel has been commenced and the money has failed, and the fine portico which is to decorate it one day as yet only exists on the architect's paper."

About three months ago the Father Mathew Centenary Committee issued a circular to some of the leading architects practising in Ireland, about twelve in number, Catholic and Protestant alike, but all more or less identified with ecclesiastical architecture, inviting them to send in designs for the façade of this church, which it was proposed to complete as a memorial to the Apostle of Temperance. From the twelve designs—the identity of the authors being distinguished by a motto or *nom de plume*—submitted, three were selected for further competition, the authors being required to furnish all the work, drawings, and other requirements necessary for the perfection of the building contract, for which each was rewarded with the *honorarium* of 50*l.*, the author of the design finally selected by the committee being chosen as the architect of the work. The successful competitor in this case is Mr. Walter G. Doolin, M.A., of Dublin, who has circulated amongst the building committee an explanatory statement descriptive of his design, from which some of the following particulars are extracted. He admits that the conception of the Messrs. Payne, the architects who more than fifty years ago began this church, is in its way a fine one, and has founded on its main idea, his own design, which is English Gothic of a late Perpendicular type. The façade consists of a portico of three arches the full height of the nave, with screens of sculptured stonework at the base, having niches, containing the patron saints of the southern provinces, with a glory of early Franciscan saints and martyrs. Over the main gable rises the tower, which is in three stages, crowned by an octagonal spire. The architect provided for all the work being done in County Cork limestone, and wrought within the city. The estimated cost of erection is 6,000*l.* Mr. G. C. Ashlin, R.H.A., acted as referee or consulting architect to the committee.

#### THE ROYAL ACADEMY:

ADMISSIONS TO THE ARCHITECTURAL SCHOOL, JULY, 1889.

MR. R. PHÉNÉ SPIERS, the Master of this School, sends us the following lists:—

##### Students: Upper School.

A. Mackintosh.	J. C. Watt.
L. Martin.	

##### Students: Lower School.

A. W. Hoskings.	W. S. Taylor.
W. C. Howgate.	A. F. Usher.
H. E. Kirby.	H. A. Woodington.

##### Probationers.

C. W. Baker.	R. A. Reid.
O. Bywater.	P. D. Smith.
A. J. Edwards.	J. S. Stewart.
E. J. Gibson.	G. Streetfield.
S. M. Herbert.	H. Tooley.
R. S. Lorimer.	A. B. Yeates.
H. L. Paterson.	

#### Sale of the Grove Estate, Wanstead.—

The sale of the first portion of the Grove Estate, Wanstead, took place on the 11th inst., and attracted a very large attendance of buyers. The sale was conducted by Mr. G. F. Morris, of the firm of Protheroe & Morris, under a marquee on the premises. We understand the whole of the plots were sold.



## Illustrations.

## DUNSTABLE PRIORY CHURCH:

PART OF WEST FRONT.

**D**UNSTABLE Priory Church was founded by Henry I. the charter being drawn up soon after 1131. The fine impressive late Norman work of the nave may safely be dated at a year or two after this,—viz., 1132 or 1133. The nave is all that remains of the original Norman church, there being now no choir, transepts, or central tower. Of the priory and its buildings only a basement remains. The original west end (the last part of the church which was finished) is Transitional in style. Of this Transitional work all that now remains is the large central west door, with its magnificent and elaborately-carved semi-circular arch, together with the right half of a second and smaller semi-circular arch to the left, beneath which are one or two intersecting arches of the same date and identical in design, or almost so, with the remarkable series of intersecting arches in the "slype," on the south of the south transept of St. Albans Cathedral. The semi-circular intersecting arches spring from richly-carved capitals, as they, without doubt, originally did at St. Albans. The original splendour of the western doorway at Dunstable can be well inferred from our illustration; all the carved work was originally deeply undercut, and this delicate hollow work has always attracted birds for nesting purposes. The birds, in turn, have had a strong attraction for boys, and heavy stones have in past times been thrown up to dislodge birds'-nests and eggs, the consequence being that very little of the old carved work is now left intact. There is, however, sufficient carving left for a drawing of a restoration of the original carved designs, and we may return to this subject at some future time. The supporting capitals are all *in situ*; these are mostly carved with figure subjects in the best style of Transitional art. The shafts have all vanished except two, as shown. Other pieces of shafts are built into an adjoining wall. Over the capital of the shaft to the extreme left is a bust (apparently of a King), and said to be Henry I., the founder. The remains of three other busts occur over the extreme right and the two inner capitals. The grand Early English door to the left opens into the present tower; the two tiers of arching above are equal to any of the work at Westminster Abbey or St. Albans; the diaper-work on the surface reminds one strongly of Westminster. All the Early English work at Dunstable is of the best and finest character. The two windows over the central door light the nave. The Early English work inside these windows is very fine, and reminds one of the original work within the three porches at the west end of St. Albans. The small door (seen in the fifth opening from the left of the upper arcade) is reached from the south side of the nave below, and the open arcade passage leads to the staircase of the tower turret to the left. The large central door is filled in with Early Perpendicular work: this might have been inserted to prevent the collapse of the great arch, for parts of the church have in old times fallen in. Numerous sculptured figures must have embellished this front at one time, for in the portion illustrated there are niches and pedestals for no less than fourteen figures, and the lower portion of one figure still remains *in situ*,—seen at the bottom left of our plate in the buttress. In every instance the courses of the masonry show where work of different periods coalesce. A few years ago the tower was entered from outside over a stone coffin; this coffin has now disappeared. The church was well restored some years ago by the late Mr. G. Somers Clarke. Our illustration is from a drawing made by Mr. Worthington G. Smith, of Dunstable.

## "THE KULM," BEARSTED, KENT.

This house has recently been built on an elevated site commanding a delightful view over the North Downs, with the ivy-draped church and village of Bearsted lying in the middle distance, surrounded by hop-gardens. On the south-east from a broad terrace with concrete retaining walls has been constructed on the hill-side, and contains in front various out-offices, such as potting-shed, tool-house, &c. A Canadian wind-mill which pumps the water from a well for domestic purposes forms a conspicuous but not unsightly object in the rear of the house.

These works, with the sewerage arrangements and laying-out of the site generally, were completed prior to the erection of the house under the direction of the proprietor, Dr. Adams, of Maidstone.

The arrangement of the house, as regards the ground-floor, is shown on the plan given with the accompanying views. The accommodation of the upper floors consists of eight bedrooms, dressing, bath, linen, and box-rooms, and w.c. The basement contains larder, wine-cellar, store-cellars, and heating apparatus.

The walls, where not covered with tile-hanging, are faced with local red-pressed bricks, and the roof is covered with red tiles. Red Californian pine has been used for the panelled ceilings of dining-room, library, and hall, and for much of the internal joinery, yellow pine being employed in the more exposed positions. Wood block flooring of simple pattern, in oak and jarrah wood, has been laid in the hall and library.

The house has been built without contract, at a cost of about £1,600, by Mr. George Ansett, builder, of Maidstone, from the designs of Mr. John Langham, architect, of Manchester.

## GLOUCESTER MUNICIPAL BUILDINGS COMPETITION.

We give this week perspective views of the second and third premiated designs in this competition, by Messrs. Medland & Son and Mr. J. Fletcher Trew respectively, and also the perspective view of the design submitted by Messrs. Giles & Gough, which we referred to in our article on the competition as the best drawing in the room. For this reason we have given it on a larger scale than the two premiated designs, which, architecturally, it must be confessed, present but very meagre interest, and which probably owed their position in the competition mainly to merits of plan.

The plans of all three designs exhibit good points, and we have given the principal floors of each, side by side, for comparison.

Beyond this it is unnecessary to add anything to the remarks we have already made on the various designs.

## THE LATE SIR JAMES PICTON.

We record with much regret the sudden death of Sir James Picton, F.R.I.B.A., F.S.A., which occurred on Monday evening last, at his residence, Sandyknowe, Wavertree, Liverpool, after a few hours' illness. According to a biographical notice in the *Liverpool Daily Post*, he was born in Liverpool on Dec. 2, 1805, and he was therefore in his eighty-fourth year. He was the son of a timber merchant, Mr. William Picton, who had migrated to Liverpool from Warrington, in which town or its neighbourhood several generations of the family had lived. Young James Picton was sent to a school kept by a Mr. Prior, but his school-days were brief, for a little after he was thirteen years of age he entered his father's office, and became bookkeeper. It is stated that he threw himself into this dry business work with as much energy as that which characterised his more congenial studies of antiquarian matters in later years. After the termination of his father's business career, the deceased was thrown upon the world at a very critical period, between boyhood and manhood, without any technical knowledge of a trade or profession, and without any patronage to secure him an opening. At this time two very diverse situations were offered, one in a venetian-blind business, the other in the office of Mr. Daniel Stewart, architect and surveyor. As everybody knows, he accepted the last-named offer, and it is stated that he quickly adapted himself to strange circumstances, and became exceedingly valuable to his employer. He married at an early age. To support his position he had to make great efforts, and to encounter an immense amount of work. He was in the habit of leaving his home at two or three o'clock in the morning, when he would get through a piece of surveying in the country, and would return in time for ordinary office work at nine o'clock. He would carry on his usual duties the whole day, and business hours were much longer then than now. Then he would sit up the greater part, or occasionally almost the whole, of the next night to work out the figures he had taken the previous morning, and to write his report. By this means he made himself so valuable as to become a

necessity of the business. He identified himself with it, and when Mr. Daniel Stewart retired, he succeeded both to his house and office, which were situated at the corner of Russell-street and Warren-street. But as the professional work now rapidly increased, a removal was necessary to the more commercial part of the town. The period of palatial office buildings was just beginning, and his business-like grasp of practical needs, together with his clear-headed faculty, made him very successful in the arrangement of plans. At the same time, he thoroughly understood the peculiar adaptability of Italian architecture to commercial needs. The result is seen in Fenwick-chambers, Tower-buildings, the Corn Exchange, Brown's buildings, and others. Sir J. Picton's clear style of writing and his power of lucid exposition stood him in good stead as a surveyor, and when it was found that he could not only express well the grounds of an opinion, but could bear with imperturbable composure any amount of cross-examination upon the subject, his services in railway business became very highly valued. In the complicated questions arising out of compulsory acquisition of land for public purposes he was for many years recognised as one of the highest authorities in the country. Our space is too brief to mention at length Sir James Picton's public services to his native town, where his name will be perpetuated by the Picton Reading Room, in which is a brass plate bearing the following inscription:—

"This building, erected by the Corporation of Liverpool, was by resolution of the Council, dated 8th October, 1875, ordered to be named the Picton Reading-room, in recognition of the valuable services rendered by James Picton, Esq., F.S.A., in his capacity as chairman of the Public Library and Museum and Gallery of Art Committee, which he has occupied for a period exceeding a quarter of a century."

His labours as an antiquary and writer are well known, one of his latest works being entitled "Memorials of Liverpool." He was the author of a large number of other works, including numerous papers read before archaeological and other societies. Many of these have appeared from time to time in the columns of the *Builder*. He was knighted a few years ago (at the instance of Mr. Gladstone) in recognition of his services to his native town. Active in mind and body to the last, his death has evoked the warmest expressions of regret from public men and public bodies, the flags of the public buildings in the city being raised half-mast. We understand that the funeral is to take place on Saturday afternoon next, at Smithdown-road Cemetery.

## LECTURES ON ARCHITECTURE.

The following is the result of the examination held at the Central Institute, South Kensington.

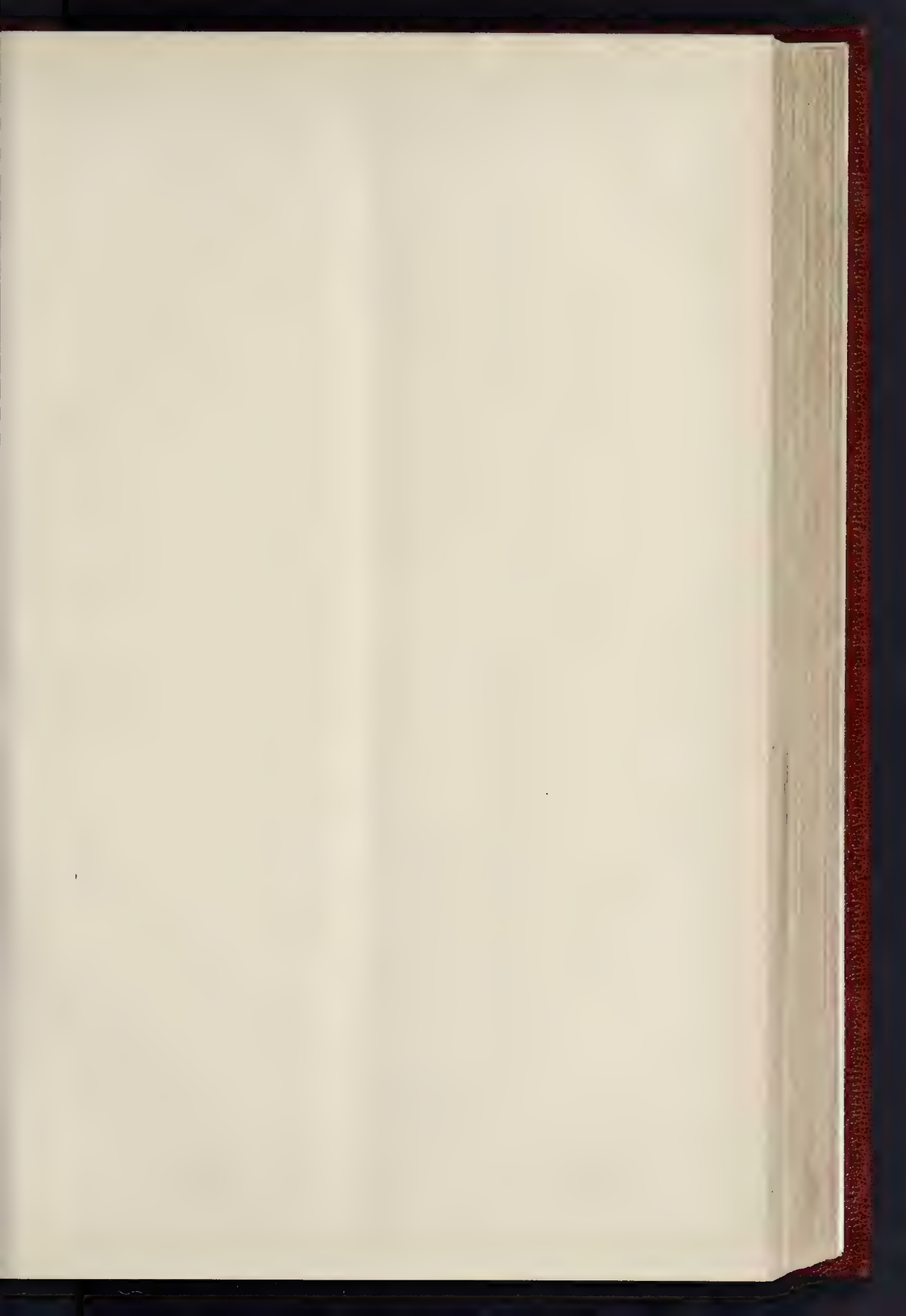
The first prize given by the Worshipful Company of Carpenters was gained by Mr. A. B. Yeates, with 241 marks out of a possible 270.

The second and third prizes given by the lecturer, Mr. Banister Fletcher, were gained by Mr. A. Hale, with 213 marks, and Mr. A. Corderoy with 199 marks.

The following obtained first-class certificates:—Messrs. D. A. Ross, R. T. Hughes, H. G. Leslie, A. E. Mullins; and the following second-class certificates:—Messrs. H. P. Fletcher, G. F. Carruthers, J. Baddock, H. S. Cregeen, H. H. Knight.

**Roman Remains in Algeria.**—According to a recent report of the British Consul-General at Algiers, the opening-up of Algeria by railways has had the effect of rendering easily accessible many interesting Roman remains which formerly could only be reached with much difficulty and fatigue. "Those going from or to Biskra must pass through Batoua, about half way between Biskra and Constantine, and a centre from which numerous excursions may be made. One of exceptional interest, at a distance of about five hours' drive, is the ancient Roman city of Thamugus (modern Tunesad), which has been entirely unearthed, and is nearly as remarkable as Pompeii. Fortunately being situated in a district far removed from European residents, there has been no temptation to destroy its monuments, or remove its stones for building purposes. Another has just opened in the department of Constantine from the Station of Souk-Ahras, the country of Surat Augustine, southwards to Tebessa, where are some of the finest Roman ruins out of Rome."





FIRST



GROUND



EAST OF

SECOND PREMATED DESIGN.



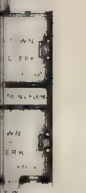
Scale 1/4 inch = 1 foot

PLAN OF BUILDING

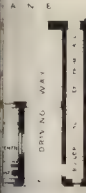
THIRD PREMATED DESIGN.



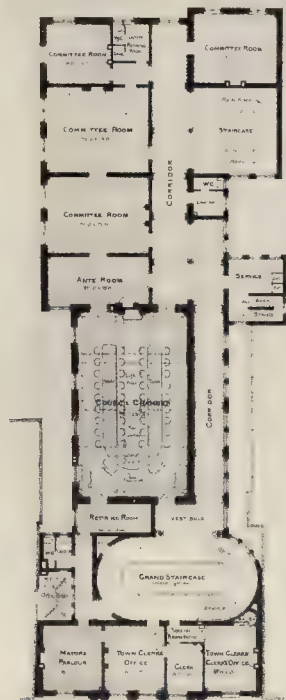
PLAN



R PLAN

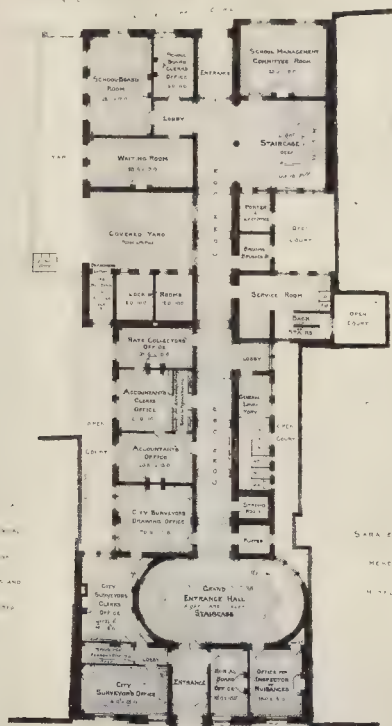


FIRST FLOOR PLAN

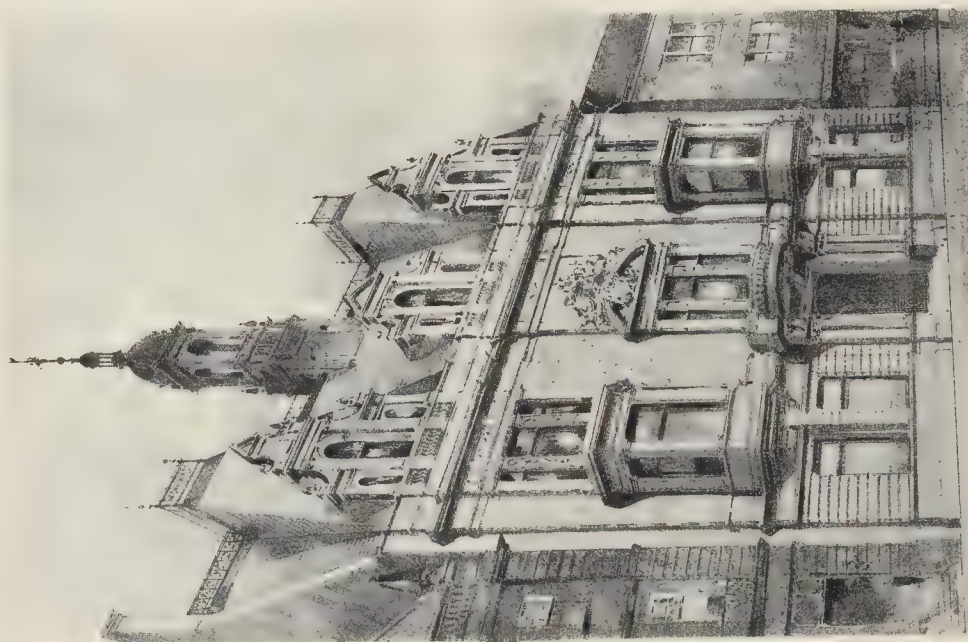


DESIGN BY MESSRS. GILES & GOUGH.

GROUND PLAN



PHOTOGRAPH BY MESSRS. GILES & GOUGH.

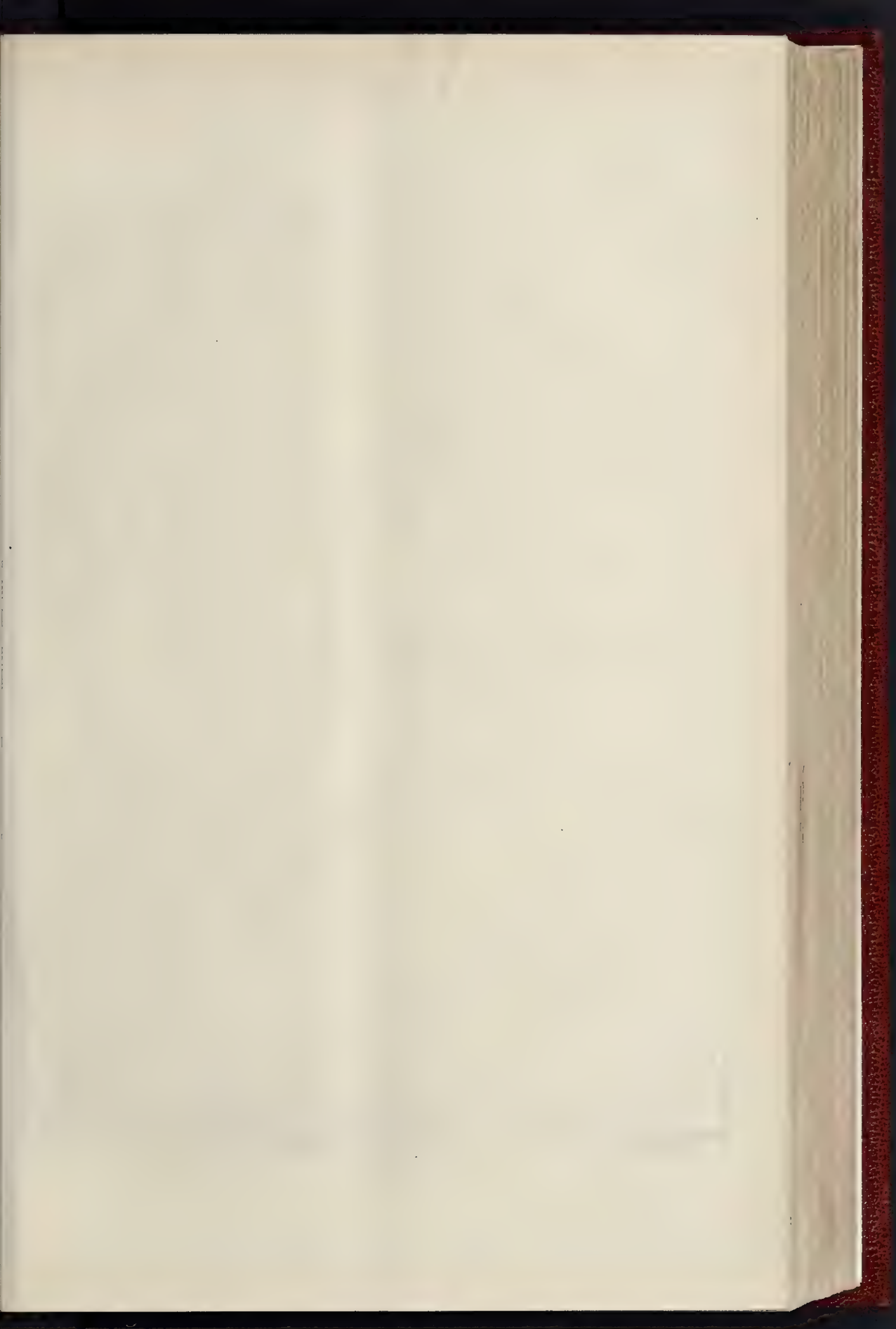


SECOND PREMIAED DESIGN, MESSRS MEDLAND & SON, ARCHITECTS.  
OF CHESTER. MANCHESTER MUNICIPAL BUILDINGS. COMPETITION.

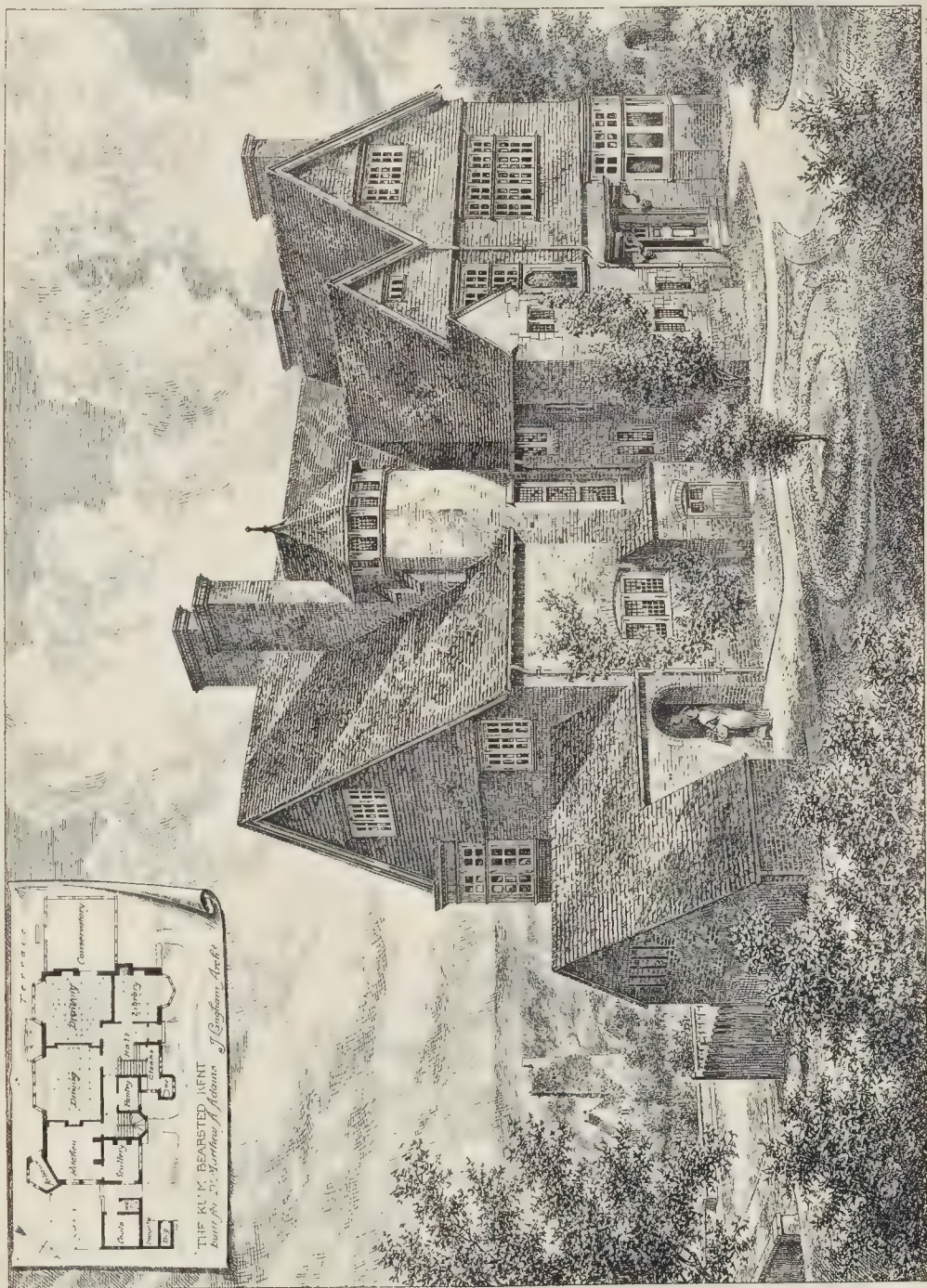


THIRD PREMIAED DESIGN, MR. J. FLETCHER TREW, ARCHITECT.  
OF CHESTER. MANCHESTER MUNICIPAL BUILDINGS. COMPETITION.





THE BUILDER. JULY 20, 1889.











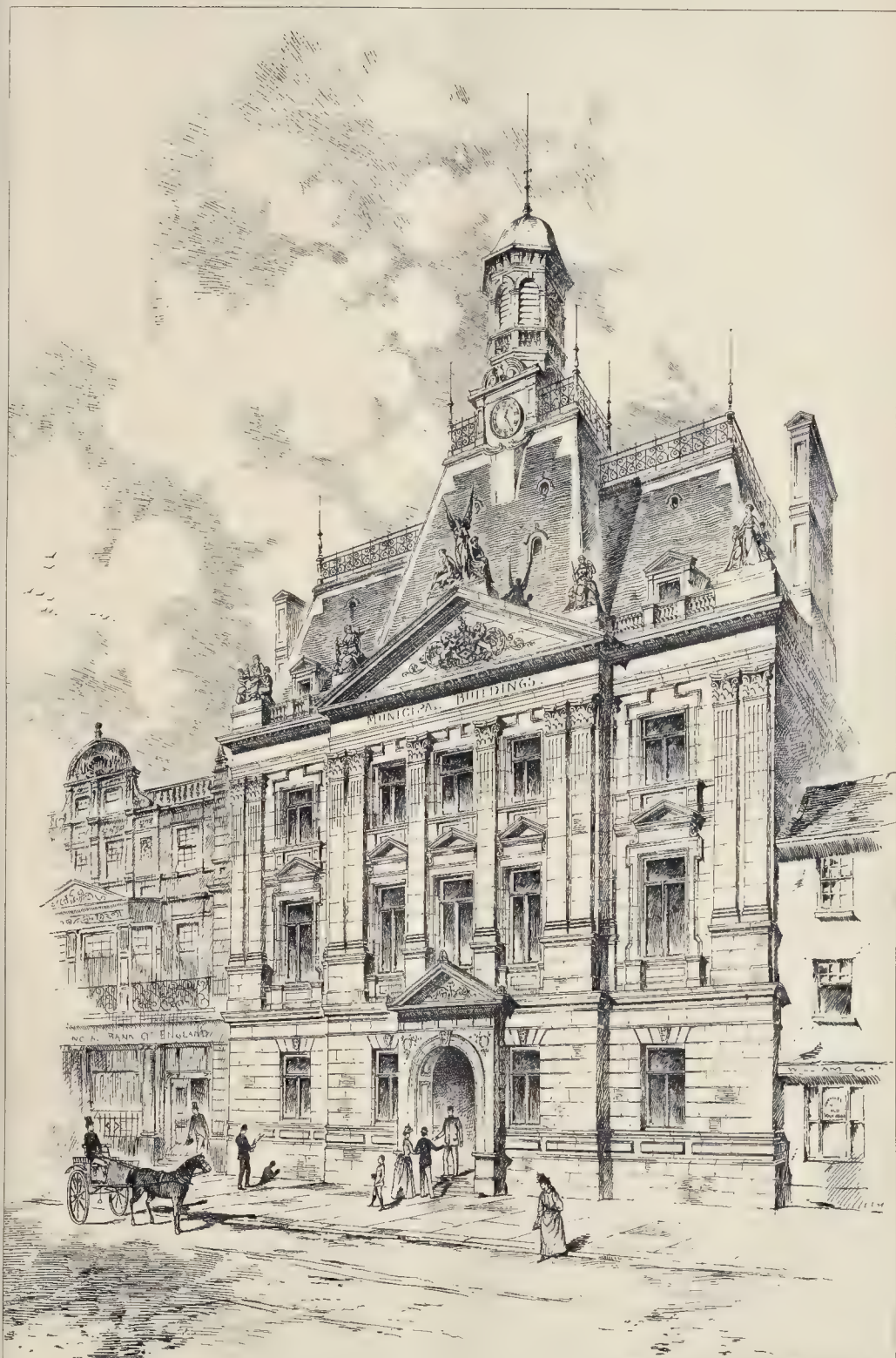
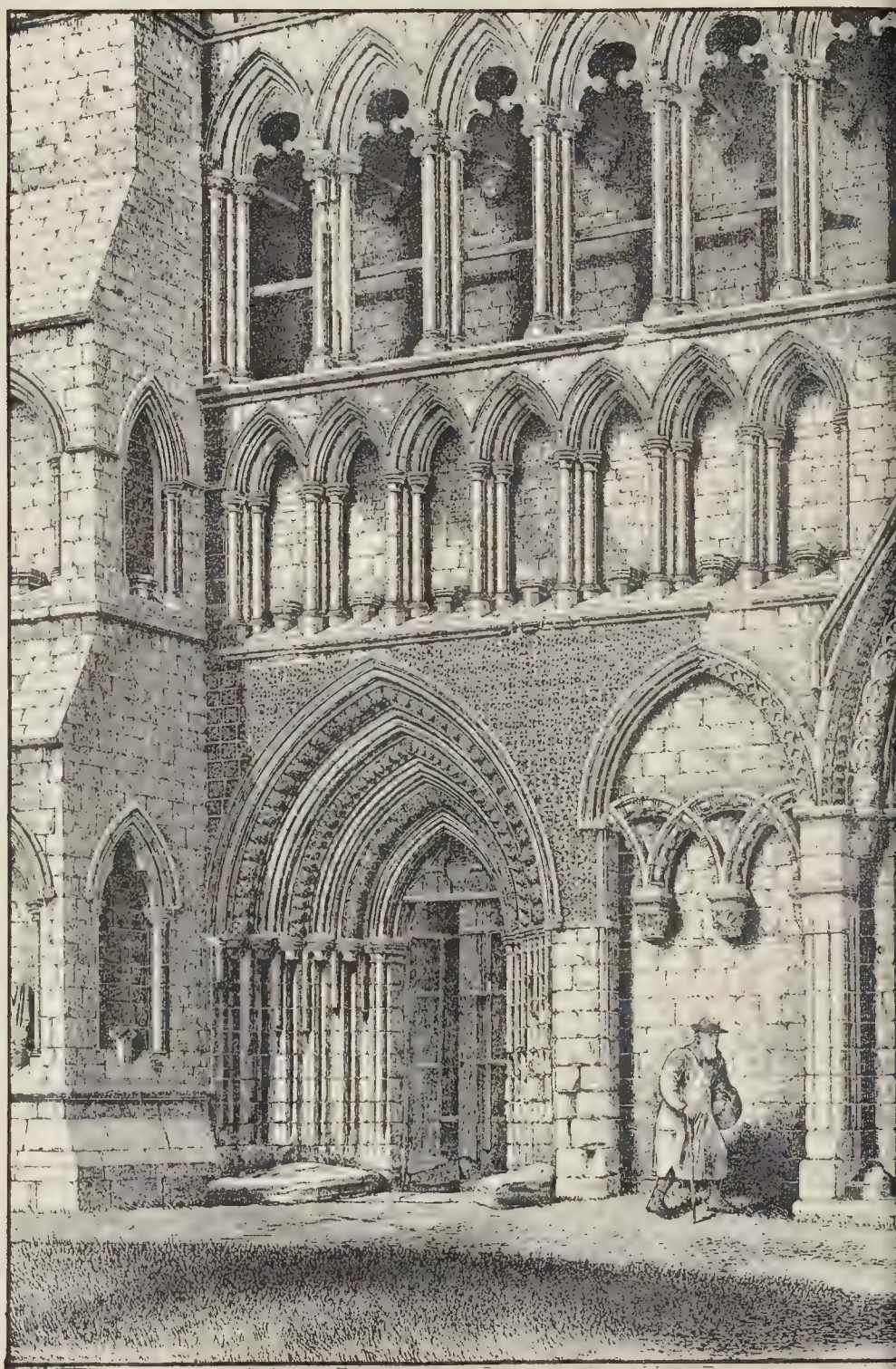


PHOTO. L. TWO. GRACE & 20 MARTIN LANE. KENTON ST. LONDON E.C.

GLOUCESTER MUNICIPAL BUILDINGS COMPETITION.  
DESIGN SUBMITTED BY MESSRS. GILES & GOUGH.









PART OF WEST FRONT  
DUNSTABLE PRIORY CHURCH

PHOTO LITHO SPRAGUE & CO 22 MARK LANE CANON ST. LONDON, E.C.





ARCHITECTURAL ASSOCIATION  
VACATION VISITS.

THE fourth vacation visit of this Association was made on Saturday last to the house of Mr. Hubert Herkomer, A.R.A., at Bushey, when a large party of members attended, and not only enjoyed the study of beautiful handicraft, but learnt many valuable lessons in artistic principles from the conversation of the genial professor. The visitors were received by Professor Herkomer in his studio, a temporary structure which, until the erection of the house now in progress, serves, not only as a painting-room, but is also at once the chief living-room and the repository of the furniture which has been prepared for the future home. From this furniture Professor Herkomer illustrated the first principle the visitors learnt, that nothing should exist as furniture in a home simply for ornament alone, but that the utility of each object as an article of domestic use should be the primary consideration. Hence everything seen had its purpose, writing-table, settles, bookcases, and cupboards for various necessities. The furniture, as also all the appointments of the house, have been designed, and much of the work executed, by Mr. Herkomer himself. In this way that unity of thought and motive which is so essential to complete artistic effect is maintained. The style adopted throughout is that of the late German Gothic, appealing, as it does, to the national feeling of the Bavarian artist-owner, and lending itself to infinite richness of ornament and variety of design, both in wood and metal. A notable feature of the furniture is the large provision of cupboards, for, as Professor Herkomer said, "We are a very tidy people, and, in order to maintain tidiness, you want plenty of cupboards in which to put things away." Hence the books are put in cupboards, and proof engravings mounted in frames are also in cupboards, not only for the sake of tidiness and their preservation, but to avoid the unpleasant effect of staring white paper on the walls. Leaving the studio, the visitors were next shown the workshops, around which the house is being built, and which have consequently been planned with a view to their incorporation in the finished structure. Here were seen the smithy, at which so much of the beautiful ironwork produced by the master has been fashioned, and a model to a large scale of the house, the elevations of which were designed by Richardson, the architectural genius to whom America owes so large a debt. The exterior of the building is being carried out with that regard for texture which Richardson so firmly advocated and practised. Granite is used for the plinth, with sawn *tuff-stein* from the neighbourhood of Landsberg, near Munich, for the main walling, relieved by bands of roughly hammer-dressed red sandstone. A characteristic of all great artists was brought out by an inquiry as to the cost of bringing the *tuff-stein* from so great a distance, which elicited from Mr. Herkomer the answer, "I want the effect of this stone, and I must have it, no matter what it costs." To obtain the highest perfection of art, the cost, whether of thought or of labour, must be a matter of the least consideration, for if genius be not, as is sometimes said, an infinite capacity for taking pains, it is at least closely allied thereto.

Much of the internal woodwork of the house is completed, and here again the value of texture is fully illustrated by contrast of finish, of material, of tone, of method. The workshops in which the woodwork is executed are fitted with modern working machinery, the motive-power being supplied by an Otto gas-engine, for Mr. Herkomer has an utter scorn for the idea that modern art-workmen should shorten their opportunity for artistic work by ignoring the advantages provided by modern engineering skill, for lessening the sheer labour of sawing, planing, and preparing work. Another side of the versatility of the artist was seen in a visit to the printing-room and etching-room, from which have proceeded the reproductive works which, being more accessible, spread over a larger area the enjoyment of an artist's skill that would otherwise be confined to the few who are wealthy, instead of the many, to whom art is a pleasure and a benefit as much as to the few. The method of mezzotint engraving was explained, as well as that of etching, and the operation of printing practically exemplified.

Having seen the various works in progress towards the erection of the house, and inspected the plans of the completed buildings, the

visitors were next taken to the theatre, which has of late been so often described and spoken of, and here Mr. Herkomer showed them the first scene of his latest dramatic work, and allowed them to enjoy the reality and fidelity to nature of the scenic environment. The theatre, which, though small, is thoughtfully contrived, has its decoration simple in character, but displaying the same unity of thought and fertility of artistic invention which is seen in the house. The illusion of the scene having been duly appreciated, the members were invited on to the stage "to see how it's done," when the building up and lighting of the scenic accessories and the mechanical contrivances were inspected, and with that a most enjoyable and instructive visit brought to a close.

## THE ARTISTS' BENEVOLENT FUND.

THE eightieth anniversary festival of this Fund was held on Wednesday evening, in the Freemasons' Hall, when the Bishop of Ripon presided over a company numbering 108 ladies and gentlemen.

The Right Rev. Chairman, in proposing the toast of the evening, "Prosperity to the Artists' Benevolent Fund," made a long and eloquent speech. He pointed out that, in the conduct of the Artists' Benevolent Fund, it was sought to encourage as much as possible the spirit of self-help; and such an organisation, the members of which subscribed year after year for the purchase of annuities, commended itself to the generosity of the public. He asked his hearers to remember the great obligations which the world owed to art. To those artists who lifted us out of ourselves, and tried to appeal to us from the standpoint of nobler things, was due a debt of gratitude surpassing that which was merely owing to the revelations of beauty. Art might well claim something at our hands for the benefits she was bestowing, the meaning, value, and comprehensive force of which could scarcely be understood. With the toast was coupled the name of Sir Henry Cartwright, a member of the Committee, who responded in the absence of the President of the Fund (the Earl of Derby).

The Archdeacon of London, in proposing "The Royal Academy" and kindred societies, referred to St. Paul's Cathedral as the burial-place of Sir Joshua Reynolds and other distinguished Academicians, and expressed regret that internally the walls of the Cathedral were still almost as bare as when Sir Christopher Wren left them to posterity to complete. He thought that if the artists of the country, as represented by the Royal Academy and the other artistic societies, would join together and co-operate in the work of decorating the interior of the Cathedral, the result would be very happy. It was matter for congratulation that we were now to have a National Portrait Gallery worthy of the nation, but what was much wanted also was a National Gallery of Sculpture, the absence of which from a great capital like London was, he thought, a great misfortune.

During the evening subscriptions and donations to the amount of 600*l.* were announced by the secretary, Mr. Lambton Young.

We may add that the Artists' Annuity Fund is raised and wholly supported by the contributions of its members for their own relief in sickness or old age; it neither asks for nor receives any support from the public. All artists in painting, sculpture, architecture, and engraving are eligible to become members. The Artists' Benevolent Fund, which is a purely charitable society, has for its object exclusively the relief of the widows and orphans of members of the Annuity Fund left in need; it is supported by the donations and subscriptions of the patrons of the fine arts and artists, and annual contributions of the members of the Annuity Fund. These annual sums, payable to the most needy of the widows, and to the orphans, are respectively supplemented by donations and from the interest on benefactions of Miss E. L. Pye and the late Mr. Edward Absalom. The claims of all widows and orphans who become entitled to its benefits are admitted at once, and without limit to their number. During the past year forty-eight widows and seventeen orphans received annuities, amounting in the whole to 1,018*l.* The annual sum of 20*l.* is paid to each widow, and the annual sum of 6*l.* to each orphan under the age of sixteen. The committee are anxious to increase these allowances as soon as the patrons of art will

enable them to do so. Since the institution of the society the sum of 52,306*l.* has been distributed in relieving widows and orphans of artists whose circumstances render such assistance necessary.

## ARCHÆOLOGICAL SOCIETIES.

*British Archaeological Association.*—The forty-sixth annual congress of this Association will be held this year at Lincoln, from Monday, July 29, to Saturday, Aug. 3, with three extra days to Wednesday, Aug. 7. The Earl of Winchelsea and Nottingham is the President of the meeting. The opening meeting of the Congress will be held in the County Assembly Rooms, on Monday, July 29, at 2 p.m., when the President and Members of the Association will be received by the Mayor and the Corporation. The Mayor and Mayoress will entertain the company at luncheon at 2 o'clock. The delivery of the address by the President will probably take place after the luncheon, at the close of which a visit will be paid to the following places, viz., Church of St. Peter at Gowts; Hall of St. Mary's Guild; Church of St. Mary le Wigford, and the old High Bridge. Opening dinner at the "Great Northern Hotel," at 7.30 p.m., the President in the chair.—At 9.30 a.m., on Tuesday, July 30, the Stonebow and Guildhall will be visited, and the seals, documents and insignia of the Corporation will be inspected. The old Grammar School (Grey Friars) will next be visited, also the two Norman houses on the Steep-hill, en route for the Cathedral, where at 11 a.m. the party will be met by the Rev. Precentor Venables, who will give a detailed description of the Cathedral. At 1.30 p.m. luncheon will be prepared at the "White Hart Hotel." At 3 p.m. the party will assemble at the Castle and inspect it; after which it will visit the following places, viz.: Roman remains in Balgait and in the playground of North District National School; Roman Gateway (Newport) and Lines and Remains of Roman City Walls; Remains of Wall of Cathedral Close; Minster Green, Chancery and Pottersgate Arch; Vicars' Court and Stables, and the Bishop's Palace. In the evening there will be a meeting at the School of Art at 8.30 p.m.—On Wednesday, July 31, the party will leave the Great Northern Station at 9.35 a.m. for Boston, and arrive there at 10.45 a.m., where the following places will be visited, viz.: the parish church, St. Botolph; the Town Hall and old ware-Hussey Tower. Luncheon at the Shod Friars Hall, at 1 p.m. Leave Boston Station at 3.35 p.m. for Tattershall, and inspect the Castle and the (Holy Trinity) Church. If satisfactory arrangements can be made the party will also visit the ruins of Kirkstead Abbey, and what is described in the programme as "the fast-perishing little gem of architecture, the Parish Church of St. Leonard." The party will arrive at Lincoln, on return, about 7.16 p.m.—On Thursday, August 1, the party will leave the Great Northern Station at 9.2 a.m. for Sleaford, and inspect the Church and the ruins of the Castle. It will also drive to visit the Churches of the following villages—Kirkby Laythorne, Asgarby, Haddington, Howell, and Ewerby. The Bishop of Nottingham has kindly offered to be the guide this day and on Friday, August 2, the party will leave the Midland Station at 9.45 a.m. for Newark, and arrive at 10.16 a.m., visit the Castle, Church, and old House in Market-place. A drive may also be made to Haxton Church (Easter Sepulchre), about two miles away. Lunch at Newark, and proceed at 1.59 p.m. to Southwell, inspect the Minster and the Old Palace, leave Southwell at 6.45 p.m., and reach Lincoln at 7.40 p.m. On Saturday, August 3, the party will leave the Great Northern Station, South Platform, at 9.42 a.m. for Gainsboro', and visit the Old Hall and Parish Church. Drive from Gainsboro' to the villages of Stow and Coates, and inspect the old Churches. Back at Lincoln about 3.30 p.m. Closing meeting to be held at School of Art at 4 p.m. The programme for the three "extra days" is as follows.—Monday, August 5: Leave Midland Station at 10 a.m. for Thornton, and inspect the Abbey; thence proceed to Barton-upon-Humber, and inspect the two Churches there. Back in Lincoln about 7.30 p.m. Tuesday, August 6: Drive to Navenby, Wellingore, Welbourn, Loadenham, and Brant Broughton, to see the Churches at these villages, and return to Lincoln via Somerton Castle. Wednesday, August 7: Leave Great Northern Station at 10 a.m. for Grantham, and visit the Church and the Angel Hotel (ancient), and the Grammar School; thence proceed by train to Belvoir Castle (Redmile Station), and return via Bottesford, and inspect Church, monuments, brasses, &c. The papers already promised for the Lincoln Congress include the following:—"Excavations on the site of the Roman Station, Vinovium, near Bishop Auckland," by the Rev. Dr. Hooppell; "Seals and Charters relating to Lincoln," by Mr. W. de Gray Birch, F.S.A.; "The Churches of Boston, Grantham, and Lincoln," by Mr. E. P. Loftus Brock, F.S.A.; "Notes on Certain Early Churches in Algeria, excavated by the French," by Mr. E. P. Loftus Brock, F.S.A.; "The Churches of Lincolnshire," by Mr. E. P. Loftus Brock, F.S.A.; "Pre-Norman Sculptured Stones in the County of Lincoln," by Mr.



thawing it, or melting it by adding a known quantity of warm water,—which, of course, must be deducted from the result of the measurement. Roughly speaking, a foot of snow gives an inch of water.

#### EVAPORATION.

The measurement of evaporation is made by an instrument called an atmometer, of which there are various forms. It, however, is a very difficult and uncertain operation, and our knowledge concerning evaporation generally, excepting in regard to its cause and effect, is in an extremely elementary condition. This is the more to be regretted, as the practical applications of this portion of our subject are numerous and important. Apart from the calculation of deductions to be made in arriving at the amount of water available for supply in a drainage-area, drying up the moisture in the soil, &c., we have to contend, especially in tropical countries, with the gradual evaporation of water in storage reservoirs. Mr. A. R. Binnie calculated that in the dry season of 240 days at Nagpur, in India, as much as 4 ft. of water, or one-fifth of an inch per day, were evaporated from the reservoir, and the entire loss due to this cause was 54 per cent., or more than half of the annual supply of the tank.

Dr. Haughton gives the following data for the torrid zone and its vicinity:—

Locality.	Latitude.	Evaporation.
Madras .....	13° N. ....	91.25 in.
St. Helena .....	17° S. ....	83.78 "
Nagpur .....	29° N. ....	73.15 "

Mr. C. E. Greaves, C.E., gives the following differences between the average rainfall and evaporation at Lea Bridge, near London, extending over a period of fourteen years:—

Excess of rain over evaporation from	25.721
water .....	20.613
	5.108
Excess of evaporation from water over	20.613
evaporation from ground .....	18.138
	2.475

In only three years did evaporation exceed the rainfall.

It is tolerably certain that in nearly all parts of the globe, in situations not far from the sea-coast, the rainfall, and evaporation from a free water surface, are about equal.

#### Books.

*The Elementary Principles of Electric Lighting.* By ALAN A. CAMPBELL SWINTON. (London: Crosby Lockwood & Son. 1889.)

THE author commences his book by the question, "What is Electricity?" and then carefully explains that in assuming it to be a fluid, he does so simply for the purpose of explaining its fundamental principles by the aid of hydraulic analogies; if, therefore, any of his readers get wrong ideas by carrying the analogy too far, it will not be from want of timely warning that, closely as electricity resembles a fluid in its general behaviour, it possesses many properties peculiar to itself, and its real nature is not yet fully known.

The difficult task of explaining to unscientific readers what is meant by "an electric current," "electro-motive force," &c., &c., as well as the definitions of the commoner units used in making electrical measurements, has been performed in a particularly happy way; many persons who profess to be electricians would do well to study carefully this portion of the book. Owing to its extremely elementary character, this little book leaves much for the beginner to learn about many of the simplest points in electric lighting, but it possesses the greatest of all merits in a popular exposition of any technical subject, namely, that in pursuing his studies further the reader will not have to unlearn anything Mr. Swinton has taught him. Throughout, the author says just enough to express the idea he wishes to convey, and stops at the point where popular and untechnical language would fail. A few words about galvanic batteries and magnetism leads to the subject of magneto-electricity and dynamo-electric machines. The value of this book would have been much increased had the same care been bestowed upon the illustrations as upon the text. On page 21,

fig. 7, is shown a portion of an alternating-current machine with the current flowing through the armature in the wrong direction; but the illustration of the continuous-current dynamo, page 25, fig. 10, betrays a far worse blunder, for if the current were made to flow round the field magnet cores as drawn, the machine would consist of a gramme ring revolving in a field produced by two north poles, an ingenious contrivance by which no current could possibly be generated.

As the direction of the current produced, when a conductor moves through a magnetic field is not explained, these errors will pass unnoticed by the general reader, but they should not be found in the second edition of a book of this character. The section devoted to electric lamps would be improved by a brief description of some typical regulating device for arc lamps, and some mention should be made of the cut-out used in conjunction with lamps run in series.

The section on electric accumulators follows that on electric lighting installations. This is an odd arrangement, as in consequence of it no accumulators are shown in the installation diagrams; this is, perhaps, the weakest part of the book. The author may, of course, have his own views as to the desirability of relying upon accumulators, but considering how extensively they are used, the way of connecting them with a circuit should be shown. A section on electric transformers brings the book to a close, and a useful little index has been added.

Although galvanometers, ammeters, voltmeters, and photometers are all referred to in turn no special mention is made of electricity meters. This omission should be remedied in a future edition, as it was long said by the enemies of the electric light that it could never come into universal use until supply by meter was possible. With the exception of the errors in the diagrams, which we have already pointed out, the information to be obtained from this valuable little book is remarkably reliable and well put. The matter the book does contain is so excellent that it seems a pity there is not more of it.

*Electric Light for the Million: (A Handbook for the Uninitiated, of Concise, Practical Information on Electric Lighting and its Cost).* By ARTHUR FREDERICK GUY. London: Simpkin, Marshall, & Co.; York: J. Sampson. 1889.

THE contents of this little book resemble strongly the introductory remarks that so frequently precede the price-lists of electric lighting firms; it will, however, doubtless fall into the hands of, and interest, many who would not be likely to study trade catalogues. After a few remarks and figures setting forth the "progress and advantages" of the electric light, the author discusses its "production" and the "systems of lighting." This part of the work is especially disappointing, as it merely describes the methods of lighting by arc or incandescent lamps worked by the continuous current, either direct from the dynamo-machine or from secondary batteries. Not one word is said about alternating-current machines, converters, or any of the apparatus or devices which have of recent years made town lighting a commercial possibility; it hardly seems probable, therefore, that this little work will "induce gas companies to consider the advisability of utilising their premises as Central Stations," according to the hopes of the author, expressed in his preface. The section relating to the "approximate cost of installations," should prove useful by showing the "uninitiated" millowner or householder, that the installation and maintenance of a small lighting plant is by no means the expensive luxury it was formerly supposed. Such figures can never be more than rough estimates, but when given by an author who abstains from advocating the plant of any particular manufacturer, they are far more likely to carry conviction with them than when read in an advertisement professing to set forth the advantages claimed for any particular patents. Under the heading "Practical Hints and General Remarks," are given some very useful instructions for keeping in working order dynamo-machines and accumulators, and it is a great pity that this really valuable and reliable part of the book has been marred by an attempt on the part of the author to become scientific and define the meaning of terms commonly used by electricians. For example, we have always laboured under the impression

that quantity of electricity was measured in coulombs, and current in amperes, and that the relationship between these two was the same as that between a distance of forty miles and a speed of forty miles per hour; but "the million" are taught that "Quantity is expressed in amperes, and is called current." Again, Mr. Guy tells us that "1 Board of Trade unit=10,000 watts," while the Board of Trade defines its unit as "the energy contained in a current of one thousand amperes flowing under an electro-motive force of one volt during an hour,"—that is, the energy conveyed by a current delivering power at the rate of 1,000 watts for a period of one hour. We cannot ourselves reconcile these two definitions. The general arrangement of the book is good, and it is to be regretted that the author has not seen fit to modernise his descriptions of the methods of lighting, and to be accurate in his definitions of technical terms.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

9,803, Building Construction (Fire-escape). A. J. Hogan.

According to this invention, the walls of houses are so built as to provide a permanent means of escape in the event of fire. Steps and hand-irons are built in regular intervals, or are added to the walls after the building is put up.

10,298, Chimney-pots. J. Way. This invention relates to an improved ventilator, or chimney-pot, intended to cure smoky chimneys and to prevent down-draught. Flanges, sloping upwards, are fixed on hinges inside the pot, and allow the smoke to ascend, but act as baffles-plates, and prevent down-draught.

11,610, Paving Bricks. H. Johnson. On the upper or wearing surface of the paving brick which is the subject of this patent there is formed a series of projecting ribs running parallel, or nearly so, to the longer sides of the brick. These ribs are rounded at their top edges, and the troughs, or depressions, between them are rounded at the bottom. In some cases these ribs are made to run obliquely to the sides of the brick, but for ordinary purposes they are all of the same size, and arranged in rows end to end, with reference to the longer sides of the brick. The ribs, when the pavement is laid, cross at right angles to the walk, and afford a good foothold and safety. The pavement is also of uniform pattern, there being no observable difference at the junction of the bricks. A pavement made this way is readily cleaned by sweeping crosswise,—that is, toward the gutter at the edge of the pavement.

12,499, Windows, &c. R. Mason. According to this invention, no pulleys, weights, or cords are used. The improved method simplifies and cheapens the construction of the frame, and allows of easy adjustment and fastenings, while, at the same time, the casements can be placed in such positions as to be particularly adapted for ventilation or cleaning. The frames are pivoted in the centre, and the special method of opening and fastening them is the important feature of the invention.

4,522, Glazing-bars. I. Page. The glazing-bars which are the subject of this patent are constructed in such a shape that the lead does not need additional fastening to the wood: it keys itself on leaving a sufficient flange of lead on both sides of the bars to turn up and lap over the edge of the glass.

6,653, Wood-carving Machine. E. Küster. This invention relates to a machine for carving; duplicate patterns by means of a kind of mechanical pantograph, and is especially applicable for producing carved ornamental mouldings such as are used for making picture-frames, decorating furniture-panels, &c.

8,060, Metallic Lathing. J. Maw. According to this invention, the laths are made corrugated and with slits or slots, in order that plaster or mortar applied to their surfaces may bind better. The form adopted also reduces to a minimum the unsightly cracking of the plaster common in ceilings. Mortar in itself forms a preventive of rust, and tends to preserve the lathing. In some cases the metallic laths are coated with asphaltum or composition to prevent rust.

##### NEW APPLICATIONS FOR PATENTS.

July 1.—10,610, C. Showell, Sash, Door, and other Handles.—10,616, J. Wilson, Fire-resisting Flooring, &c.—10,618, H. Atkin, Securing Closed Doors.—10,632, G. Hay, Firegrates or Stoves.

July 2.—10,646, E. Calosse and F. Chapman, Stoves and Ranges.—10,655, E. Adams, Window-faster.—10,663, C. Winton, Sewer-gas Trap.—10,677, J. Marston, Opening and Closing Fanlights, Skylights, or Casements.—10,694, A. Curtin and A. Yates, Ventilator.

July 3.—10,722, M. Robinson, Hinges for Water-closet Seats.—10,754, J. Dean, Flushing Closets with the Waste Water from Sinks.—10,759, El

\* Six Lectures on Physical Geography," 1889, p. 165.  
+ Min. Proc. Inst. Civil Engineers," vol. xiv. (1876), p. 59.



Massey, Fireplaces.—10,770, E. Edwards, Movable Centrefires for Masonry or other Arches Built between Iron Girders.

July 4.—10,824, J. Brunton and L. Griffiths, Artificial Stone, Concrete, &c.

July 5.—10,839, T. Switzer, Mitring Mouldings.—10,840, E. B. Lewis, Paint.—10,902, J. Tonce, Preventing Down-draughts and Quenking Up-draughts in Chimneys, &c.

July 6.—10,914, H. De Lespaze and W. Shafto, Concrete.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

3,513, W. and H. Hoskin, Lock Furniture.—7,988, M. Farrell, Fastenings for Windows.—8,114, T. Bate, Water-closets.—8,272, H. Brookfield, Flushing Water-closets, Drains, &c.—8,546, T. Horner, Hinges, &c.—8,914, A. Tonks and F. Baker, Flush-bolts for Doors, &c.—8,961, E. Hauff, Window-fastenings.—9,045, G. Belling, Window-sash Fasteners.—9,119, E. Eyford, Electric Bells.—9,533, A. Johnston and C. Hayward, Ventilation.—9,543, J. Roberts, Door Frames and Sashes.—9,644, W. Byers, Preventing the Shaking or Rattling of Window-sashes.—9,742, I. Smith, Ventilating Flues for the prevention of Down-draughts.—9,760, A. Katz, Ceilings.—10,257, C. Harding and A. Hunt, Bakers' Ovens.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to Opposition for Two Months.

9,643, J. Phillips, Sanitary Trap Golly.—9,751, F. Smith, Caps or Heads for Ventilating and Flue Shafts.—9,761, J. Palmer, Plastic Wall Decoration Composition.—12,708, E. Nunan, Metal Laths for Building Purposes.—8,435, W. Thompson, Fastenings for Windows, Doors, &c.

## RECENT SALES OF PROPERTY:

## ESTATE EXCHANGE REPORT.

JULY 4.—By DEVERE & CO. (at Guildford).  
Surrey—“Bramley Manor Farm” and 68a, 1r. 3p., £23,500  
Bramley Toll-rate and 6a, 2r. 3p., £400  
“Bramley Manor Farm” and 2a, 0r. 2p., £1,000  
Thames Croft and 4a, 3r. 2p., £1,000  
“Yieldhurst Farm” and 20a, 2r. 3p., £950  
“Derry’s Farm” and 178a, £8,000  
“Northbrook Hill Farm” and 32a, 3r. 1p., £2,000  
“Derry’s Hill House” and 20a, 1r. 7p., £855  
Enclosures of f. land, 33a, 0r. 4p., £1,410  
The Strand Brick and Tile Yd., 18a, f., £440  
Several cottages and 11a, 2r. 3p., £1,025  
Numerous enclosures of land, 48a, 0r. 6p., £1,350  
By G. E. SWOBBER & SONS (at Bishop’s Stortford).  
Herts, Fernesux Pelham—Four enclosures of land, 12a, 1p., £178  
Albury—2r. 1p., £103  
“Langley Hall Farm,” and 220a, 3r. 1p., £1,980  
“The New Farm,” and 67a, 3r. 1p., £630  
“The Manor of Langley,” with its rights, &c., £100  
Enclosures of land, 51a, 2r. 3p., £400  
JULY 5.—By FAREBROTHER, ELLIS, & CO. (at Wakefield).  
Wakefield, near—Five enclosures of f. meadow land, 21a, 1r. 2p., £1,050  
By HUMBERT, SON, & FLINT (at Rickmanworth).  
Rickmanworth—Two plots of f. land, £1,251  
JULY 6.—By MESSRS. COBB (at Canterbury).  
Faversham, near—Three cottages and 14a, 1r. 1p., £1,900  
P. marsh land, 38a, 0r. 3p., £1,100  
P. pop. arable, and woodland, 50a, 0r. 2p., £5,415  
Sixteen f. cottages and 68a, 0r. 4p., £2,355  
Two cottages and out-house, f., £900  
JULY 8.—By W. W. JENKINSON.  
Tulse Hill—The f. house, “Silwood,” and 4½ acres, £6,000  
By R. J. COLLIER.  
Peckham—1 and 2, 2r. 1p., £295  
By BAXINGFIELD & TUN.  
Hampstead—“The Hare and Hounds” public-house, f., £260 p.a.  
F.g.r. of £50, with reversion in 77 yrs., to e.r. £200 p.a., £1,250  
Raling—Six villa residences, n.t. 70 and 97 yrs., g.r. £200, r. £198 p.a., £900  
1 to 4, Western-rd., n.t. 73 yrs., g.r. £29, r. £298 p.a., £735  
21 to 24, Western-rd., n.t. 73 yrs., g.r. £29, r. £298 p.a., £640  
26, 28, 30, 31 and 32, Western-rd., n.t. 73 yrs., g.r. £28, 12a, r. £103, 8a, p.a., £750  
33 to 35, Western-rd., n.t. 73 yrs., g.r. £27, 4a, r. £194 p.a., £1,010  
Herts, Perry-green—“Buckler’s Farm” and 137a, £7,275, r. £191, 6a, p.a., £1,500  
“Warren Farm” and 88a, 0r. 4p., £900  
Enclosures of f. land, 6a, 2r. 1p., £100  
Hadhram—“Hogland’s Farm” and 65a, 0r. 2p., f., £775 p.a., £200  
2, 47½ p.a., £200  
Forest-hill—6, The Pavement, n.t. 84 yrs., g.r. £10, r. £70 p.a., £795  
By DENNEMAN, TEWSON, & CO. (at Bournemouth).  
Bournemouth—Ten f. building sites, £4,147  
By MESSRS. COBB (at Folkestone).  
504 Shares of £10 each, paid up, in the Folkestone Water Works Company, £11,064  
JULY 9.—By DENNEMAN, TEWSON, & CO. (at Ipswich).  
Felkstone—A plot of f. land, 6a, 2r. 3p., £620  
Four plots of land, f., 13a, 3r. 2p., £5,830  
East Bergholt—Two cottages and stabling, f., r. £27 p.a., £310  
By MONTAGU & ROBINSON.  
Woolwich—35 to 39, Coleman-st., f., r. £90 p.a., £1,165  
11 and 13, Unity-pl., f., r. £98 p.a., £590  
By FULLER, HOBBS, SONS, & CASSERLY.  
Cubitt Town—The London Rice Mills and Wharf, n.t. 52 yrs., area 69,000 ft., ex machinery, £5,000

By PHILLIPS, LEA, & DAVIES.

Finsbury—80, Paul-st., n.t. 22 yrs., g.r. £7, 4s., r. £12 p.a., £235

By H. C. NEWSON.

New Bond-st.—No. 151, Corporation lease, r. £353 p.a., 10,300

No. 38, Coadwell-st., Corporation lease, r. £225 p.a., 11,800

By HAMPTON & SONS.

Chobham, Surrey—“The Warren” and 13a, f., £6,000

By A. RICHARDS.

Hammersmith—14, Mansion House-st., n.t. 75 yrs., g.r. £4, r. £28 p.a., 335

Poplar—18, North-st., c. r. £28 p.a., 200

25, North-st., and a plot of land, c. r. £54 p.a., 45, Pennylane, c. r. £23, 8a p.a., 150

By DENNEMAN, TEWSON, & CO.

Horton—13, Branch-pl., f., r. £21 p.a., 240

By DEVERE & CO.

Bowers Gifford, Essex—“Jotman’s Hall Farm,” 234a, 1r. 12p., f., £2,250

Camberwell-rd., No. 294—F.g.r. £43, with reversion in 71 yrs., £1,120

No. 302 and 304, Camberwell-rd., f., r. £150 p.a., 3,100

Denmark Hill—No. 1, f., r. £52 p.a., 1,150

Bromley-F. plot of land, 380

JULY 10.—By D. SMITH, SON, & OAKLEY.

Twenty £100 shares, £2, 10s. paid up, in the Law Fire Insurance Company, £340

City, St. Swinham-lane—The letting of 3,160 ft. of land, on lease for 80 yrs. Realised £1,400 p.a.

By EGERTON & BRACE.

Richmond—21 and 22, Dunstable-villas, n.t. 73 yrs., g.r. £7, 10s., r. £39 p.a., £410

By H. GOODWIN.

Peckham—31, Wagon-rd., n.t. 54 yrs., g.r. £5, r. £28 p.a., 265

By PROTHORPE & MORRIS.

Leyton, High-st., f. house, with possession, £410

By CHINNOK, GALSORTHY, & CO.

Wandsworth Common—6 and 7, St. Ann’s-hill, n.t. 32 yrs., g.r. £12, 12s., r. £140 p.a., 1,000

By J. A. SMITH.

Hammersmith—44, Glenhorne-rd., f., e.r. £80 p.a., 610

By FAREBROTHER, ELLIS, & CO.

Fulham—“Colehill House” and 7a, 1r. 2p., f., £10,700

Walbrook—No. 26, f., r. £350, advancing in 6 yrs. to £400 p.a., 6,000

JULY 11.—By COOK & SERR.

Upminster, Essex—The residence called “West Lodge,” f., r. £75 p.a., 1,400

By T. B. WESTCOTT.

Shepherd’s Bush—54, Coningsham-rd., n.t. 78 yrs., g.r. £8, 10s., e.r. £35 p.a., 170

By MR. MORRIS.

Croydon—41 to 42, West-st., £630

By G. A. BICKERTON.

Lewisham—15, Loompit-vale, f., r. £50 p.a., 830

Peckham—“East Gate Lodge,” n.t. 21 yrs., g.r. £15, 12s., r. £25 p.a., 220

By RETNOLDS & EASON.

Stoke Newington—75, Spencer-rd., n.t. 62 yrs., g.r. £5, 5s., £330

South Hackney—79, King Edward-rd., n.t. 40 yrs., g.r. £10, e.r. £28 p.a., 750

Kilburn Rise—The residence called “Lion Lodge,” n.t. 84 yrs., g.r. £22, £1,550

By DOWSETT & CO.

Fimlico—23 and 25, Sutherland-st., n.t. 44 yrs., g.r. £16, r. £130 p.a., 1,120

Harbury—30, Richmond-rd., n.t. 53 yrs., g.r. £8, £450

Clacton, Essex—“Clacton Cottage,” and 21a, 3r. 2p., f., £800

By PHILLIPS, SON, & NEALE.

Paddington—9, Chesnow-villas, f., r. £20 p.a., £1,300

19 and 20, Dickens-pl., n.t. 16 yrs., r. £20, 10s., r. £31 p.a., 480

15, Ledbury-rd., n.t. 54 yrs., g.r. £8, 8s., r. £57, 10s. p.a., 540

21 and 20, Farnbridge-villas, n.t. 54 yrs., g.r. £30, r. £20 p.a., £1,680

Camden Hill—21, 35, and 41, Bedford-gardens, n.t. 34 yrs., g.r. £28, 16s., r. £170 p.a., £1,625

By NEWSON & HARDING.

Green Lane—4, King’s-rd., n.t. 70 yrs., g.r. £8, e.r. £40 p.a., 310

1 to 8, Albert-st., n.t. 90 yrs., g.r. £68, r. £253 p.a., 1,400

Wimbledon—F.g.r. of £28, 6s. with reversion in 90 yrs., £1,470

F.g.r. of £20 with reversion in 94 yrs., £455

F.g.r. of £15 with reversion in 89 yrs., £350

Bromley-by-Bow—F.g.r. of £20 with reversion in 75 yrs., £415

F.g.r. of £15 with reversion in 78 yrs., £300

F.g.r. of £8 with reversion in 75 yrs., £120

Walthamstow—F.g.r. of £27 with reversion in 90 yrs., £648

F.g.r. of £27 with reversion in 91 yrs., £618

Stoke Newington—56, 58 and 60, Bouverie-rd., n.t. 84 yrs., g.r. £16, 10s., r. £76 p.a., 800

By J. G. & A. PERVOY.

Victoria Park—65, Gore-rd., n.t. 65 yrs., g.r. £6, e.r. £42, 410

St. George’s-in-East—21, 22, and 23, Station-pl., r. £36, 10s., n.t. 18 yrs., g.r. £46, 10s., 100

Poplar—17, 19, and 21, Ricardo-st., n.t. 38 yrs., g.r. £5, r. £49, 8s. p.a., 175

By E. STIMSON.

Brixton—118, Sussex-rd., n.t. 34 yrs., g.r. £5, r. £35 p.a., 240

Lambeth—30 and 32, Hartington-rd., n.t. 18 yrs., g.r. £8, 6s., r. £50 p.a., 205

Old Kent-rd.—Nos. 740 to 746 (even), and a f.g.r. of £20, n.t. 21 yrs., g.r. £43, 9s., r. £142 p.a., 830

Battersea—14 and 16, Faversham-st., n.t. 70 yrs., g.r. £8, r. £50 p.a., 455

Newington-butts—9, Albert-st., n.t. 54 yrs., g.r. £9, r. £42 p.a., £325

Brixton—121, Loughborough-park, n.t. 33 yrs., g.r. £9, e.r. £80 p.a., 600

Peckham—66, Donnet-st., f., e.r. £29 p.a., 240

Forest-hill—34 and 36, Dalmain-rd., f., r. £48, 16s., p.a., 350

Thornton-heath—9 and 10, Burton-rd., n.t. 76 yrs., g.r. £11, 10s., r. £104 p.a., 215

Sarbiton-hill—“Sunderland House,” f., e.r. £85 p.a., 500

Hackney—75, Eleanor-rd., n.t. 68 yrs., g.r. £5, e.r. £22 p.a., 230

By C. C. & T. MOORE.

Leyton—3, 5, and 6, Garfield-ter., f., r. £24 p.a., 925

Hackney—374 and 376, Mare-st., f., r. £160 p.a., 2,225

22, Tower-st., f., r. £104 p.a., 945

Charlton—3, Alexandra-cottages, f., 151

Bow—210, Bow Common-lane, n.t. 73 yrs., g.r. £8, r. £30, 310

By WORSFOLD & HATWARD (at Dover).

Dover—32, Trevanion-st., f., 510

11, Town-wall-st., f., 310

4, Bucher-row, f., 118

54, Maison Dieu-rd., f., r. £14 p.a., 215

22, Tower-st., f., 124

Charlton—3, Alexandra-cottages, f., 151

Bow—210, Bow Common-lane, n.t. 73 yrs., g.r. £8, r. £30, 310

July 12.—By HUMBERT, SON, & FLINT.

Easton-rd.—No. 164, n.t. 18 yrs., g.r. £28, 6s., r. £80 p.a., 300

Portman Estate—15, Lower Berkeley-rd., n.t. 35 yrs., g.r. £57, 2,500

By NORTON, TRIST, & GILBERT.

Mile-end—65 and 67, Globe-rd., and 1 to 4, Rose-pl., f., area 4,200 ft., e.r. £170 p.a., 1,480

By BAKER & SONS.

Harlesden, near—Twenty-seven plots of land, f., 1,741

Willesden-green—Twenty-four plots of land, f., 1,762

By E. E. CAUCHER & CO.

Stroud-green—4, Granville-rd., n.t. 89 yrs., g.r. £9, r. £45 p.a., 450

West-green—1, 2, and 10, Leville-ter., n.t. 82 yrs., g.r. £22, 10s., r. £86 p.a., 900

By R. REID.

Dorset—87, 89, Upper Gloucester-pl., n.t. 31 yrs., r. £15, r. £105 p.a., 900

Regent’s-park—14, Park-pl., and 26, Park-st., n.t. 11 yrs., g.r. £7, 1s., £56 p.a., 265

Baywater—9 and 11, Norfolk-mews, n.t. 54 yrs., g.r. 5s., r. £90 p.a., 560

Dorset—20, Balcombe-st., n.t. 19 yrs., g.r. £20, r. £30 p.a., 380

Balcombe-st.—F.g.r. of £40, term 31 yrs., £10

Blandford—F.g.r. of £25, n.t. 48 yrs., n.g.t. of £1 p.a., 1,360

Seven Sisters-rd.—F.g.r. of £20, with reversion in 25 yrs., £1,360

Notting-hill—F.g.r. of £20, with reversion in 55 yrs. to £360 p.a., £1,670

[Contracts used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; n.t. for unexpired term p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

THURSDAY, JULY 25.

Builders’ Benevolent Institution.—Annual Meeting of the Subscribers and Donors, Willis’s Rooms, St. James’s 3 p.m.

SATURDAY, JULY 27.

Architectural Association.—Fifth vacation visit to Maidstone and Leeds Castle. (See advt.)

## Miscellaneous.

**The Corinth Canal.**—The Royal Commission appointed to report upon the works of the Corinth Canal, which was to have cost thirty million francs, and to have been finished last year, has come to the conclusion that the canal cannot be completed for less than twice that amount, and that the work cannot be finished till the end of 1891. It has been ascertained that ten million cubic feet of earth have still to be removed. All work on the canal is at present at a standstill, owing to the want of funds.

**Cement in Japan.**—It is very probable that the imports of cement into Japan will soon cease. According to the *Japan Gazette*, a Yokohama dealer in cement has discovered a stone, called *mekura*, in the Noto district, which is stated to possess remarkable qualities as a cement material. It is said that the cement will sustain a weight of 400 lbs. to 500 lbs. per square *sun* (about 1½ in.). Foreign cement is sold in Japan at about 470 dollars per barrel, while the estimated sale price of the native cement is about 250 dollars.

**New Concert Hall in New York.**—It is stated that a gigantic new concert-hall is to be erected in New York with funds left by the late Mr. Andrew Carnegie, the well-known millionaire. The cost is estimated at about 130,000, and the grand hall will seat 8,000 persons.



**The English Iron Trade.**—The English iron market continues firm and in a rising tendency, although the trade doing is not very large, the recent advances having to some extent checked business. Pig-iron is very stiff, the strong tone of the Scotch warrant market being particularly marked, and causing makers in Scotland to improve their quotations by from 1s. to 1s. 6d. a ton. In the North of England the feeling in the pig-iron trade has greatly improved, and No. 3 Cleveland pig cannot now be obtained under 40s. Both in Lancashire and Staffordshire prices of pig-iron are higher, while hematites in the north-west and on the east coast are quoted 6d. a ton more. Finished iron rules very steady at the advanced rates declared at last week's quarterly meetings. The bulk of the trade doing is increasing, while in steel the same amount of activity shows itself as has been observed during the last few weeks. Shipbuilding is still an active and increasing trade. Engineers continue to do well.—*Iron.*

**A New Light Fire-Escape.**—On Saturday last we witnessed some trials of a new patent fire-escape at the works of the makers, Messrs. E. H. Bayley & Co., Limited, Newton Causeway. The new escape, which reaches to a height of 30 ft., is intended for use by the police and other authorities as a quickly available and readily-moved auxiliary to the heavier escapes in use by the Fire Brigade. It weighs only 4 cwt., and is thus easily moved and worked by one man. It is devoid of the usual shoot, and is very strong, being built of ash timber, well braced by wire rope. For the purpose indicated, as well as for use in villages and in connexion with large institutions and private mansions remote from fire brigades, it likely to prove of great service.

**The Savoy Hotel.**—In our description of this structure, in last week's *Builder*, we omitted to mention the arrangements of locks throughout the building, which were supplied by Messrs. Hobbs, Hart, & Co., of Chapside. These locks are made on the vertical or Continental principle, with the keyhole below, the handles of ebony. The locks of each floor, from the eighth downwards, are made to differ, with a separate sub-master-key for each, opening all the locks on its special floor, but having no connexion with any other floor, and a grand master-key to open the whole of the establishment. This is probably one of the largest suites of locks ever made.

**The Howard Estates.**—Shortly will be offered for sale at auction, and in several lots, the larger portion of the late Earl of Carlisle's property in the Morpeth and Castle Wards, County Northumberland. The estates to be sold are situated in the parishes of Morpeth, Miford, Bedlington, Ugham, and Stannington, and lie between the Rivers Wansbeck and Blyth. They extend over 12,000 acres, including about forty farms, together with the villages of Hepscott, or Leipscott, 1,604 acres, in Morpeth Parish; Netherton, occupied chiefly by pitmen, 1,506 acres, near to Bedlington; Ugham, and Stannington.

**The Essen Works.**—The directors of the Essen Works have just issued an interesting little pamphlet respecting their history, from which it appears that in 1833 only nine workmen were employed there, the number having risen to seventy-four in 1848, and last year to 20,960. There are now at the works 1,195 furnaces of various kinds, ninety-two steam-hammers of from 100 to 50,000 kilos weight, and 370 steam-engines of 27,000 horse-power; 2,785 tons of coal and coke are consumed daily, and the diurnal output of iron of all kinds is 600 tons.

**Death of an Aberdeen Architect.**—Intimation was received at Aberdeen, on the 10th inst., of the death of Mr. J. Russell Mackenzie, architect, who only left the city for South Africa in August last. Previous to leaving the country he was made the recipient of a handsome public testimonial. During his thirty-one years' career in Aberdeen Mr. Mackenzie was the designer of many public buildings, and as a Town Councillor he also rendered good service.—*Scotsman.*

**The Sanitary Institute.**—At a meeting of the Council of this Institute, held on the 10th inst., Prof. W. H. Corfield, M.A., M.D., in the chair, further arrangements were made for the congress and exhibition to be held at Worcester in September next.

**Raffety, Thornton, & Co.**—The Directors of Raffety, Thornton, & Co., Limited, have declared an interim dividend at the rate of 7 per cent. per annum free of income-tax.

**Sale of an "Adventurer's Share" in the New River Company.**—On Wednesday last, at the Mart, Tokenhouse-yard, Messrs. Edwin Fox & Bousfield offered for sale by auction, in one lot, an entire freehold Adventurer's Share in the New River Company. It was stated in the particulars of sale that such a "lot" had never been submitted to public competition since the river was finished. The annual income of the company from land and water is ever increasing, and last year it amounted to 511,356*l.* There is the reversion to considerable estates in Middlesex and Hertford, to various premises in the City, and to the Myddelton-square estate (Clerkenwell) of about 50 acres, which for the most part is covered with buildings, the leases of which will expire in about twenty years. The share offered for sale Wednesday qualifies the possessor for a seat at the Board. In submitting the "lot," Mr. Bousfield stated that the income derived by the share for last year up to Christmas was 2,610*l.* The first bid made was 80,000*l.*, followed by offers of 81,000*l.*, 85,000*l.*, and 90,000*l.*, which was increased, by bids of 1,000*l.* each, to 95,000*l.* The auctioneer then called attention to the growing revenue and the improving prospects of the company, with the increase in the population served, and the reversion to the estates mentioned. Offers were subsequently made up to 122,000*l.*, and eventually the share was disposed of for 122,800*l.*, the purchase being made on behalf of the Prudential Assurance Company.—*Times.*

### PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	s.	d.
Greenheart, B.G. ....	7	0	0	7	15
Teak, E.I. ....	12	0	0	14	0
Sequoia, U.S. ....	0	0	0	0	0
Ash, Canada, ....	3	10	0	6	0
Birch " ....	3	10	0	6	0
Elm " ....	4	0	0	8	0
Oak " ....	2	10	0	3	0
Fir, Dautic, &c. ....	2	10	0	4	0
Canada " ....	8	10	0	7	0
Pine, Canada red " ....	3	10	0	4	0
Lath, Dautic, ....	4	10	0	6	0
St. Petersburg, ....	5	0	0	8	0
Wainscot, Riga, &c. ....	2	15	0	4	0
Deal, Finland, 2nd and 1st, &c. ....	9	0	0	11	0
" 4th and 3rd " ....	7	10	0	8	15
Riga " ....	7	0	0	9	0
St. Petersburg, 1st yellow " ....	10	0	0	11	0
" white " ....	7	0	0	10	0
Swedish " ....	9	10	0	17	0
White Sea " ....	16	0	0	26	0
Canada, Pine, 1st " ....	11	0	0	17	0
" 2nd " ....	10	0	0	16	0
" Spruce, 1st " ....	9	10	0	11	0
" 3rd and 2nd " ....	7	0	0	9	0
New Brunswick, &c. ....	8	10	0	8	0
Battens, all kinds of " ....	6	10	0	13	0
Flooring Boards, sq. ft. in, prepared, First " ....	0	11	0	0	14
Second " ....	0	8	0	0	10
Other qualities " ....	0	6	0	7	9
Cedar, Cuba, ....	0	0	42	0	42
Honduras, &c. ....	0	0	42	0	42
Managony, Cuba " ....	0	0	42	0	42
St. Domingo, cargo average " ....	0	0	42	0	42
Mexican " ....	0	0	42	0	42
Tobacco " ....	0	0	42	0	42
Honduras " ....	0	0	42	0	42
Bor, Turkey " ....	0	6	0	15	0
Rose, Rio " ....	15	0	0	20	0
Bahia " ....	14	0	0	18	0
Satin, St. Domingo " ....	0	0	0	1	0
Porto Rico " ....	0	0	0	1	0
Walnut, Italian " ....	0	0	42	0	42

### METALS.

IRON—Bar, Welsh, in London .....	4	5	0	5	10
" " at works in Wales .....	4	10	0	5	0
" " Staffordshire, in London .....	5	10	0	6	0
COPPER—					
British, cake and ingot .....	46	0	0	48	10
Best selected .....	47	0	0	47	10
Sheets, strong .....	63	10	0	0	0
Chil, bars .....	41	0	0	0	0
YELLOW METAL .....	0	5	0	0	52
LEAD—					
Eng. Spanish .....	12	5	0	12	7
English, com. brands .....	12	10	0	12	6
Sheet, English .....	13	10	0	14	0
SPECIALS—					
Russian, special .....	19	2	6	19	7
Ordinary brands .....	19	0	0	19	2
TIN—					
British .....	89	0	0	0	0
Australian .....	88	10	0	0	0
English Ingots .....	93	0	0	0	0
ZINC—English sheet .....	21	0	0	22	0

### OILS.

LINSEED .....	28	7	6	27	10
Cocunut, Ceylon .....	29	10	0	23	0
Palm, Lagos .....	24	10	0	0	0
Rapeseed, English pale .....	23	10	0	0	0
" brown " ....	27	10	0	0	0
Cottonseed, refined .....	28	0	0	27	10
Tallow and Oleum .....	31	0	0	40	0
Lubricating, U.S. .....	5	0	0	6	0
" refined " ....	7	0	0	12	0
Tar—Stockholm .....	1	3	6	1	4
Archangel .....	0	15	9	0	15

### TENDERS.

[Communications for insertion under this heading must reach us not later than 12 Noon on Thursday.]

**ANGLESEY.**—For alterations and additions to "Oakridge House," for Mr. S. T. Blake, Mr. Wm. Yeardley, architect, High-street, Gosport:—  
C. J. Lear & Son, Alverstoke (accepted), £500 0 0

**BALHAM.**—For erecting model dairy. Mr. J. Nixon Horsfield, architect, 20, Market-place, Kingston-on-Thames. Quantities by Mr. F. Thomas, 5, Great James street, W.C.:—

Bywater & Co. ....	22,447	0	0
R. Toms " ....	2,258	0	0
Batley & Co. ....	2,293	0	0
R. S. Lambie " ....	2,042	0	0
Turtle & Appleton " ....	2,010	0	0
Lorden & Son " ....	1,989	0	0
J. Johnson, Belle Vue-road, Wandsworth-common (accepted) .....	1,377	0	0
Dickeson & Wallis " ....	1,848	0	0

**CROYDON.**—For alterations and repairs to Richmond and Chances Villas, for Mr. W. Sharp:—  
Maides & Harper ..... 2151 | 0 | 0 || Ridge & Broughton ..... | 1,100 | 0 | 0 |
Long " ....	111	0	0
Watson " ....	110	0	0
Taylor " ....	101	0	0

**CROYDON.**—For the erection of mews and cottages, Mayday-road, Croydon. Mr. Henry Gough, architect, Station-road, West Croydon:—  
Edwin London " .... £1,530 | 0 | 0 || Taylor, Croydon " .... | 1,150 | 0 | 0 |
Marriage, Croydon " ....	1,100	0	0
Sedgwick, Croydon " ....	1,050	0	0
Saunders, Croydon " ....	907	0	0
Smith & Bullard, Croydon " ....	907	0	0
Barker, Croydon " ....	850	0	0
Batley & Linford, Croydon " ....	948	0	0

**EALING.**—For erecting four shops at Ealing Dean, for Mr. J. B. Brown, Mr. J. Hume, architect and surveyor, 10, The Square, Hammermith. Quantities supplied by architect:—  
T. Parker " .... £1,120 | 0 | 0 || C. Green " .... | 1,059 | 0 | 0 |
| H. Bayard " .... | 1,060 | 0 | 0 |
| G. Allen & Son, Hackney " .... | 1,047 | 15 | 0 |

**EASTHAM.**—For the erection of a residence for Dr. Beaumont. Mr. Richard Peters, architect, 72, Wool Exchange, Coleman-street, E.C.:—  
Reed " .... 2,853 | 0 | 0 || Bishop Bros. & Marston " .... | 681 | 0 | 0 |
| Lacelles " .... | 572 | 0 | 0 |
| Hood " .... | 553 | 0 | 0 |

**EDMONTON.**—For the enlargements at Brettenham-road and Crayland-road Schools, for the School-Board for Edmonton:—  
Brettenham-Crayland-road " .... £1,685 | 0 | 0 || Humphrys & Son, Tottenham " .... | 1,850 | 0 | 0 |
W. Gardner, Waltham Abbey " ....	1,599	0	0
Brass & Son, St. Luke's, E.C. " ....	1,371	0	0
C. Wall, Chelsea " ....	1,329	0	0
Messrs. Patman, Enfield " ....	1,423	0	0
J. H. Mollett, Poole-street, Hoxton " ....	1,518	0	0

**LONDON.**—For building casual wards and receiving-wards in Strand, Lincoln's Inn-fields, for the Guardians of the Strand and Lincoln's Inn, for Mr. H. B. Pollard:—

	Casual	Receiving	Total
Ward " ....	2,313	25,141	£27,454
B. Nightingale " ....	9,245	4,995	14,240
Garlick & Horton " ....	9,350	9,923	19,273
J. Clemence " ....	9,176	4,975	14,151
Louley & Co. " ....	9,100	5,000	14,100
Bi-art & Sons " ....	9,235	4,720	13,955
Patman & Fotheringham " ....	8,990	4,350	13,340
Patrick & Son " ....	9,050	4,770	13,820
Hall, Beddall, & Co. " ....	8,969	4,692	13,661
Stephens & Bastow " ....	8,967	4,777	13,744
W. M. Dabbs " ....	8,968	4,691	13,659
Dorrell & Co. " ....	9,116	4,280	13,396
Brass & Son " ....	8,773	4,597	13,370
Chas. Wall " ....	8,149	4,557	12,706
J. O. Richards " ....	8,430	4,489	12,919

**LONDON.**—For pulling down and re-erecting the premises Nos. 20 and 21, Baywater-terrace, W., for Mr. W. Stradwick, Messrs. Rimeston & Gabriel, 42, Old Broad-street, E.C., architects:—  
W. Brass & Son " .... £1,614 | 0 | 0 || W. Hearn & Co. " .... | 4,670 | 0 | 0 |
Thos. Boyce " ....	4,614	0	0
E. Lawrence & Sons " ....	4,438	0	0
John Allen & Sons " ....	4,394	0	0
Jas. Smith & Sons " ....	4,387	0	0
William Shurmer " ....	4,320	0	0
Kilby & Gayford " ....	4,213	0	0
Chas. Kynoch & Co. (accepted) " ....	4,123	0	0

**LONDON.**—For alterations and fittings, 12 and 13, Catherine-street, for the Hansard Publishing Union (Limited), Messrs. Mackenzie & Horne, architects:—  
W. Vanstone " .... £2,485 | 0 | 0 || Monk " .... | 2,450 | 0 | 0 |
| Collis " .... | 2,400 | 0 | 0 |
| Hampson " .... | 2,537 | 0 | 0 |

**LONDON.**—For the erection of a school to provide accommodation for 800 children on the site of the Metropolitan School, Wandsworth, for the School Board for London, Mr. T. J. Bailey, architect:—  
S. Barton & Co. " .... £12,936 | 0 | 0 || J. Shillington & Son " .... | 19,238 | 0 | 0 |
D. Charteris " ....	11,763	0	0
E. Kirk & Randall " ....	11,709	0	0
J. Longley & Co. " ....	11,633	0	0
Hugh Knight " ....	11,604	0	0
J. Holloway " ....	11,600	0	0

\* Recommended by the Works Committee for acceptance.



## COMPETITION, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Town Hall	Cromer Town Hall Co. Ltd.	Not stated	Aug. 17th	i.

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Building Nurses' Rooms, &c.	Whitechapel Union	B. J. Capell	July 23rd	x.
Roadmaking and Paving Works	Willenden Local Board	O. Claude Robson	do.	x.
York Paving, or Victoria or other Stone	Mile End Old Town Vestry	J. N. Knight	July 24th	x.
Constructing Sewer	St. Mary Abbots Ves. (Kensington)	Official	do.	x.
Branch Puddle Trench	Thirk Water Co.	A. E. Preston	do.	x.
Workshops	Wandsworth and Clapham Union	T. W. Aldwinckle	July 25th	ii.
Stoneware Drain Pipes	Brighton Town Council	G. E. Andrews, C.E.	July 26th	ii.
Erection of Schools	St. Athanasius School Committee	Duckworth & Medcalf	Official	do.
Sundry Alterations	London County Council	do.	July 29th	x.
Boundary Wall and Fence	do.	do.	July 30th	ii.
Boiler, Steam Engine, Water Tanks, &c.	Strand Union	W. S. Cross	do.	ii.
Lodges, &c.	London County Council	Official	Aug. 1st	ii.
Waterworks	Faringdon Union R.S.A.	F. H. Barfield, F.S.I.	Aug. 2nd	ii.
Broken Granite	Brentford Local Board	J. H. Strachan	Aug. 6th	x.
Leveling, Paving, Kerbing Roads, &c.	Southend Local Board	P. Dodd	do.	x.
Machinery	Richmond Main Sewerage Board	J. C. Mallis	Sept. 4th	ii.
External Painting, Tarring, &c., Chichester.	War Department	Official	Not stated.	ii.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Temporary Clerk of Works	Royal Regent, Sheerness	10s. per diem	Not stated.	xvi.
Temporary Foreman of Works	do.	do.	do.	xvi.
Quantity Surveyor	Huddersfield Corp.	Not stated.	do.	xvi.

LONDON.—For the enlargement of the Rockingham-street School, Newington-causway, by 600 places, for the School Board for London. Mr. T. J. Bailey, architect.

G. S. & W. Williams & Son.....£3,745 0 0  
D. Charters.....3,640 0 0  
Wm. Downs.....3,640 0 0  
W. L. Kellaway.....3,634 0 0  
Geo. Parker.....3,495 0 0  
A. & W. Garner.....3,330 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of a junior mixed school, to provide accommodation for 427 children, on the "Latchmere" site, Battersea Park-road, for the School Board for London. Mr. T. J. Bailey, architect.

S. Barton & Co.....£8,086 0 0  
J. Longley & Co.....6,864 0 0  
D. Charters.....6,328 0 0  
W. Lendley & Son.....6,021 0 0  
J. Holloway.....5,650 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For the enlargement of Gainsborough-road school, Hackney, by 600 places, for the School Board for London. Mr. T. J. Bailey, architect.

E. S. & W. Williams & Son.....£9,698 0 0  
Wm. Downs.....9,698 0 0  
Kilby & Gayford.....9,638 0 0  
Chas. Cox.....9,397 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For enclosing, levelling, draining, and tarping the additional land adjoining the Manchester-street school, Gray's Inn-road, for the School Board for London. Mr. T. J. Bailey, architect.

Norris & Luke.....£598 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For providing and fixing hot-water apparatus throughout the whole of the Compton-street School, Newington, for the School Board for London. Mr. T. J. Bailey, architect.

J. & F. May.....£1,050 0 0  
Kilby & Cochran.....725 0 0  
J. Grundy.....725 0 0  
R. P. de Ridder.....600 0 0  
Comyn, Ching, & Co.\*.....549 10 0  
Mungravy & Co.....530 0 0  
J. Jackson.....473 0 0  
T. Dowd.....435 0 0  
J. L. Barfield & Co.....388 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For extending the boys' staircase, Handbaker-road, Hackney, for the School Board for London. Mr. T. J. Bailey, architect.

E. A. Roome.....£113 0 0  
Norris & Luke.....103 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of five shops, Old Kent-road, for Mr. W. J. Hurley. Mr. E. E. Niblett, architect, 124, Hackney-road.

Anley.....£2,390 0 0  
Wilkinson Bros.....2,325 0 0  
J. Walker.....2,220 0 0  
Spencer & Co.....2,140 0 0  
Yeats & Co.....1,900 0 0  
Yeats (accepted).....1,875 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For erecting warehouses at No. 61, High-street, St. Giles's, Bloomsbury, for Mr. Joseph Mankett. Mr. W. M. Yettis, architect.

Rowlandson.....£1,110 0 0  
W. Gladding.....759 0 0  
Maley.....737 0 0  
S. W. Hawkins.....631 0 0

LONDON.—For pulling down houses on the Tiliard Estate, Norton Folgate, E.C., and building five houses and shops. Messrs. Farbrother, Ellis, & Clark, surveyors.

C. Kynoch & Co.....£6,413 0 0  
Lawrence & Son.....6,332 0 0  
Smith & Son.....6,187 0 0  
Kilby & Gayford.....5,936 0 0  
S. J. Scott.....5,681 0 0

LONDON.—For alterations and additions to the Hampstead Branch of the London and South-Western Bank, Limited, for the Directors. Mr. Edward Gabriel, architect, 42, Old Broad-street, E.C.

W. H. Waite.....£3,499 0 0  
B. E. Nightingale.....3,386 0 0  
Gould & Brand.....3,242 0 0  
Jas. Smith & Sons.....3,103 0 0  
Chas. Kynoch & Co. (accepted).....2,970 0 0

LONDON.—For sundry additions, alterations, and decorations at 11, Upper Berkeley-street, W. Messrs. New & Son, architects.

Evers.....£243 3 8  
Oudry & Co.....734 0 0  
Tenant & Co.....696 0 0  
E. W. Harris & Sons.....696 0 0  
Mark.....693 0 0

LONDON.—For alterations and additions to the "Primrose" Tavern, 63, Oxford-street, for Mr. J. G. Newton. Mr. E. E. Niblett, architect, 192, Hackney-road.

Thompson.....£159 10 0  
Yeats & Co.....159 10 0  
Yeats (accepted).....159 10 0

LONDON.—For the supply of materials to the Vestry of Chelsea.

For the supply of 780,000 3 in. by 9 in. by 5 in. Yellow Dutch Blocks, at per Thousand.

Powis & Wedlake.....£8 5 0  
Fargherson Bros.....0 2 6  
Skelton & Co.....5 17 6  
Burt, Boulton, & Haywood Informal.....6 14 6

For the supply of 678 Tons Best Portland Cement to specified test, at per Ton.

Lavers.....4 0 0  
West Bros.....29 9  
Skelton & Co.....29 9  
J. Williams.....29 6  
Wakley Bros.....23 10  
Eastwood & Co.....23 0

For Ballast and Sand. Total.

J. Neal.....£567 10 0  
Skelton & Co.....484 11 8  
Covington.....493 0 10

LONDON.—For the erection of six houses upon the Petley Estate. Messrs. W. Reddall & Son, architects and surveyors, 10, South-street, Finsbury, E.C. Quantities not supplied.

Laucelles.....£2,280 0 0  
Wire.....1,768 0 0  
Elkington.....1,439 15 0  
Coldwells.....1,250 0 0

LONDON.—For addition to offices, Dockhead, Bermondsey, for Messrs. Chas. Southwell & Co. Mr. Lawton R. Ford, architect, 24, Railway Approach, London

Bridge, S.E. :—  
A. White & Co.....£563 0 0  
J. Buller (accepted).....495 0 0  
S. Kippis (withdrawn).....476 0 0

LONDON.—For erecting and completely finishing the George Works, Chequer-alley, E.C., for Messrs. J. De la Rue & Co. Messrs. Parr & Sons, architects.

M. Patrick.....£14,483 0 0  
Burge.....14,400 0 0  
Collis & Son.....13,940 0 0  
Ashby & Horner.....13,600 0 0  
Woodward.....13,278 0 0  
Lascelles & Co.....13,250 0 0  
Simpson & Son.....13,268 0 0  
Brass & Son.....12,773 0 0  
C. Kynoch & Co.....12,685 0 0

LONDON.—For the erection of a Police-station, Wick-road, Victoria-park, for the Commissioners of Police.

J. Morter.....£4,487 0 0  
Avis.....4,270 0 0  
J. Chappell & Co.....4,182 0 0  
R. Lawrence & Son.....4,128 0 0  
W. Brass & Son.....4,100 0 0  
W. Shurmer.....4,077 0 0  
J. Grover & Son.....3,900 0 0  
W. Lenden.....3,897 0 0  
Perkins.....3,980 0 0  
Hart.....3,973 0 0  
Ansell.....3,950 0 0  
Scrivenor & Co.....3,887 0 0  
Lathley Bros.....3,870 0 0

LONDON.—For additions and alterations to premises, Camden-street, Kensington, for Mr. E. Maundrie. Mr. J. Hume, architect and surveyor, 15, The Grove, Hammersmith.

C. Rogers.....£247 15 0  
H. King, Kensington.....233 10 0

LONDON.—For building organ factory for Mr. A. Mont, 550, Holloway-road.

Lockwood & Co. Walsworth.....£1,630 0 0  
Edwards.....1,470 0 0  
Beaves Bros., Kentish Town.....1,300 0 0  
Mollett.....835 0 0  
Hughes, Broad Green.....825 0 0  
Norris & Luke.....800 0 0  
T. Channing.....845 0 0  
McKewin.....835 10 0  
J. Roberts, Stratford.....835 0 0  
A. Nichols, Leytonstone.....825 0 0  
Marriott, High Barnet.....791 0 0  
A. & W. Garner, Fackham.....717 0 0

LONDON.—For alterations to the "Star and Garter" public-house, Caledonian-road, N. Messrs. Wilson, Son, & Aldwinckle, architects.

E. Toms.....£2,494 0 0  
W. Shurmer.....2,268 0 0  
Ashby & Horner.....2,192 0 0  
Hearle & Son.....2,180 0 0  
J. Mills & Co.....2,100 0 0

LONDON.—For alterations, &c., to the "Duke of York," Clerkenwell-road, E.C., for Messrs. George Sargam & Sons. Mr. H. J. Newton, architect, 49, Victoria-street, Westminster, S.W.

S. R. Lambie, Kentish Town.....£931 0 0  
H. Burman & Sons, Kennington Park.....620 0 0  
S. G. Golden, Bryanston-square.....535 0 0  
W. L. Kellaway, Clerkenwell.....492 0 0

\* Accepted.

LONDON.—For about 570 ft. of pipe sewer, Seagrave-road, for the Vestry of the Parish of Fulham, Mr. James P. Norrington, Surveyor.

Rogers & Co., Notting-hill.....£407 0 0  
Norris, Twickenham.....272 0 0  
Adams, Kingland.....261 0 0  
Mears, South Kensington.....255 0 0  
Tomes & Wimpsey, Hammersmith.....232 0 0  
Marriott, High Barnet.....230 0 0  
Nowell & Robson, Kensington.....217 0 0

LONDON.—For superintendent's residence, South-Eastern Ambulance Station, Old Kent-road, for the Metropolitan Asylums Board. Mr. Thomas Ashblith, architect, 2, East India-avenue, Leadenhall-street, E.C.

Allow for old material.

H. Toton & Sons, 161, Gloucester-road, South Kensington.....£239 0 0 £29 0 0  
H. L. Holloway, 181, Queen's-road, New Cross Gate.....750 0 0 Nil.

Thomas Hooper, 59 and 61, Wands-worth-road.....764 16 10 45 12 0  
William Johnson, Wandsworth Common.....739 0 0 65 0 0

Harry Bacon, 58, Queen's-road, West Croydon.....728 13 0 63 10 0  
Edward Hughes, 91, Lancaster-road, Broad Green.....695 0 0 40 0 0

John Mills, Broadwail, Stamford-street, S.E.....700 0 0 80 0 0  
A. & W. Garner, 30, Frankton-road, Hill-street, Fackham.....600 0 0 32 0 0

LONDON.—For alterations to gates and re-setting piers, at the Blackstock entrance to Finsbury-park, for the London County Council. Mr. Thomas Ashblith, Architect. Quantities not supplied.

F. Blandford, Highbury.....£237 0 0  
C. Killinback, James street, Camden. 390 0 0  
Lova.....296 0 0  
Faulkner, Walton-on-Thames.....296 0 0

\* Accepted.

NEWCASTLE-ON-TYNE.—For additions to the Northern Assurance Company's premises, Newcastle-on-Tyne. Mr. Henry S. Legg, architect, Christ's Hospital, London.

Maddenias, Newcastle.....£7,393 0 0  
Rev. Newcastle.....6,835 9 9  
Lowry, Newcastle.....6,760 0 0  
Walter Scott, Newcastle.....6,617 8 10

POTNEY.—For erecting house and shop in Lower Richmond-road, for Mr. G. F. Garner. Mr. J. Hume, architect and surveyor, 15, The Grove, Hammersmith.

Lucas & Wiseman.....£137 5 0  
C. Green.....410 15 0  
H. Williams.....400 0 0  
W. Wheeler, Wandsworth.....397 10 0

**SEVENOAKS.**—For levelling, metalling, channelling, storm-water drains with manholes, gullies, &c., to Bethnal road, Sevenoaks, for the Sevenoaks Local Board. Mr. James Mann, Town Surveyor:—  
 Thomas Adams, London ..... £381 4 3  
 Alfred Palmer, Bromley ..... 373 2 8  
 Woodhams & Fry, Greenwich ..... 361 5 2  
 William Coker, Haling ..... 350 8 6  
 Marriot & Co., High Barnet ..... 314 0 6  
 Thomas Fishenden, Sevenoaks ..... 285 9 8  
 J. Hedwell, London ..... 281 15 2  
 Mid Kent Building and Contracting Works, Limited, Beckenham ..... 280 0 0  
 Sidney Hudson, London ..... 270 0 0  
 E. B. Chittenden, Offham ..... 250 2 11  
 Surveyor's Estimate ..... 271 5 0  
 \* Accepted according to Schedule of prices.

**STUBBINGTON.**—For the erection of water tower, servants' hall, &c., at Stubbington House, for Mr. M. H. Foster, C.C. Mr. W. Yearly, architect, High-street, Gosport. Quantities supplied:—  
 W. Hill & Co., Gosport ..... £1,461 0 0  
 E. Tuttle, Fareham ..... 1,438 10 0  
 T. P. Hall, Southsea ..... 1,353 0 0  
 F. G. White & Sons, Landport ..... 1,345 0 0  
 C. Wareham, Stubbington ..... 1,298 0 0  
 H. Jones, Southsea ..... 1,295 0 0  
 J. Crookrell, Landport ..... 1,218 10 0  
 W. Hagley, Forton ..... 1,213 15 6½  
 F. Plummer, Fareham (accepted) ..... 1,210 0 0  
 G. Beech, Southsea ..... 1,188 0 0

**STUBBINGTON.**—For the erection of a pair of cottages, for Mr. M. H. Foster, C.C. Mr. Wm. Yearly, architect, Gosport. Quantities supplied:—  
 C. Wareham, Stubbington (accepted) ..... £800 0 0

**TOTTENHAM.**—For alterations, bar-fittings, pewtering, and other work, at the "Rall" Inn, High-road, Tottenham, for Mr. S. Perrin. Mr. G. L. Wilson, architect. Quantities not supplied:—  
 P. Blandford (accepted) ..... £364 0 0  
 [No competition.]

**UXBRIDGE.**—For alterations and additions to St. John's School, Uxbridge Moor. Messrs. George & W. Eves, architects, Uxbridge:—  
 Kearley, Uxbridge ..... £813 0 0  
 Farnside & Son, Uxbridge ..... 584 0 0  
 Harry Cowley ..... 589 0 0  
 A. & B. Hanson, Southall ..... 589 12 6  
 Brown & Son, Harefield ..... 508 0 0

**VIRGINIA WATER.**—For erecting new homestead at Trumps Farm, near Virginia Water. Messrs. Castle, Field, & Castle, architects, 18, Merton-street, Oxford:—  
 G. Reavell, Station ..... £1,275 0 0  
 Knight & Sons, Chertsey ..... 1,222 0 0  
 Wilkins & Son, Oxford ..... 1,098 0 0  
 G. Gray, Egham ..... 1,097 0 0  
 W. Musselwhite, Basingstoke ..... 998 0 0

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**TO CORRESPONDENTS.**  
 P. H. J. (Thanka)—J. M. "Puckham" (this inspector is perfectly right, and you evidently know nothing of sanitation).—W. H. S.S.—E. H. L. B. (your letter is not one that we could consent to publish anonymously; you must sign it and take the responsibility).—J. M. (yourly "with us" is superfluous).—T. H. (this circular is very edifying, no doubt, but the date too old to take notice of now).—H. I. N. (we cannot insert letters unless the amounts be given).—H. H. B. (too late).—H. E. P. (too late).—J. O. R. (too late).  
 All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.  
 Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.  
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## PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

**THE INDEX AND TITLE-PAGE** for Volume LXV. (Jan. to June, 1889) were given as a Supplement with the last Number. A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office.  
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# The Builder.

VOL. LVIII. No. 2483.

SATURDAY, JULY 27, 1895.

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### The House of Lords on Architecture.



LAST week the House of Lords indulged in one of those field-days of architectural criticism with which both legislative bodies occasionally vary the monotony of business, and afford

a certain amount of edification to the architectural world. In the House of Commons, it is true, the argument usually turns chiefly on what a building has cost or may cost, or how it might be done cheaper. The general tone of such discussions in the House of Lords is higher than that, and there is usually evidence of some perception of the value of architecture for its own sake; nor was such evidence wanting on the occasion referred to. But the debate, the principal part of it at least, furnished one more example of the confusion of mind under which most political men seem to be as to the meaning and objects of architecture, and of the absurdly illogical side issues which are raised in such discussions.

The subjects discussed were three, or rather they came under three heads, for there were in reality four points under discussion, viz.: the widening of Parliament-street; the site for the National Portrait Gallery; the Constitution-hill arch; and Westminster Hall. Of these, the *Times* characteristically says, "two are of real interest"; these of course being the questions of widening Parliament-street and of preserving an open space next to the Portrait Gallery; such subjects as the architectural treatment of Westminster Hall and of the Constitution-hill arch being, in the eyes of the *Times*, of no "real interest": an amusing example of the faithful manner in which the leading journal reflects the opinions of the average British Philistine. The advantage of widening a street is a matter that the average Englishman can appreciate; the blunder of maltreating a great building, in an architectural sense, is one to which he is entirely indifferent.

We may quite concur, however, in the positive statement that the Parliament-street question is of real interest, without admitting its supposed complementary negative; and Lord Lamington, who does good service to the country in keeping an eye on questions relating to public improvement, was oppor-

tune in calling attention to a delay in a long-promised work which appears anything but creditable. The Government, however, has placed itself in the power of a private company to some extent in this matter, putting the work into the hands of the said company, while imposing on it the restriction that 500,000*l.* Ordinary Stock must be subscribed for before they could pull down a house. Whether such an important public improvement ought to have been left in the hands of a private company is, as Lord Henniker implied, a point rather too large to be discussed as supplementary to the main question why the work had not been taken in hand; though we entirely concur in what we suspect was his unexpressed opinion, that it ought not to have been so left, and that it is a weak and sidelong manner of getting such an important public improvement carried out. As, however, the Government have by this process tied their own hands as well as those of the "private company" referred to, we have only to compose our patience to wait till the money is raised.

In the discussion as to the purchase of the plot of land immediately north of the proposed site of the National Portrait Gallery, in order to secure an open space adjoining the Gallery both for light and security, Lord Rosebery, speaking as Chairman of the London County Council, was undoubtedly in the right in his position, that the Council would not be justified in giving, for a national purpose, a site which constituted part of the municipal property for the management of which they are responsible to the ratepayers. This view of the matter is still further enforced when we consider that the Government have had the cost of building the Gallery taken off their hands by private munificence, and that, as Lord Rosebery put it, having had 100,000*l.* given them for a building which they ought to have carried out themselves, they might certainly "screw up their courage" to find 7,000*l.* for preserving the site from encroachment by other buildings. Lord Hardinge went so far as to hint that, if they refused to do this, "it was possible the anonymous donor might cry off." The unknown, we are inclined to believe, is too public-spirited a person to take such a course, but the Government will present a very shabby figure if it refuses the money, considering that, as to the importance of preserving the space intact, both on architectural and practical grounds, there can be no doubt whatever.

We now come to the portion of the debate

touching on purely architectural questions, which, if of "no real interest," is certainly amusing. Earl Wemyss, who has some ideas on things architectural, hoped in the first place that as the approaches to Constitution-hill from Hyde Park-corner were about to be altered, the Government would cause them to be so formed as to admit of the levelling of the base of the arch at the entrance to the drive, "which, since its removal to its present site, enjoyed the unique privilege among similar structures of having one side considerably shorter than the other, consequent upon its being built upon a slope." It might be possible in this way to render the position of the arch a little less absurd in regard to detail, but that can hardly disguise the fact that the arch is on the side of a declivity, that it faces nowhere and is central to nothing. These things should have been thought of before it was done; it is too late now. And are we, after such a piece of blundering, to have further modifications of laying-out, under the auspicious direction of the Office of Works, with no higher mind to oversee them? If so, there will be more blundering; to be again perceived and pointed out when it is too late.

Then Earl Wemyss proceeded to the Westminster Hall business, and his speech would certainly be a noteworthy justification to us for indulging in that rather disagreeable form of retort which is summed up in the expression, "I told you so!" Long before anything was done, we said that when it was discovered what the result of this treatment was on the interior of the Hall, there would be a storm of indignation. Is it not so? Earl Wemyss proceeded to sum up all that had been said "in another place" about it, and to point out that, with the exception of Mr. Shaw-Lefevre (the principal instigator in the transaction) and the Commissioner of Works (the responsible official), not a Member of Parliament had a word to say in defence of the result. Earl Wemyss added a graphic statement of his own feelings on the matter:—

"There was a hoarding which long concealed the whole thing from the public. When he first beheld the staircases he was flabbergasted at what he saw, and there being nobody else to whom he could express his feelings, he could not resist saying to the policeman as he went through St. Stephen's Hall, 'I don't think the Fenians could have done worse.' The policeman replied, 'I don't think they could.'"

But why did not Earl Wemyss and others, who now profess such interest and indignation, why did they not go behind the board-



ings and find out what was being done before it was too late? As members of one or the other House they would have had no difficulty in doing so. They could have had plenty of information about what the result would be, if they had looked for it where they might be sure to find it. But the fact is that though noble lords and honourable members can make indignant speeches about matters of this kind after the event, not one of them really cares enough about architecture to take the trouble to find out what is going on, and endeavour to prevent a blunder before it is too late. And how much knowledge of what architecture means Earl Wemyss really possesses is shown in his proceeding solemnly to read a letter on the subject from Lord Grimthorpe, as "a member of their Lordship's house who was a great authority on architecture, especially on Gothic architecture." How long is this farce to go on? There is no ground whatever for quoting Lord Grimthorpe as "an authority on Gothic architecture," except his own statements in his ridiculous and bragging letters in the *Times*, and his spiteful abuse and depreciation of architects for some reasons best known to himself. It is really inexplicable that not only the general public, but people of education like Earl Wemyss and others, should accept a man as an authority on so delicate a subject of intellectual perception as architecture, simply, as Iago says of Othello, "for bragging, and for telling them fantastical"—but we will leave Iago to finish the quotation. This absurdity has been going on for a whole generation now. Years ago, when the same kind of demonstration of vulgar vanity appeared in the papers with the signature of "Beckett Denison," every one who knew the facts knew that the assumption of architectural knowledge claimed by that specimen of the "polite letter-writer" was a mere farce and pretence. And here is Earl Wemyss quoting Lord Grimthorpe's contemptuous denunciation of the work at Westminster Hall, and his suggestion that about a dozen modern architects should be blown up along with the steps! We cannot defend the architects in this case. One of them has done what we call, in its general conception, a most foolish and unarchitectural piece of work, and others have upheld him in a manner for which Earl Wemyss's suggestion, that architects backed each other up from notions of *esprit de corps*, really seems to us the most charitable explanation. But who is Lord Grimthorpe, that he is to condemn them? And does Earl Wemyss know that Lord Grimthorpe himself has disfigured a great national building with "restorations" of the most barbarous character, such as an artist like Mr. Pearson would be incapable of? If Earl Wemyss does not know the facts, he had better, if he pretends to have any acquaintance with Gothic architecture, go and look at the south transept of St. Alban's, and then publish an apology to the architectural profession for publicly quoting Lord Grimthorpe's impertinence in regard to them.

Lord Henniker's defence of the Westminster Hall work was as characteristic as anything in the debate. It was to be defended because it was his official business to defend it; and the defence amounted to this, that it was all regularly done according to the plans officially passed by a Committee of the House of Commons. The only deviation was that the steps had not been carried out as far into the floor of the Hall as the plans had first shown (and for that small mercy we believe those who care about the matter are indebted to us). "Henry III. cut doorways at the head of the large flight of steps, and Mr. Pearson, without knowing of the existence of that doorway, had designed one in the very same place, and in cutting it found traces of the old doorway, which had been built up and which now answered its original purpose. Those facts showed that the repairs, or whatever they might be called, to Westminster Hall were intended as a reproduction and not as a new departure." Lord Henniker does not seem to be aware that this is precisely the *gravamen* of the complaint against the whole

business; that it is a foolish attempt at replacing what may have been there before, merely because it may have been there before, and not on any grounds of architectural suitability or practical utility. The additions were made to preserve a piece of Norman masonry in the outer wall of the Hall—the architect's admission to that effect is down in print in the blue-book of the evidence; and rooms have been built on the wrong levels; rooms which every one now sees are inconvenient in shape and plan, and nearly useless, as we foretold from the first they would be; and for which it has been necessary to project unsightly staircases into the Hall to get to rooms for which no one can find any use when they have got there; and all this under the plea of "restoration"—a restoration, in nearly all its details, purely conjectural.

As to Earl Wemyss's suggested panacea, of a special Standing Committee of advice of both Houses to consider such questions; in spite of Lord Rosebery's cruel sarcasm about the House of Commons consisting of "the 670 most intelligent men in the country," we can only remember, as Lord Rosebery said, that the actual procedure in regard to Westminster Hall was settled by just such a Committee as that would be; and we see the result. Earl Wemyss's remark as to the purely political nature of the appointment of First Commissioner of Works is quite to the point. He only remembered one First Commissioner for fifty years whom any one in private life would think of consulting if he intended to build a house. Our often-repeated suggestion has been that there should be a permanent Minister of Public Works, independent of political party, who should be appointed for his special knowledge of architecture and capacity for dealing with public architectural work. Beyond this, however, two other conditions are necessary, before we can hope to see our State architecture what it ought to be. One is, that the public should be better educated in the subject, and learn to find a "real interest" in it. The other is that architects should take a wider view of their profession and its meaning, and regard it as something more than the correct reproduction of the architecture of the past. There is evidence of a progress in this direction, but it is not very wide-spread as yet. That is the meaning of the Westminster Hall blunder. Mr. Pearson's reading of the old remains and their testimony was most ingenious; his restored details (always excepting the "fearful creatures") are as correct and refined as any one could make them. But that sort of thing is not what architecture is for; and the result is merely a foolish, costly, and inconvenient archaeological plaything.

#### CONCRETE FLOORS.

BY FRANK CAWS, ARCHITECT.

**T**HE strength of Portland cement varies greatly. All other things being equal, the finest-ground and heaviest is the best. The strength varies, not only from quality of material, but also, and very greatly, from age when used. The older the better, provided the old has been kept in a dry atmosphere. New cement is too hot and strong for immediate use. It sets more rapidly, and expands more, than old cement, and the result is an irregular and less reliable one. The maximum strength of a briquette of old cement is maintained, while that of a briquette of new cement is found to "go back," as the manufacturers phrase it.

Not only do the quality, fineness, and age of cement when used affect its ultimate strength, but also the mode of use largely governs the result. Thus, for example, the less the water used (all other things being equal), the stronger the product. And, again, if the briquette be made under heavy pressure, it proves much stronger than if made with minimum pressure.

The time in which the setting is accomplished, and in which the maximum strength is attained, varies greatly. The best cements mature most slowly. Large masses set more

slowly than small masses. Masses whose surface area is large in proportion to their volume set in air more rapidly than masses whose surface area is small in proportion to volume. Masses under pressure set more rapidly than masses not under pressure. Thus, the brick beds and joints of a piece of underpinning, built in cement, set as fast as built, and expand so as to neutralise the effect of pressure from the superimposed weight; but thick masses of concrete in floors and walls take a much longer time to set. For underpinning work, where quick-setting is needed, new cement answers quite as well, if not better, than old; but for floors the case is different.

Architects can easily specify old cement for their concrete floors, but they cannot easily get it. Generally the demand for cement is so heavy that manufacturers do not keep much old in store, except for purposes of seasoning the new.

The best way to obtain really old cement is to make a special compact with a first-class manufacturer, that his cement shall be specified, on the sole condition of his putting by a separate heap for the exclusive use of this particular contract. If the quantity of cement required be considerable,—say 60 to 100 tons,—it is worth the manufacturer's while to make such an arrangement; and, provided he has a three months' full notice, he can generally honourably fulfil his promise. Having thus done his best to secure for his client the best cement in the market, the architect will now be well advised to make his calculations for strength on the assumption that he is getting, if not the worst cement obtainable, still a quality barely up to the average.

A briquette of matured strength and fairly good cement will stand a tensile stress up to 500 lb. per inch. Briquettes of one month old will break at a tension ranging from about 250 lb. up to about 450 lb. per inch, according to quality of cement, quantity of water, and mode of mixture, &c.; also, according to the mean temperature during the month of setting. Briquettes matured more rapidly than thick floor slabs. Many contractors for concrete floors carelessly remove the centring within one week, two weeks, and three weeks of setting. And, as a result, the floors are often permanently injured or weakened, visibly or invisibly, though seldom are they ruined and destroyed by it; for it takes more than common measure of folly to squander all the huge hoard of strength of a concrete slab.

In calculating strengths, the architect should reckon only on an ultimate tenacity of neat cement of 250 lbs. per square inch, though in all probability his best cement after twelve months old would, if mixed under best conditions, realise an ultimate tenacity of something like 1,000 lbs. per inch. And in no case should the centres be removed in less than five weeks; and if they can be maintained much longer so much the better, for special reasons which will hereinafter appear.

When brickwork, which has been built in fairly good Portland cement, is pulled down, builders find it impossible to clean the bricks for re-use. The cement cleaves so fast that it cannot be separated from the brick. This fact shows why in estimating the strength of concrete composed of cement and broken brick aggregate, the quality of the aggregate is so great a consideration. There is a marvellous difference between the tensile strength of good hard well-burnt bricks; and of soft ordinary stocks. No bricks, however, are so strong as cement. The best obtainable broken brick suitable for concrete aggregate probably possesses about one-fourth the strength of best cement; or from one-fourth to one-third, both tensionally and compressively. And for practical calculations it will be wise to treat the aggregate as possessing only one-fifth the strength of neat cement. When the aggregate and cement are combined, as in concrete, the strength of the concrete will depend, to a considerable degree, on the proportion of the two ingredients.

For concrete floors, the cement should be not less than one of cement to four of aggregate.



gate. The concrete in this case will possess a strength of about two-fifths of neat cement; but, for practical calculations, it is safer to consider the concrete of this proportion of admixture equal to quarter strength of cement.

Just as in iron beams the greatest stress occurs in the flanges, and the webs are in comparatively little stress; so in concrete floors the material nearest the surface is in greatest stress, the top surface being in compression, and the bottom in tension. Thus, if concrete floors were cast in hollow homogeneous slabs, the vertical divisions connecting the top and bottom layers would have comparatively little stress to bear. Hollow floors of this sort cannot well be formed at small cost. But the same allowance for disposition of stress can be made in another way—viz., by first laying a thickness next the centreing; then, before that is fairly set, following upon it with an intermediate thickness; and, finally, finishing with a top thickness. Just as the flanges of a well-proportioned girder are very thin in comparison with the girder's total depth; so the first and last layers of concrete may be very thin in proportion to the total thickness of the slab. And what the narrowness of the web is to the girder, that the smallness of proportion of cement to aggregate in the central layer will be to the slab.

Instead, then, of mixing the whole thickness of slab one of cement to four of aggregate, a much stronger result will be obtained by making the bottom layer and top layer each about one-sixth the total thickness, and composed of one and a quarter of cement to two of fine crushed brick; and making the central four-sixths of concrete thickness, composed of one of cement to six of ordinary broken brick aggregate. In this case the cement still forms one-fifth of the dry bulk of cement and aggregate; but the cement, as will be understood, is disposed to better advantage. The bottom and middle layer should always be done in one day, and the top layer should be done on the following morning, or as soon after as to secure perfect homogeneity.

In ordinary cases, no such disposition of the cement in flanges, so to speak, is intentionally performed. But, fortunately for the strength of floor-slabs, where no fine bottom layer is separately and purposely laid as above recommended, the cement is deposited by gravity in much greater quantity next the ceiling level than at higher levels of the thickness; so forming, as it were, its own natural flange. Indeed, so remarkable is this sediment of the cement to the bottom of the slab thickness, that the most perfect impression of the board-centring is always obtained on the under surface; even the grain of the wood being so minutely reproduced as to deceive the eye into thinking the ceiling is really composed of boards, when the board-centring has been entirely removed.

The joints of the wood centreing act as a sieve, and allow superfluous water to drip through. This is not desirable, because it not only drains away the cement with the water, but also introduces streams of motion in the concrete during the time of its setting, when it ought to be perfectly undisturbed.

An excellent method has lately been adopted for preventing this dripping and disturbance, and, at the same time, for securing a perfectly finished, smooth, fair ceiling of solid concrete, instead of the usual plaster skimming coat, which is liable to fall off, because the cement is so dense it affords very little key or suction.

The improved method is as follows:—Before the concrete is cast, the centreing is coated with a thin skin of plaster of Paris floated up perfectly level and fair. Upon this plaster surface a grout of pure cement and water is thinly spread, and upon this grout the concrete proper is cast, and beaten down in the usual manner. The skin of plaster of Paris is perfectly water-tight. Not a drop passes through it, and thus the concrete sets more slowly, and to better purpose; and when the centreing is eventually removed, the plaster comes away with it, and leaves the concrete solid ceiling smooth and fair, without a blemish or defect to mar its continuity of surface.

It is of the utmost importance to set the uprights which sustain the weight of centreing upon very sharp wedges of soft wood. The softness of the wood of these wedges admits of an infinitesimal deflection or yielding under weight, which is a useful relief to excessive stress; and, by slowly relieving the supports by means of the gradual loosening of these sharp wedges, the builder avoids that sudden jar of stress which tends, when centres are too suddenly removed, to damage the slab floor much more severely than years of heavy wear and tear. It is impossible to over-estimate the importance of this matter, for it is absolutely certain that, when the weight of the floors is transferred from the centreing to the haunches, or edges, or skewback abutments, of the floors, an infinitesimal, but none the less real, deflection of the centre of every slab must occur, and the almost utterly inflexible nature of the cement concrete slab renders it absolutely imperative that this transference and its unavoidable set or sag shall be accomplished with the utmost practicable slowness and avoidance of momentum.

The damage done to a slab by neglect of this precaution in removing centres is seldom, if ever, detected immediately. But the weakness is immediately produced by the jar of the sudden sag. And the evidence of this weakness is afterwards developed by the resistless force of expansion, which will surely find out the weak spots.

It is necessary now to show how this expansion comes about, and in what manner it acts upon the slab. And to show this, a very homely illustration will best serve, viz., the phenomena attending the baking of what is called a "tin loaf" of bread. The dough with which the tin mould is filled expands with the heat of the oven. Being confined at bottom and sides by the mould, the dough expands upwards in spite of its own weight, because the force of expansion is greater than the dead-weight of the dough. Being most free from contact and restraint at the centre of its upper surface, it there rises highest, and so forms a dome-like roof to the loaf. The expansion in this way so distends the upper skin of dough as to exceed its ultimate tenacity,—so the loaf cracks and opens at the crown to admit of the full degree of expansion due to the temperature to which the material is subjected. The tin mould so represses expansion that cracks in the sole of the loaf are very tiny or wholly absent.

If, before the loaf is half baked, but when it is set stiffly enough to sustain without visibly bending its own weight, if then it be turned out of its mould and supported (top side up as before) in the oven by a frame firmly gripping its four sides but leaving its top and bottom free to expand, any further expansion which it undergoes will cause a deflection and cracking of the bottom skin rather than of the top skin; because, in this case, the force of the expansion and of the dead-weight of the loaf act in the same resulting direction, viz., downwards.

The case is even so with the cement slab. The expansion which takes place, while the centre sustains the dead weight, results upwards in spite of the dead weight. But in many cases, especially with thick floors, this expansion is known to continue perceptibly for many months; and when the centreing is removed, at one week's or two weeks' or three weeks' limit, after casting, though the concrete is much more than able to sustain its own weight, like the half-baked loaf, its expansion is incomplete; and the remains of that irresistible force, acting downwards, aided by the deadweight of the material and the leverage due to its span, distends the skin of ceiling beyond its ultimate tenacity, and causes cracks, which, though they are mere skin cracks, present a very unpleasant appearance, especially to the uninitiated, who naturally, though mistakenly, refuse to believe, till convinced by actual experience, that such cracks in the ceiling of a concrete floor detract little, if any, more from its enormous strength than the crack of a lath-and-plaster

ceiling detracts from the strength of timber-joisted floor above it.

In order, then, to avoid such expansion-cracks, and the want of confidence in strength of floor which those cracks mistakenly but naturally engender, the wisdom of maintaining the centre in position for at least five weeks (and as much longer as practicable) after casting concrete, is sufficiently obvious.

In addition to the maintenance of centreing, a further and most useful, though very inexpensive, precaution against expansion-cracks in concrete floors is the use of short iron cramps, embedded in the ceiling layer of concrete, at the middle of span, where the tension is sure to be most severe. These cramps, by resisting the stretch essential to deflection, compel the expansion, which cannot be repressed, to vent itself upwards, just as it would do if the centreing, instead of the iron cramps, were bearing the stress of the dead weight.

Inasmuch as the compressive strength of cement concrete is about eight times its tensional strength, it will be seen that the sectional area employed in tension must be about eight times as much as that engaged in compression, in order for the tensional and compressional forces to be about equal to each other. Thus, the great importance of the top layer, as the compressional member, so to speak, of the slab is evident. This consideration, together with the necessity for finishing the floor to stand the friction of traffic, shows the wisdom of putting a specially fine and strong finishing coat, when as yet the main body of concrete is only a few hours set.

It is also important that while this finishing coat is green it should be jealously protected from the wear of traffic, as workmen's rough shoes, &c., have often in this way damaged a floor-skin before it set, and such damage is generally irreparable. The use of fine sand in the finishing coat should not be allowed. It disintegrates and spoils the surface texture.

The expansion of cement concrete during setting is effected by a practically irresistible force, to which the slab at once owes both its strength and its weakness.

If a long cylinder,—say, for example, a metal hollow column,—were well filled with cement concrete, the diameter of that concrete core would increase by expansion, in spite of the resistance of the column, but not to so great an extent as if unrestrained. The resistance of the column to expansion does not, and cannot, reduce real, i.e., molecular, expansion, but it compels the expansion to result in compression, which increases the density and strength of the mass. The metal column may, or may not, be cracked in the process; but, either way, the density and strength of its cement core is increased in direct ratio to the bursting pressure which has been exerted on the column. Thus, expansion contributes to strength of concrete in some ratio to the strength, or inflexibility, or inextensibility, or rigidity of the mould into which it is cast. If the column, or cylinder, were much thinner, and more yielding at the middle than at the ends, the resistance to increase of core diameter by expansion would be less at the middle than at the ends, and, as a consequence, the core diameter would actually swell more at middle than at ends; and the strength of the middle, per unit of sectional area, would be less than at the ends, by reason of the less compression and density. Thus, a very yielding part of any mould, by reducing the compression due to expansion, induces comparative weakness at that part.

Thus, in the case of concrete floors, when the centreing has been removed, and the weight and leverage of the floor and its load are left to act in the same resulting direction with the thrust of such expansion as is still going on in the immature mass, the skin is consequently broken, and cracks appear just at those parts where the centreing was most yielding. For example, if it be the case of a wide, long corridor floor, where no cross girders have been used, but where the concrete has been put down in one continuous slab, a crack will frequently appear, running



from end to end of the corridor, right along the middle of the floor soffit, because the centres have not been well propped in the middle. In such cases the crack will run right to the end walls, if the floor or its centreing, instead of *resting on*, has been simply *butted against* the end walls. But, if the floor and centreing have been properly supported on the end walls, the crack will terminate at each end of the corridor floor soffit, at about half the width of the corridor short of the end walls, *i.e.*, at mitre-line intersections.

It is not always practicable, without great expense, to provide centreing equally inflexible in every part. Indeed, it will generally happen that the centreing of a slab will be weakest in the middle. By carefully considering the most flexible points of the centreing, and the points of greatest bending moment to which the floor itself will ultimately be subject, the architect can place iron cramps, by anticipation, across the site of probable cracks, and imbedding these cramps in the substance of the floor, near the soffit skin, can so prevent the cracks occurring. In square slabs these cramps should generally be placed across the mitre lines, and in rectangular slabs they should be placed mostly across the crown, and also across mitre lines thus:—



It is desirable to keep such irons as near the ceiling level as practicable; because if placed higher up in the concrete thickness they are nearer the axis of neutral stress, and are correspondingly less effective.

Evidently, when centreing is equally inflexible at all points, repressed expansion, in the case of floor slabs, will be at all points in ratio to the weight of the floor; and the density will be, therefore, approximately equal throughout. And this, of course, is practically, or very nearly, the case in general practice.

But when the centreing is removed before the expansion has ceased (as unfortunately generally happens) then the after-expansion works differently from the former expansion, for, instead of inducing equal compression and density at all points, it induces greater compression and density of margins than of centre of slabs; so (apart from the question of centreing-flexibility), accentuating and contributing to the weakness of the centre of the slab.

Sometimes a yielding of centreing occurs through the subsidence of some individual column foundation, or through the insufficiency or entire absence of some temporary prop or shore. Whatever may be the cause of the depression, the middle of the depression is the centre of weakness, to which cracks radiate; as they do to the hole in a plate-glass window through which, or against which, a stone has been thrown.

This brings us to remark that the likeness between the conditions of stress and behaviour of window panes and of floor slabs is very close and instructive; and will repay investigation in some degree of detail.

It may be well at this stage to remark that well-holes, and other holes through floor slabs, should be of circular shape, or, at least, should have no square or sharp angles, because square and sharp angles are weak angles in cement concrete, as in cast-iron. But when openings with square angles are formed (as they unavoidably must often be), then they can be strengthened by embedding short iron cramps of quadrilateral shape at the corners of openings. Also, it must be remembered that if the hole be cut out of the corner of the square or rectangular slab, great loss of strength results; but not if the hole be cut out of middle of slab.

Expansion-cracks often occur in concrete pavements laid upon *terra firma*; and the shapes and directions of these cracks always, more or less plainly, demonstrate the truth already expressed, that expansion-cracks mark the lines of least resistance. If the edges of

such pavement be confined between strong walls, or immovable abutments of any kind, the line of least resistance is midway between the abutments. Hence, in the case of a rectangle of say 10 ft. or 12 ft. wide, and of indefinitely extended length (as, for example, a passage pavement or street) if expansion appear anywhere, it will be found generally expressed in one long medial line of crack. Again, if in a courtyard of say 12 ft. or 15 ft. square or diameter, the edge of the pavement be next immovable walls, and if the pavement be laid with very hot cement, the central point of the pavement will be the point of least resistance; and cracks will radiate therefrom, having their fissures wider as they approach the point of convergence; and none of these fissures will extend quite up to the walls. If such a court were walled on three sides only, the point of common convergence of cracks would be found not in the middle of the slab, but nearer the unclosed edge. If all the edges were unclosed, and if the expansion were absolutely free to extend the mass horizontally in all directions, then no cracks would be seen so long as the measure of expansion did not exceed the measure of tenacity. But this is an impracticable freedom in the case of concrete pavements; the inertia and friction of the mass of the material, where no other resistance offers, alone suffice to repress expansion's horizontal movement, and compel it to issue vertically in the centre. In such cases, however, the edges do move horizontally further from the centre, and their expansion is horizontal, while the centre does not move horizontally, and its expansion is vertical; and, between these extremes of centre and edges, the intervening area of pavement expands both vertically and horizontally, the vertical element predominating towards the centre, and the horizontal element predominating towards the edges. For, as will be seen, the inertial and frictional resistance to horizontal movement of mass is at zero at the edges; and the inertial and frictional resistance to vertical movement of mass is at zero at the centre. Practically the horizontal expansion, though real, is infinitesimal, resulting in compression rather than in visible displacement of mass, while the vertical expansion is more pronounced. And thus it comes about that pavement laid with hot cement in large slabs on solid ground, will crack by expansion even when the edges are comparatively unconfined. And in fact, free expansion does exceed the tenacity of skin when the skin area is small in comparison with the volume of mass; and so it is only by repressing expansion we prevent skin cracks, and at the same time, by means of the force of compressed expansion, compress and consolidate the concrete. Thus, it is a fact, however paradoxical, that expansion compresses and strengthens the material by virtue of the resistance it encounters. The resistance is greatest round the edges, and least at the centre, and the concrete is consequently stronger, and more consolidated to a slight extent, round the edges than at the centre of slab—a fortunate fact, for the edges of slabs of self-sustained floors need more strength than their centres.

Here, again, the loaf of bread admirably illustrates the same truth, for whether it be a "tin loaf" or a loaf baked without any mould, the edges of the sole are invariably the hardest and strongest crust, because at these edges the forces of expansion have met their toughest fight with resistance. Of course, irregularity of structure, due to the imperfectness of dough, may cause an occasional expansion crack even round the edges of the loaf sole. But such cracks are extremely exceptional. Similarly, a section of extra hot cement will blow and cause a crack anywhere. But such irregularities are to be obviated by well mixing before setting the material; and it is of the utmost importance to thoroughly mix the dry cement and aggregate before applying moisture.

The expansion of concrete floors must not be understood to imply or involve simply an increase of bulk; for while the interior of the slab's volume is still expanding, the exposed exterior surface has not only reached the limit

of its expansion, but has actually, in most cases, begun to contract. And this contraction of the upper, or exposed, surface co-operates with the swelling of the heart of the slab, to produce not only cracks across the slab, but also a shrinkage round the skirting, or edges, of the slab, which in some cases is very noticeable, though of no practical consequence, generally speaking.

F. C.

(To be continued.)

## NOTES.



**EFFECTIVE** house-drainage often produces illness of which nobody knows but the persons concerned.

On the 10th inst. John Albert Butler, twenty-seven years of age, died after a month's illness, at Coventry, of what the Medical Officer of Health said was blood-poisoning, the symptoms of which and those of typhoid fever were, he said, much alike, and that the illness in this case was caused by the condition of the drainage of the house in which the man had resided. Other persons in the same house were ill for a long time. At the coroner's inquest, on the 18th instant, the jury did not attribute crime to any one, but it may be well for those employed in laying house-drains to beware of the very small practical distinction between crime and carelessness when death is the consequence of either act, and that in any similar case a jury may give a different verdict. A plot of land was laid out for building upon through which a main drain was laid by the owner of the estate, having a proper junction with a public sewer. It was at first thought the fault was that this main drain had an insufficient fall, but the City Surveyor proved that that was not so,—that it had an inclination of 1 in 68, which was amply sufficient. From this main drain several house-drains were laid, as and when required, but the junctions for all were inserted in the main drain as the work proceeded, and into each of those junctions from which the house-drain was not immediately laid a plug—a piece of tile or slate—was inserted to keep back the earth until the time came for laying the house-drain. The labourer who was employed by the builder said that when he laid the main drain he plugged the junction of the house-drain with a piece of stone cut round to fill the socket of the pipe. One of the sewer men employed by the City Surveyor said he bared the drain of the house in question, near its junction with the main drain, and found a piece of tile fixed upright in the socket of the junction. The drain was blocked by this obstruction and was full of sewage, the house having been occupied since November last. He also found a piece of a 6-in. drain-pipe, 7 in. by 5 in. The man who laid the drain could not account for this being found. When he left the work from time to time he left it guarded by some loose bricks placed at the end of the pipe while he was away. All this is private work, the main drain included. The evidence was to the effect that "the builder's man made the connection of the house-drain with the main drain," and that "it was possible for a builder to make a junction without removing the plug." The Corporation had not, at the time of the inquest, taken over this main drain as a public sewer. The junction with a sewer had been properly made, and some general directions appear to have been given that all junctions should be inspected when being made, but further than that the Sanitary Authority probably could not go, after ascertaining that the inclination of the proposed main drain would be sufficient, and that its size and its adjuncts of manholes and lamp-holes were suitable to its situation in number and general form of construction. In such case, the main drain belongs to the owner of the estate, until he transfers the control to the town authority.

**T**HERE should be no such thing as a main drain laid by the owner of an estate within a town for the purpose of dis-



posing of the land in building plots, and afterwards transferred to the town authority as a sewer. It should either remain a private drain or be laid at once by the town authority, such disposition of the property being made as to enable that to be legally done. It cannot long remain a private drain, for as the land becomes occupied by buildings, the ownership of portions of it becomes changed, within the curtilages of the houses, while that outside is disowned by all, as long as possible; but eventually it becomes public ground, and the main drain becomes a sewer. But the circumstances under which it has been made, and house-drains connected with it, often make it unworthy to be adopted as a public sewer. It may be said there is nothing to prevent a town authority laying such a main drain as a sewer at once; the owner would probably consent; but it may be observed that it is in the first instance for the benefit of the estate only, and economists (short-sighted though the economy be in such cases) who sit at meetings of the town authority jealously guard the public purse and prevent anything being done which might benefit any particular person. They act wisely in one sense, but in one only. They should take means to make it legal and binding on the public authority to construct all main drains as sewers wherever required. It is not difficult to ascertain whether any such proposed main drain would be a public advantage, and, if not, they can prevent its being constructed by refusing to allow its junction with a public sewer; but, if it would be so, it should be made at once by the town authority. The outlay, if not immediately compensated by the rapid occupation of the ground by buildings, must in general be so within no long time; but, whether the time be long or short, the health of a town demands that something should be done to prevent the recurrence of such cases as this we have referred to.

**MR. DE RUTZEN** is a magistrate who appears to hold some decisive and very salutary views as to what may be called the sanitary responsibility of landlords. Last week the owner and occupier of No. 6, Salutation-alley, Woolwich, were summoned before him for overcrowding. The Sanitary Inspector gave evidence to the effect that Bryan (the occupier) and his wife, their married daughter and her two children, lived and slept in one room 12 ft. by 10 ft. and 8 ft. high, giving a cubic capacity of 960 ft., while the law required 1,600 ft. (the two children counting as one adult). After some further information had been elicited as to the way in which the rooms were let, the magistrate said that in such cases the persons really to blame were the landlords, "who screw every penny from the poor tenants and let them live like dogs"; and he fined the landlord 3*l.* and withdrew the summons against the occupier. We put on record this decision as one which we hope to see made a precedent.

**ONE** of the most important, or at least one of the most-needed requirements in Sir Michael Hicks-Beach's proposed Bill for the regulation of railways is that which empowers the Board of Trade to order a railway company to provide a subway or bridge at any station or at any level crossing on a public carriage road. We call this one of the most important provisions, because it is one of those which railway companies show a disposition to neglect, even where they do their duty very well to the public in other respects. The requirements to use interlocking points and signals, a block system, and continuous brakes, are really putting in the form of a legal demand precautions of which railway companies themselves first set the example; but the provision of safe crossings is still neglected at many points, and as it is one of the things which do not immediately concern the safety of a railway company's actual customers, but that of occasional outsiders, it is the more desirable that it should be made a matter of legal compulsion.

**IT** is clear that the Parliamentary measure known as the Post Office Sites Bill, by which the site of Coldbath Fields Prison is to be covered with buildings connected with the Post Office Department, will have a rough Parliamentary journey. Last week it was talked out for the time, and the further consideration of the measure had to be adjourned for a future occasion. It is evident that the use of the site of this old prison is a good bargain for the public, but it takes up an open space, or, rather, what it is generally considered should be used as an open space, or for artisans' dwellings. It appears to us that some middle way might be found to enable this important site to be utilised for public buildings and also to afford breathing space for the people of Clerkenwell. A space such as that occupied by the gardens on the Thames Embankment might be thus laid out with walks and flower-beds. We do not refer to the actual size of the open space, but to its character as a surrounding or addition to buildings.

**THE** projected establishment of a new suffragan diocese to include Southwark receives fresh stimulus from a letter which the Bishop of Rochester has addressed to Mr. J. F. Field, warden of the Great Account of St. Saviour Parish, Southwark. He expresses his intention to help, to his utmost, a movement for restoring the Church, and for making it worthy to serve as a cathedral for South London. We gather that Sir Arthur W. Blomfield, A.R.A., has reported upon the untoward state of the transepts, choir, lady-chapel, crossing, and tower; and that efforts will be made to raise funds sufficient for re-building the modern nave (1838-9), which is at present closed, in a style more congruous with the old and beautiful portions of the fabric. On September 25, 1886, we printed an account, with several illustrations, of the church and its principal monuments. It will be enough just now to say that a granite tablet fixed against the western wall of the Lady-chapel close by Bishop Andrewes's tomb, bears this inscription:—

M [coat of arms] S.  
George Gwilt F.S.A. &c.  
an eminent architect & a scientific man  
born 8 Feby 1775 died 27 June 1856  
lies buried in the south side  
of St. Saviour's Ladye Chapel  
the complete restoration of which  
he gratuitously superintended  
His daughter Hannah Jackson placed this tablet  
as a tribute of much affection  
mors janua vitæ

The illustrated work of Mr. Francis T. Dollman, architect, entitled "The Priorie of St. Mary Overie, Southwark," was printed in 1881.

**IN** reviewing, on Nov. 3 last, Messrs. Rendle and Norman's illustrated work upon the inns of Old Southwark, we briefly cited the White Hart as having even a more stirring history than that of its neighbour, the Tabard.

Within a few days all the remaining portions of that former hostelry, which, under this sign, at all events, dates from the beginning of the fifteenth century, will have disappeared, with the making of a new road, paved with wood, through the premises. Together with the Tabard (rebuilt), Spur, King's Head, George, and Queen's Head, in the Borough, it is named in the list given by Stow. Of these the Spur Inn-yard (No. 129) is quite modernised; the George (No. 77), mentioned as the St. George as long ago as 35 Henry VIII., retains part of its southern galleried front; the King's Head (No. 45), distinguished by its latticed-worked balustrades, finally succumbed four or five years since; and the Queen's Head (No. 105) has been identified as successor to the Crowned, or Cross, Keys, that is to say, the Keys of St. Peter, being one of the twenty inns in this quarter which are marked on the earliest authentic map of Southwark, circa 1545. John Taylor's "Carriers' Cosmographie" singles out the White Hart for the extent of its business; and Hutton avers "this is the largest sign about London, except the Castle Tavern in

Fleet-street." In 1450 it formed the headquarters of Jack Cade and his men. Of Cade's sojourn therein many particulars are to be read in one of the Paston Letters, in the Grey Friars' Chronicle, and in Holinshed. Hall chronicles that "the captain being advertised of the King's absence [at Killingworth Castle, Warwickshire], came first into Southwark and there lodged at the White Hart." Shakespeare, too, makes Cade to exclaim:—"Hath my sword, therefore, broke through London Gates, that you should leave me at the White Hart in Southwark?"\* Nevertheless it is to be remembered that this, together with others of the Borough inns, was destroyed in the fire which in 1676 occasioned the destruction, either by burning or by demolition to stay the flames, of some 500 houses,—and, indeed, it had suffered much from a previous conflagration. The White Hart, King's Head, and George were rebuilt, and, in a measure, after their pristine fashion. Very few relics of that mode are now extant in London; the best preserved, perhaps, is the courtyard of the Old Bell, Holborn.

**THE** sale at auction of the Jourdans and Church farm estates in the parishes of, respectively, Chalfont St. Giles and Chalfont St. Peter, Bucks, demands a brief notice, for the former property encloses a burial-ground attached to the Quakers' "Meeting." Here, on August 5, 1718, was buried William Penn, who had passed the closing years of his life at Ruscombe, in Berkshire. There, too, had been interred his first wife, Gulielma Springett, and their elder son. The Quakers of this part held their meetings at Grove, in Chalfont St. Giles, previously to their acquisition of Jourdans. The author of "No Cross, No Crown,"—written in the Tower shortly after he had espoused the cause and precepts of his old Oxford friend, Thomas Loeb—owned Stoke Park in this neighbourhood, having bought it from Anne, Viscountess Cobham, who inherited it from Sir Edward Coke. There stood the manor house commemorated in the "Long Story" of Gray. In 1799, John (grandson to William) Penn erected a sarcophagus in the park to the poet's memory. He rebuilt the house just 100 years ago, after James Wyatt's designs, which included two fronts in the Doric order. Richmond and Repton laid out the lake and grounds. Stoke Park subsequently passed to the Labouchere family; at the late Henry, Lord Taunton's death (1869), it was bought by Mr. E. J. Coleman. Lord Taunton is said to have sent to the Great Western Railway an additional cheque, finding that his property had improved after the incursion of the railway, for which his father, Mr. Peter Labouchere, had received compensation when the line was first laid. In 1886 the park was converted into a racecourse, and the house refitted to serve for purposes of a sporting club.

**IN** the last issue (vol. iii., Heft 4) of the Roman section of the "Mittheilungen" of the German Archaeological Institute, there is an admirable paper by Dr. Studniczka on the study of archaic statues in general, and the well-known Artemis of Pompeii in particular. Dr. Studniczka rightly observes that the term archaic covers a very wide field, and encourages a generalization that is destructive to really close and distinctive criticism. In the term archaic are included (1) works of affected archaism, probably intended at the time of their making to pass for original works of the period they imitated: these are comparatively worthless; (2) works such as those that proceeded from the school of Pasiteles, which takes its inspiration from, but by no means slavishly copies, works of the Transitional period: these have their own charm, apart from the manner they reflect; (3) honest intentional copies of temple and other statues of note, which are as faithful as the skill of the copyist and the material

\* Second Part of "King Henry VI.," Act iv., scene 8.



he uses will allow: this class is of great importance, as it enables us to recover ancient types otherwise irrevocably lost. The search for these types is but just begun; the material is at hand in every Greco-Roman museum. Such a statue, Dr. Studniczka holds, is the Pompeii Artemis,—perhaps the best-known and most admired of all archaic statues, both on account of the traces of brilliant colouring it still retains, and for a singular grace and charm in the pose of the goddess. We cannot follow here the course of Dr. Studniczka's complete and ingenious argument. The result he arrives at,—chiefly from an examination of coins,—is that the statue is a careful copy, executed about the time of Augustus, of a famous image made by two Naupactian artists,—Mensichmos and Soidas,—of Artemis Laphria; an image which had been transplanted from its original home by Augustus and set up at Paks, and there worshipped with due honours down to the time of Pausanias.

DR. PAGE'S report to the Local Government Board on a prevalence of enteric fever at Mytholmroyd, in the West Riding of Yorkshire, attributes the insensate state of the neighbourhood indirectly to divided sanitary authority and consequent want of systematic inspection and treatment. Dr. Page obtained evidence of unwholesome conditions of water-supply, drainage, and excrement disposal, "such as enteric fever when endemic in a place is habitually associated with." Among other things he reports:—

"In Sowerby division, five houses have been attacked by enteric fever during the past two years, out of twenty-two dwellings situated in the 'square' and draining into a stone highway sewer. It was informed that stone drains (since replaced by pipe drains) communicating with this sewer passed under the floors of three of the invaded households. In a dwelling-house situated near Calder Bridge, in another part of this division, wherein two cases of enteric fever had occurred in October and December of last year, the privy was placed in the corner of an outbuilding communicating with the house and projecting over the Cragg Brook. The water-supply of the household was obtained from a pump-well sunk upon the banks of the stream.

"In Todmorden division, three houses out of twenty-three forming an isolated row, known as Club Houses, have been attacked with enteric fever, the source of water supply, which had been condemned by the Medical Officer of Health, Dr. Lawson, being an open streamlet unprotected from pollution by cultivated fields and drainage. In connexion with these examples of fever prevalence in relation to various forms of excremental nuisance, the evidence implicating the River Calder as a source of infection may be considered here. There can be no question that this stream is highly polluted with sewage and excremental matters, and in its course through Mytholmroyd, is aptly described as little better than an open sewer."

The report also mentions cases of dwellings where "pail-closets provided with wooden boxes as receptacles for excrement were practically under the same roof as the dwelling, and unavoidably, from their position, ventilating into it." The village is at the meeting-point of four sanitary districts,—viz., Todmorden Rural, and Hebden Bridge, Sowerby, and Midgley Urban Sanitary Districts. The report says:—

"It would be difficult to explain, even by the aid of a map, the precise boundaries of each portion of the village which is comprised within the jurisdiction of these four sanitary authorities. By way of illustration of their intricacy, however, I may mention that on the occasion of my interview with the Chairman, Clerk, and sanitary officers of the Sowerby Urban District, none present could at the moment inform me whether certain named localities were in that or the adjoining Todmorden quarter of the village."

Not a few of these sanitary reports to the Local Government Board dwell on the difficulties thrown in the way of sanitary inspection and reform, even where individual sanitary officials are desirous to discharge their duties conscientiously, by the friction resulting from defective organisation. As Dr. Page observes, "A community without proper sewerage, largely dependent for water upon supplies that are polluted, and for the most part left to shift for itself in the matter

of cleansing of privies and ashpits, is unquestionably in a very rudimentary sanitary condition. Such is the case of Mytholmroyd."

JUDGING from what we read of the speeches at the "Workers' Congress" at Paris, it seems hopeless to expect that the agitators for what is supposed to be the benefit of the working classes will ever learn to look at both sides of a question. In the report of the proceedings given by the *Times* Paris correspondent, it is stated that "Mr. Hobart related the successful attempt to create a union among the gas-workers in London, the number of unionists having increased from 80 to 5,000 in fourteen weeks. They had secured an increase of wages and a reduction of hours. This done, they were now menaced by improvements in machinery which would destroy these advantages." Imagine a leader of working men, as we presume this speaker claims to be, with all the history of the introduction of machinery and its results in evidence, still solemnly repeating the old worn-out scare about labour being "menaced by improvements in machinery"! Such teaching is worthy of the people who think they will all be better off by shortening their hours of labour; in other words, that the less work is done, the richer the world will become.

## ARCHITECTURAL COMPETITION IN SWEDEN.

### I.—RULES OF COMPETITION.

In view of the unsatisfactory way in which architectural competitions have been conducted in Sweden, fifty-one of the leading Swedish architects have agreed to adhere to the following rules and conditions for such competitions, which will, no doubt, prove of interest to their British confrères. It may be added that the conditions are signed by Professor Iseus, architect to the Swedish Government; Herr Helgo Zetterval, chief architect to the Corporation of the City of Stockholm; Professor H. T. Holmgren, architect of the new Upsala University; Herr E. V. Langlet, who has the restoration of the ancient Cathedral of Upsala in hand, &c. In addition, they have been subscribed to by the Associates of the Society of Building of Stockholm.

#### Section I.

Competitions may be of three kinds,—viz. (1) general competitions, which are publicly announced, and in which any one may participate; (2) limited competitions, to which a certain number of architects are invited by written invitation; (3) double competitions, consisting of a prior general competition, followed by a limited one among those who have gained prizes in the former.

#### Section II.

For all such three competitions the following uniform regulations have been adopted respecting the programme of conditions which is to constitute the basis for the competing designs:—

1. The programme shall be framed by or at all events,—before competition is invited,—be examined and approved by the jury.
2. The programme should in all its stipulations be as clear and brief as possible.
3. The programme shall distinctly distinguish between absolutely binding conditions, from which no departures must be made, on one side, and conditions which are only put forth in the way of information or desire on the other.
4. Should the programme contain any statement as to cost, the latter should only be given approximately, but the estimates sent in should be carefully tested.
5. The programmes should always specify exactly the drawings desired, and the scale on which they are to be prepared.

#### Section III.

For general competitions the following special regulations are also in force:—

1. Invitation to general competition, officially announced, must state time and place for the delivery of the drawings, the number of prizes and their amount, as well as the name and position of all the members of the jury. Here with it should also be observed that the time allowed is sufficient for the competition.
2. The members of the jury must be odd in number and half of them architects.

3. Architects on the jury must not participate in the competition either openly or anonymously.

4. Every drawing forwarded for competition must be designated by some motto or other sign of identification, and accompanied by the name of the competitor under sealed cover. Only for those designs that have been awarded prizes these covers must be opened, and such opening shall be made publicly or under official control.

5. Designs are disqualified from competition in the following cases:—(a) if the design reaches the place of reception after the time appointed, unless the competitor can prove prior to the decision of the jury that this was due to no fault of his; (b) if there be a departure from the expressly stipulated conditions of the programme.

6. All prizes must be distributed in complete accordance with the tenour of the programme. Should nothing be stipulated on this point, the prizes shall be awarded in order of merit of the designs, &c., and not according to their smaller or greater absolute value.

7. Should the number of competitors be smaller than the number of prizes, the larger ones shall be awarded first.

8. All the designs premiated become the property of the invitee; the others shall be returned.

9. If nothing to the contrary be specially stipulated in the programme, the competition is considered as wholly independent of the erection of the building; the competitors compete in this case solely for the prize, not for the execution.

10. Immediately after the decision of the jury, all the drawings submitted shall be publicly exhibited.

#### Section IV.

Limited competitions, for which a certain number of invitations is issued, presuppose (a) that the erection of the building has been definitely decided upon; (b) that the invitee is fully prepared to confide its erection to one of the competitors.

In such competitions the following special conditions are in force:—

1. The invitation to compete, which shall always be accompanied by a programme, must notify time and place for the delivery of the drawings, as well as the names of the jury; and it should be observed that the time allowed is sufficient for the purpose in view. It should also be stated whether the drawings are to be submitted anonymously and accompanied by motto, sign of identification, and sealed name.

2. In these competitions there should be no graduated prizes, the competitors competing solely for the execution.

3. As fee for the labour entailed in the drawings, each competitor, irrespective of the result of the competition, should receive a sum, named in the letter of invitation, and which is the same for all, this sum being also the price of purchase of the drawings.

4. Each one of the competitors should be apprised of the result of the competition.

#### Section V.

In double competitions all the rules stated in Section III. are in force for the first competition and those of Section IV. for the second.

#### Section VI.

In all competitions the jury should be fairly remunerated for their work.

## II.—BASIS AND CONDITIONS FOR THE FIXING OF ARCHITECT'S FEES.

**Basis of Calculation.**—For drawings, estimates, description, and supervision the fee is payable on a certain percentage of the cost of building. The percentage is further defined in respect of:—

- A. The amount of artistic skill required in the work.
- B. The extent of work of the architect.
- C. The building material.
- D. The cost of the building.

A. *Division into Classes according to the degree of Artistic Skill required.*—For works requiring greater architectural skill the fee to be higher than where lesser artistic skill is required, although the cost of the work to be executed may be the same. In this respect, buildings are divided into four classes.

Class I.—Buildings of the commonest kind, such as outhouses, stables, stores and depots, factories, labourers' dwellings, and similar plain structures.



Class II.—(a) Buildings named in Class I., which are to be specially ornamented or constructed, requiring special drawings; (b) public buildings, such as schools, churches or chapels, hospitals, barracks, and plain structures of similar kind.

Class III.—(a) Buildings named in Class II., the arrangements of which require a heavier form of construction or more artistic labour; (b) works of repair or alteration, as well as structural additions of an ordinary kind.

Class IV.—Works of repair or alteration and structural additions of a heavier kind.

B. The Extent of Work of the Architect.—This is divided as follows:—

I. Sketch.—A clear drawing upon a smaller scale to serve as basis for the principal drawings, accompanied, if demanded, by an approximate estimate of cost.

II. Principal drawings.—Complete drawings upon a larger scale, consisting of plans, elevations, (and sections, together with an approximate estimate of cost, if such has not already been furnished with the sketch.

III. Estimates and description.—A calculation of cost with specified quantities and prices, together with an indication of the materials recommended, and the method of working.

IV. Working and Detail Drawings.—All constructive and ornamental drawings required in the execution of the work.

V. Supervision.—(a) Supervision of the artistic execution of the work; (b) supervision of the entire technical work of building.

C. The Building Material.—In respect of material, buildings are divided into:—1. Buildings of stone, iron, &c.; 2. Buildings of wood.

D. The Cost of the Building.—The cost is divided in such a manner that a relatively larger fee is charged for lesser work, the percentage decreasing in proportion to the cost of the building. For the calculation of the fee the cost is divided thus:—

1. Up to 10,000 kronor.*	
2. From 10,000 to 20,000 kronor.	
3. " 20,000 " 50,000 "	
4. " 50,000 " 100,000 "	
5. " 100,000 " 200,000 "	
6. " 200,000 " 300,000 "	
7. " 300,000 " 500,000 "	

For expenditure above 500,000 kronor, vide note 2 below.

\* 1 krona=100 öre=1s. 3d.; 18 kronor=20s.

#### Special Compound Fees for Architect's Work.

The architect's fee for undertaking entire work is calculated in the subjoined table in percentage of the cost of the building:—

#### BUILDINGS OF STONE, IRON, &c.

	10,000 kr.	20,000 kr.	50,000 kr.	100,000 kr.	200,000 kr.	300,000 kr.	500,000 kr.
<b>CLASS I.</b>							
Sketch .....	0.40	0.40	0.35	0.30	0.20	0.20	0.15
Principal drawing .....	0.70	0.65	0.60	0.55	0.50	0.40	0.35
Estimate .....	0.25	0.25	0.25	0.20	0.15	0.10	0.08
Working drawings .....	1.00	0.90	0.80	0.70	0.60	0.45	0.40
Supervision, a .....	1.00	1.00	1.00	0.95	0.85	0.60	0.52
<b>Total ...</b>	<b>3.35</b>	<b>3.20</b>	<b>3.00</b>	<b>2.70</b>	<b>2.30</b>	<b>1.75</b>	<b>1.50</b>
<b>CLASS II.</b>							
Sketch .....	0.50	0.45	0.40	0.35	0.25	0.20	0.15
Principal drawing .....	0.90	0.80	0.75	0.70	0.60	0.55	0.50
Estimate .....	0.25	0.25	0.25	0.25	0.15	0.15	0.12
Working drawings .....	1.25	1.25	1.10	0.90	0.70	0.65	0.63
Supervision, a .....	1.50	1.25	1.10	1.00	0.90	0.85	0.80
<b>Total ...</b>	<b>4.40</b>	<b>4.00</b>	<b>3.60</b>	<b>3.20</b>	<b>2.60</b>	<b>2.40</b>	<b>2.20</b>
<b>CLASS III.</b>							
Sketch .....	0.55	0.55	0.45	0.40	0.30	0.25	0.25
Principal drawing .....	1.05	1.00	1.00	0.90	0.80	0.75	0.70
Estimate .....	0.30	0.30	0.30	0.30	0.20	0.20	0.15
Working drawings .....	1.50	1.50	1.45	1.25	1.05	1.00	0.90
Supervision, a .....	2.00	1.65	1.40	1.25	1.15	1.05	0.90
<b>Total ...</b>	<b>5.40</b>	<b>5.00</b>	<b>4.60</b>	<b>4.10</b>	<b>3.50</b>	<b>3.25</b>	<b>3.00</b>
<b>CLASS IV.</b>							
Sketch .....	0.65	0.60	0.50	0.45	0.40	0.35	0.30
Principal drawing .....	1.25	1.10	1.05	0.95	0.90	0.85	0.80
Estimate .....	0.35	0.35	0.35	0.30	0.25	0.20	0.15
Working drawings .....	1.90	1.75	1.50	1.30	1.20	1.15	1.10
Supervision, a .....	2.25	2.00	1.70	1.40	1.25	1.20	1.15
<b>Total ...</b>	<b>6.40</b>	<b>5.80</b>	<b>5.10</b>	<b>4.40</b>	<b>4.00</b>	<b>3.75</b>	<b>3.50</b>

#### Buildings of Wood.

When the work of the architect in respect of wooden structures is in general equal to that upon buildings of more solid material, but the cost of the former being less, his fee is increased by 50 per cent. upon the figures before given.

1. However, in respect of supervision of the technical execution of artistic work upon wooden buildings, the fees are double of those stated above.

2. If the cost exceeds 500,000 kronor the fee is to be calculated upon the scale laid down here.

#### III.—GENERAL RULES.

1. If the competition should terminate upon the furnishing of sketch only, the fee is increased by 50 per cent.

2. On the cost increasing beyond the scale upon which the architect has calculated his fee, the highest figures of the lower scale are to be allowed.

3. Should the building not be erected, the architect is to calculate his fee upon his own approximate estimate; or where such have been drawn up, upon the final estimate. If the building is completed, and the cost is less than that estimated by the architect, his fee is to be calculated upon the smaller sum; and if the cost is more than estimated by him, his fee is to be calculated upon his own estimate, no extra fee being allowed upon the excess.

4. If, however, after the fee has been decided upon, alterations be made in the construction of the building entailing a greater expenditure the fee is to be calculated also upon the excess on the same scale as the estimate.

5. If the building, through more costly ornamental or alteration of construction, is raised from one class to one above, the architect charges his fee upon the higher scale.

6. Fees for sketches, principal drawings, and estimates are payable upon the delivery of each; for working drawings as they are completed; and for supervision in proportion as the work progresses.

IV.—WORK FOR WHICH FEES CANNOT BE CHARGED UPON THE ABOVE BASIS.

a. Interior and exterior decorative work not connected with the building operations which the architect has undertaken, is paid for according to agreement.

b. This is also to be observed for surveys and measurements of old buildings.

c. If the architect has to travel in connection with work for which he is commissioned, he is to receive 20 kr. a day in diet money, and if the journey does not result in his being commissioned, 30 kr. a day. In addition, his travelling expenses are to be paid in both cases, viz., first-class steam-boat, and second-class railway fare, and two horses for posting.

#### THE EXTENSION OF THE METROPOLITAN RAILWAY.

THE recent opening of the extension of the Metropolitan Railway to Chesham makes this line something more than a mere London railway. In fact, the child is swallowing up the parent, since the St. John's Wood line, as it used to be called, is now much longer than the Metropolitan line proper; and when it is completed to Aylesbury, the provincial system will really be more important than that in the Metropolis. Chesham is twenty-eight miles from London, and thus the Metropolitan must henceforth be classed among the lines which serve completely rural districts. For Chesham is the centre of a quiet and thoroughly agricultural neighbourhood, though not without a certain amount of special trade of its own, in the shape of boot-making. The extension will be welcome to many Londoners, for it will open up a picturesque and interesting district, and the pedestrian who goes into the country for a day's walk will not soon tire of the new parts to which he will now have access.

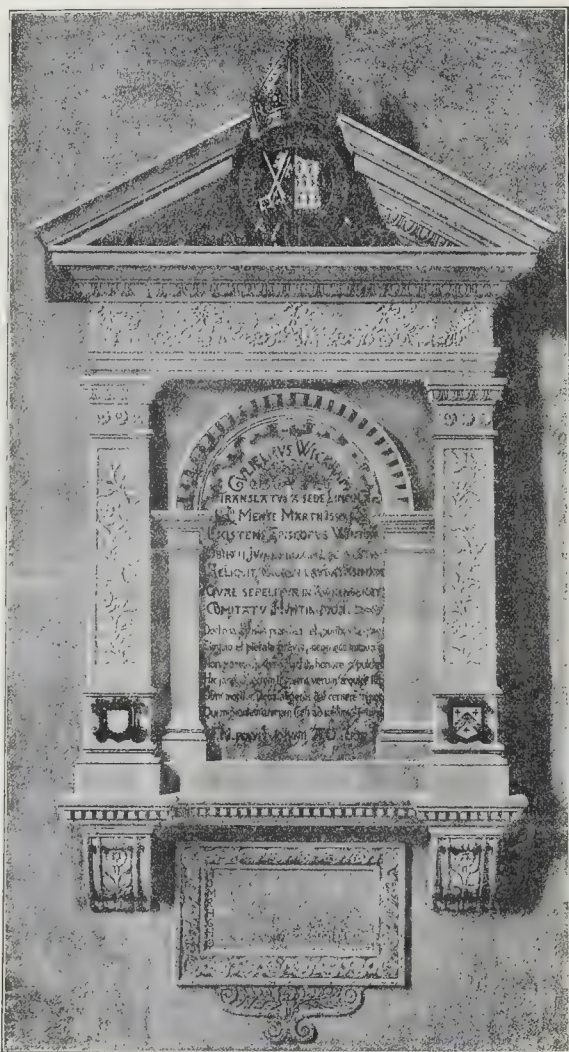
Chesham itself lies picturesquely in the valley of the Chess. Until the railway reached it, it had an old-fashioned air about it which carried one back quite into the last century; but, for actual interest, Chesham is rather than Chesham is the place which is most attractive. It is within an easy walk either of Chorley Wood Station, the next to Rickmansworth, or of Chalfont-road. The interest of Chesham is manifold; it is in itself a picturesque village amid hanging woods by the banks of the Chess; it has a kind of idyllic neatness, not unmixed with rural prosperity.

If the inhabitants are to be judged by their houses, temperance and thrift appear to be their characteristics. Unfortunately, the residuum must find its resting-place somewhere, and a single village of this character really tells little of the actual state of the district generally. Then there is the church, with its side-chapel, which has long been the mausoleum of the Russell family. This chapel, with its many monuments, has been so well described by Mr. Froude, in his Essay on "Chenies and the House of Russell," that no prudent visitor will do more than refer an intending writer to this excellent piece of literary work. But the free access which has hitherto been granted by the Duke of Bedford to this chapel is now at an end. This was an inevitable consequence of the proximity of a railway in direct communication with London, for we fear that a good many of the visitors on a Bank Holiday would have had little scruple in embellishing the beautiful alabaster monument of the first Lord Russell with their initials. The fact is, it must be well safeguarded, for the long series of monuments in the chapel makes it a national treasure, whether we regard it from the point of view of the student of art, who desires to note the progress, or it may be the decadence, of monumental sculpture in this country, or of the student of history, for whom each monument suggests stirring events in many periods of our national annals. The remains of the Manor House, which was rebuilt in the time of Henry VIII. to the west of the church, gives a good idea of its appearance when it was of large enough size for Queen Elizabeth to be entertained there, in 1570, by Francis, Earl of Bedford. It still forms a feature of great picturesqueness, its warm red tints harmonise pleasantly with the surrounding elms, and the graceful chimneys catch the eye above the western terrace.

Chalfont St. Giles is two miles from Chalfont-road Station, a place of great literary interest, for the cottage still exists wherein Milton lived when the Plague raged in London. It was here that he began to write "Paradise Regained," and as his dwelling still remains intact, it is easy to picture the home of the poet as it was in bygone times.

Chorley Wood Station stands on the edge of the Common, which is likely to make in the future its immediate neighbourhood a favourite place of residence, until, like some commons near London, it becomes too habitually a resort of the roughest kind of holiday-folk. The actual line, as completed, has given occasion for a good deal of work; in places deep cuttings have been made in the chalk hills; in others, "Bottoms," as they are called in Bucks, have had to be filled to keep the line at a correct level; but these engineering obstacles add to the pleasing variety of the journey from Rickmansworth to Chesham. Of Rickmansworth itself there is nothing to be said; that William





*Monument to William Wickham II., Fourth Protestant Bishop of Winchester.  
Mr. G. H. Kitchen, Architect.*

Penn lived there after his marriage may still arouse a languid interest in some passing visitor; and we can still well understand how George Eliot, who also lodged there for a time, retained little of it in her recollection except the astounding number of public-houses it possessed.

But there are drawbacks to the pleasure of our imaginary traveller. The carriages of the Metropolitan line are altogether unfit for a journey of more than a few minutes. The second-class compartments are the worst of their kind in England, and those of the third class are little better than cattle-trucks. The rolling-stock has not been constructed for long journeys, and, consequently, when it is taken over the lengthier spaces between the country stations, it jars and shakes the traveller in a way, which reminds him of the flimsiest of Continental railway-carriages. Again, at present the Company take forty minutes (except in the case of one train each way during the day) to compass the seventeen miles to Rickmansworth, and the patience and temper of the most good-natured of travellers can scarcely tolerate this slow rate of progress.

From the shareholders' point of view, in spite of the sanguine expectations of the Stock Exchange, it may be doubted whether they will gain by this new movement. A country line must have a proper terminus, and Baker-street Station can only be described as an inconvenient shed. The Company have spent 9,000*l.* on improvements at the main-line station, and will have to spend 30,000*l.* in no long time on a new station for the country line. There is no accommodation for passengers with luggage, and every station on the line outside London is better than the Baker-street terminus. New rolling-stock and a double line are necessities of the near future. With a further extension to Aylesbury and Towcester will come a strong competition with the North-Western and Great Western lines,—a formidable prospect for a Company like the Metropolitan, which can only pay a dividend of 3 per cent. on its Ordinary Stock. But with these points the general public is not concerned, though it will demand an efficient service and reasonable comforts from Sir Edward Watkin and his subordinates if they undertake to carry them at all.

#### THE LEVY MEMORIAL FOUNTAIN, SYDNEY.

THIS fountain is the gift of the children of the late Honourable Lewis Wolfe Levy, M.L.C., to their fellow-citizens of Sydney, New South Wales. It comprises a fountain with a number of jets and four drinking fountains for public use. (See general view on next page.)

The base is of a highly-polished red and grey granite, prepared at the works of Messrs. Freeman, Penryn, Cornwall. The figure which surmounts it,—a water-nymph in bronze,—was



modelled by Mr. C. B. Birch, A.R.A., and cast, with its accessories, at the foundry of Mr. Moore, at Thames Ditton. The figure was exhibited at the Grosvenor Gallery Exhibition this year.

The architects from whose drawings and specification the whole was contracted for are Messrs. Edmeston & Gabriel.

The hydraulic work is supplied by Messrs. Handyside & Co., of Derby, and the bronze basins for the drinking fountains by Messrs. Hart, Son, & Peard.

#### MONUMENT TO WILLIAM WICKHAM II., FOURTH PROTESTANT BISHOP OF WINCHESTER.

A MURAL monument in the style of the latter part of the sixteenth-century has lately been erected near the south entrance to the choir of Winchester Cathedral, at the expense of the bishop's direct descendant and namesake, Mr. William Wickham, of Binsted-Wyck, High Sheriff of the County. The monument has been designed by and executed under the direction of Mr. G. Herbert Kitchen, architect (who also designed the altar-tomb for the remains of Bishop Courtenay, 1487-92).

The monument is carved in Caen stone, with a beautiful alabaster slab, on which the ancient inscription is cut, and the letters are gilt. On the apex of the pediment are the bishop's mitre, surmounting a shield surrounded with the motto of the most noble Order of the Garter, as





The Levy Memorial Fountain, Sydney.—Messrs. Edmeston & Gabriel, Architects.

prelate of the order, on which are the arms of the see impaling the bishop's family arms; ermine, on a bordure engrailed gules, eight mullets, or; on the base of the pilasters supporting the pediment are two small heraldic shields, the first being the arms of the Wickham family, as above; the other, the arms of his wife Antonina, daughter of William Barlow, Bishop of Chichester, viz., argent on a chevron engrailed, between three crosses crosslet fitché, sable; two lions passant, counter passant of the first. On the alabaster slab is the following inscription:—

GULIELMUS WICKHAM.

Translatus a sede Lincoln  
Mense Martii 1695,  
Existens Episcopus Winton  
Obiit ii Junii proxime sequentis.  
Reliquit uxorem laudatissimam  
Quae sepelitur in Awkenbury  
Comitatu Huntingdon.  
Doctrina, antistes, prestans et moribus equis,  
Eloquio et pietate gravis; mensurae manique  
Non parvus, justis neglectus honore sepulchri  
Hic jacet. O seculum insipiens verum aequior illi,  
Dum moritur, Deus asperos dat cernere miseros,  
Qui migrantem animam Colla ad sublimia ferrent.  
FM posuit 10 Junii A.D. 1699.

Underneath the monument with the above inscription, formerly in the Church of St. Mary Overy at Southwark, and which Stowe says "is on a very fair stone by the Communion Table":—

"Hoc Epigramma supra scriptum  
Olim in Ecclesia S. Mariae Overy apud Southwark  
Marmoris incisum: ne periret  
Reverendissimi Episcopi precavi et memoria  
Hic repositum curavit  
Guilielmus Wickham de Binsted-Wick Armiger  
Hoc anno Comitatibus Saltham Vice comes  
Ad. MDCCCLXXXVIII."

[TRANSLATION].  
"Lest the memory of the Right Rev. Prelate, his ancestor, should perish, William Wickham, of Binsted-Wick, Esquire, High Sheriff for the County of Southwark, caused the inscription engraved above, which was formerly carved in stone in St. Mary Overy, Southwark, to be set up in this place, in the year of our Lord, 1688."

Houses of Parliament for Sweden.—At present no fewer than 130 Swedish architects are engaged in preparing designs for the new Houses of Parliament and other buildings to be erected in Stockholm.

#### MANBY CHURCH, LINCOLNSHIRE.

ON Wednesday, July 17, the Bishop of Lincoln was present at the service held on the occasion of re-opening of the chancel of the above church, which has been restored for the rector, the Rev. F. D. Hall, by Mr. Arthur C. Blomfield, M.A., son of Sir Arthur Blomfield, A.R.A. The church is of Early Perpendicular date, and consists of nave, chancel, and tower. At a period probably about 100 years ago, a barn-like structure, with no pretensions to architectural or ecclesiastical effect, with plain, square-headed windows of brick, was added in place of the original chancel, which, it is supposed, was either destroyed by fire or purposely demolished at some previous time. The walls were composed of green sandstone, with which the nave and tower are faced, intermingled with brick, and were in a very unsatisfactory state. The south wall was standing on the original foundations, but the east wall was some 6 ft. further west, thus curtailing the chancel to a very inconvenient and unsightly proportion, the north wall being also inside the line of the old foundations. The roof was found to be in a rotten and dangerous state, composed partly of the old chancel roof-timbers, of which however, many were found to be in a good state of preservation, with Early Perpendicular mouldings, which have been used again in the new roof. Two rudely-cut angels, formerly occupying positions under the slope of the intermediate principals, were also found in the roof. They are holding shields with crosses upon them, and bear traces of red and white paint. These, together with the tie-beam and two principal rafters, have been re-used in the new roof, the wall-plates being formed of the old purlins, which were neither in a sufficiently good state of preservation nor long enough to use again for their original purpose. None of the old oak rafters, of which a few only were found, were fit for re-use. A flat lath-and-plaster ceiling hid the top of the chancel-arch, of which the top stones appeared above the roof, the aperture thus formed being covered with lead. Upon demolishing the walls, portions of the jambs of the old east window were found, though not sufficient to determine the curve

of the arch nor the pattern of the tracery. A portion of the old cross and saddle-stone of the east gable were also discovered, and a quantity of chalkstone, which has been utilised to form an arched recess for the organ on the north side of the new chancel. The most interesting discovery was that of three stones, which were found built into the wall, of a pre-Norman date, of which two were apparently portions of a pair of tomb slabs (see accompanying illustration).



tion) with a well-defined interlaced pattern cut in the face, the third being a flat and narrow stone with a diagonal double pattern on the edge. There was also found embedded in the walls a small stone about 1 ft. square, with a portion of a geometrical pattern cut on the face. Some old Roman tiles were also found.

The new chancel, which has been built on the lines of the old foundations, is built of Weldon stone facing and brick and plaster lining, as much of the old green sandstone as was fit for re-use being worked in in horizontal bands.

The roof is composed of the old oak mentioned above, deal rafters and boarding, and pitch-pine purlins and traces. The altar and



chancel stalls are of oak. The floor is of biscuit and enamel tiles, by Messrs. Minton & Co. The work of rebuilding has been carried out, we are informed by the architect, in the most careful and efficient manner, by Messrs. Rudd & Sons, of Grantham. It was begun on April 23, and finished for the opening ceremony on July 17.

### Illustrations.

#### NEW CHANCEL, ST. EDMUND'S CHURCH, BUNGAY.

**T**HIS is a view of the interior of the new chancel added to the Catholic Church at Bungay, Suffolk, and consecrated by the Bishop of Northampton at the beginning of the year.

It is connected with the old church by a new chancel arch with elaborately-moulded jambs and carved capitals and arch mouldings.

The reredos is in Caen stone, with Devonshire marble shafts, super-altars, &c., and was executed by Mr. A. B. Wall, of Cheltenham, from the designs and details of the architect.

The oak wainscoting round the sides of the chancel, and the carved parapet at springing of the roof, were also executed by Mr. Wall.

The rest of the work, by the express wish of the donor (Mr. Frederick Smith, of Bungay), was entrusted to local men,—Mr. Read for the brickwork, &c., Mr. Foulger for the carpentry, and Mr. Nurse for the masonry. The windows are all filled with stained glass, the east window and one of the side ones being entrusted to Messrs. Hardman, of Birmingham; two side windows to Messrs. W. B. Simpson, of London; and the other two to Mr. Swaine Bourne, of Birmingham. The brass communion-rails, lamps, &c., were supplied by Messrs. Hardman.

The architect was Mr. Bernard Smith.

#### THE NEW GRAMMAR SCHOOL FOR BEDFORD.

THE Harpur Trustees are about to re-erect their famous Grammar School upon a new site near St. Peter's Church, at the south end of the cricket and football ground of the school.

Mr. E. C. Robins, F.S.A., has been selected, after competition, as the architect, and the plans have been approved by the Charity Commissioners. The cost of erection will be about 28,000*l.* for the buildings only.

The design is in the Tudor style, as shown by the perspective view here given. The buildings will be faced with red bricks and Weldon stone dressings, with Broseley tile roofing.

The accommodation is for 936 pupils, in eleven classes of thirty in each, six classes of thirty-six in each, and eleven classes of forty in each. These latter class-rooms are divisible into two classes of twenty each, as indicated in the ground-plan.

There are three stories, the two upper being entirely devoted to class-rooms, excepting two boys' lavatories and two housemaids' closets; and a separate fireproof staircase and corridor leads from the ground-floor to each floor.

On the ground-floor there is a head-master's room, with office and printing-room adjoining, a master's common-room and waiting-room, and two master's lavatories and conveniences; porters' waiting lobbies and entrance porches of oak at each end of the principal corridor.

The rooms are grouped around three sides of a great hall 100 ft. long, 50 ft. wide, and 50 ft. high, with two tiers of galleries, on a level with the adjoining floors. From 1,200 to 1,500 persons will be accommodated in this central hall, and its galleries and all the class-rooms have doors opening into the corridors direct, and also a secondary corridor to be used when a passage through the hall would be inconvenient, which is a concession on the part of the architect, whose principle of school-planning is opposed to the introduction of such corridors, for the reasons expounded in his published works on the subject.

On the north side of the great hall is an external ambulatory, divided by a projecting centre block forming a porch below and an organ-chamber above, with a turret to reach the roofs and for a flag-staff. The boys' conveniences are in detached buildings.

A detached building will be erected for the chemical laboratory and lecture-room, the experimental and preparation-room, the combustion store, balance, and master's room, with covered way to the main building.

#### STAIR HOUSE, LAMBERHURST, KENT.

WE publish this week a drawing of the above, showing a practical rebuilding and enlargement of the house.

The new building stands on a stone plinth, and has hollow brick walls and stone window and door dressings, the half-timber work being of solid oak; the remainder of the external walls of the upper floors are covered with hanging tiles, and the roofs also are tiled.

The work has been satisfactorily carried out by Messrs. Beale & Son, of Tunbridge Wells, and the architects are Messrs. Christopher & White.

#### SCULPTURE FROM THE HENRY IV. TOMB, CANTERBURY CATHEDRAL.

THE sketch represents the effigies of Henry IV. and his second wife, Joanna of Navarre, from their tomb on the north side of the Trinity Chapel, Canterbury Cathedral. The figures lie recumbent upon an altar tomb of alabaster, ornamented with niches and carvings of elaborate and beautiful workmanship; above is a canopy of delicate design in oak, enriched with designs in colour. These were destroyed by some person who had permission to copy them. In Strickland's "Queens of England," the effigy of the Queen is described as that of a very lovely woman, with features small and regular, the eyes and eyebrows very long, and the head singularly high and very broad. The Royal mantle is fastened to the back of her "cotehardi" by a jewelled band, which passes round the corsage, and rich brooches clasp the mantle on the shoulders. Round the throat is a collar of SS., the oldest specimen extant of this ornament. Studs set with jewels are placed down the front of the cotehardi, which is a light jacket trimmed with ermine, without sleeves (the arms being bare), round the hips is a band of jewels as a belt, from which her gown falls in full folds over her feet. Both figures were formally enamelled in colours.

In 1832 an old account was published stating that the king's body was, during a storm, thrown into the sea near Gravesend by the attendants on its journey by water to Canterbury.

To ascertain whether there was any truth in the account, part of the coffin was sawn away, and a leaden coffin was discovered within it. This was so small that hay-bands had been inserted to keep it from shifting about on its journey to Canterbury. It was moulded to the figure, and on being cut open the face was discovered in perfect preservation. The question still remains, however, whether the body is the king's or not. The rule way in which the inner lead case has been inserted with hay-packing, the cross of twice lying upon the breast, and the perfect condition of the skin (King Henry's features having been much disfigured by leprosy), lead one to suppose that the body of the King was thrown into the sea and replaced by another corpse by those who had charge of it. However, there a body lies, side by side with the body of the Queen. Whether it be that of her Royal consort or that of some obscure member of society, much honoured in death, will for ever be a mystery.

F. D. B.

#### SHREWSBURY MONUMENT, SHEFFIELD.

THE tomb from which these effigies are taken is the earliest and finest of several in the Shrewsbury Chapel of Sheffield parish church. It stands under a canopied arch of somewhat debased character, opening into the chancel. The figures themselves are remarkably fine, exhibiting a correctness and grace of modelling rare in works of this class. With Medieval repose in feeling they combine the refinement of the Renaissance in detail, and have, in fact, been attributed to Italian workmanship. They have been engraved by Blore in his usual delicate manner, but hardly with detailed accuracy.

The right-hand lady has a tomb and effigy of her own in the church of Erit, Kent, where she appears to have been buried.

W. RANDOLPH.

#### PARIS EXHIBITION ARCHITECTURE.

THE three pavilions of which we give illustrations from the buildings erected for the Paris Exhibition, are among those which will have to be removed after the close of the Exhibition,

but they are of sufficient architectural merit and importance to be worth putting on record.

Of the main façade and dome, designed by M. Howard, we gave a kind of skeleton illustration long before the Exhibition opened, from one of the officially-accepted elevations; but this does not convey much of its true effect when completed.

The classical pavilion of the Ministry of War, shown in another illustration, was designed by M. Walwein, and the pretty façade of the "Pavillon d'Hygiène" is the design of M. Girault.

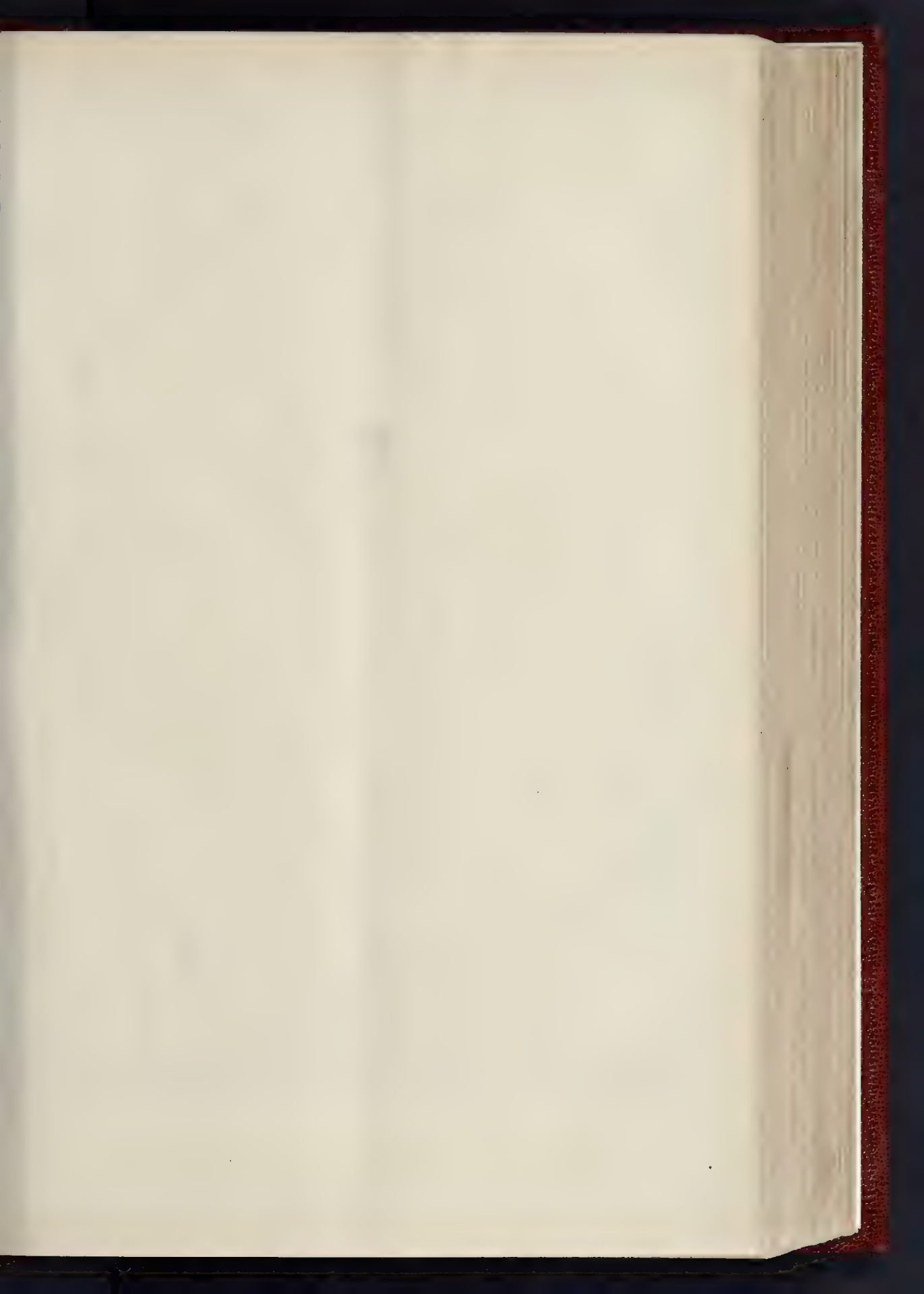
All the façades were described and commented on, in some detail, in the general article on "The Paris Exhibition," in the *Builder* for May 18 last.

#### THE SOCIETY FOR PRESERVING MEMORIALS OF THE DEAD.

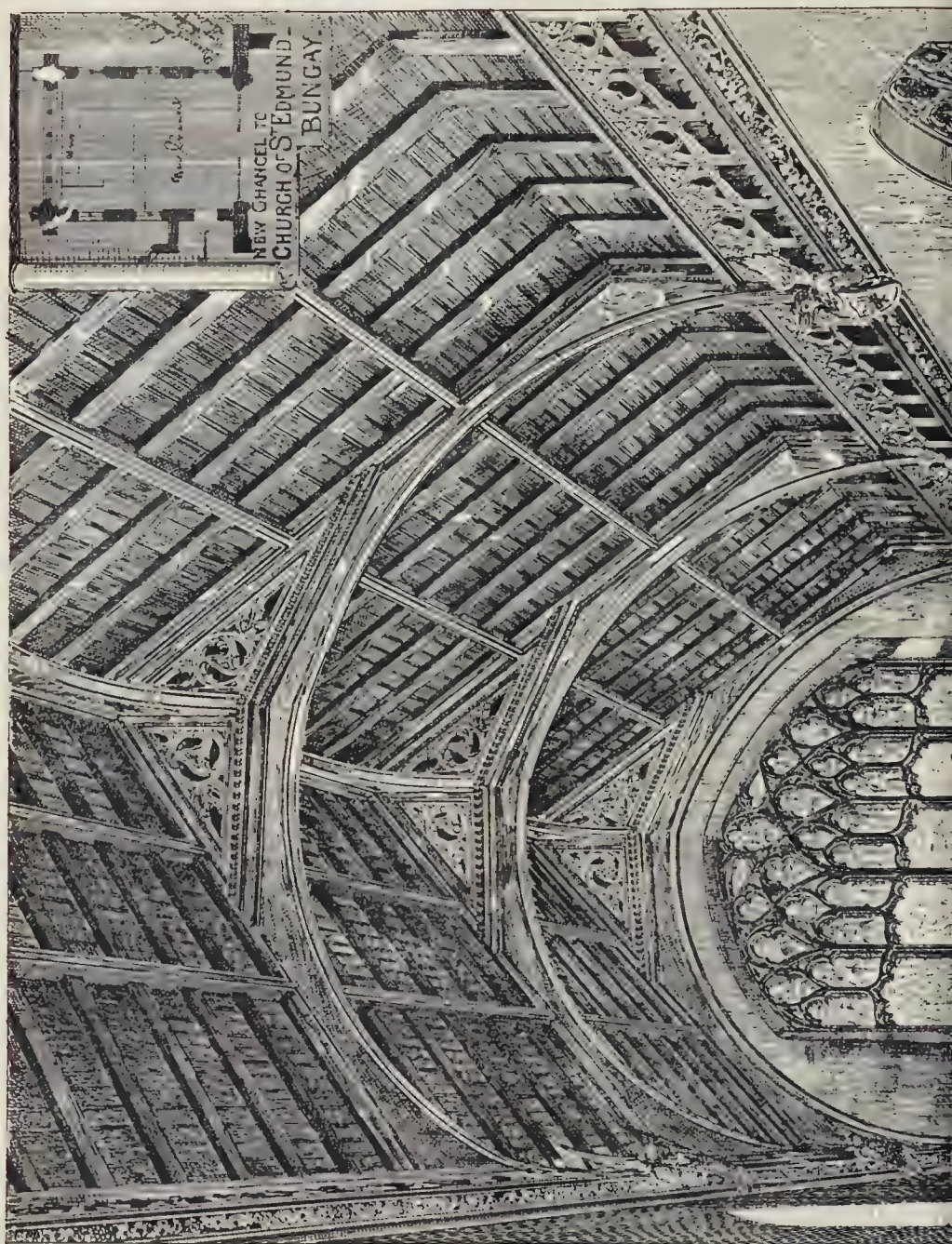
THE third general meeting of this Society for session 1888-89 was held on Monday afternoon last, in the rooms of the Royal Archaeological Institute, Oxford Mansion, Regent-circus, Col. the Hon. H. M. Hobart-Hampden in the chair.

Mr. F. Chancellor, F.R.I.B.A., Mayor of Chelmsford, read a paper entitled "The Darcies of Essex and their Monuments." The paper commenced by saying that the Darcy family claimed descent from the Norman knight De Areci, who came over in the train of the Conqueror, and whose descendants, the ancient Barons d'Areci or Darcy, of Lincolnshire and Yorkshire, Dugdale, in his "Baronage," traced down to his own time, 1675. Dugdale also stated that the Essex family was a branch of the old family of Lincolnshire, but he was not able absolutely to connect them. It was probable that Henry Darcy, who was Sheriff of London in 1327, and Lord Mayor in 1337, was a son of Norman Darcy, of Lincolnshire, a baron of the time of Edward I., who died in 1296. This Henry Darcy was apparently the first of the family who was connected with Essex. In 1329 he purchased from the FitzHumphreys the manor of Great Yeldham, near Halstead. Members of the family possessed property at Pebmarsh in 1411, and eventually four branches of the family established themselves in the county—viz., at Danbury, Maldon, Tolleshunt Darcy, and St. Osyth, where, as well as in numerous other parishes in the county, they had large estates. Weever attributed the three effigies in Danbury Church to the Darcy family, but the author of the present paper thought that was incorrect. Some of the family were probably buried there, but there were no monuments now existing. The Maldon branch of the family was really a continuation of the Danbury branch, for Robert Darcy, of Danbury, who was Sheriff of Essex and Herts in 1419, married a rich widow of Maldon, daughter of one FitzLangley, and they were both buried in the Church of All Saints or All Hallows, Maldon, where he founded three chantries. The same Robert Darcy was supposed to be the builder of the present Town-hall at Maldon, which he originally built as a moot-hall for his manor, but subsequently presented to the Corporation, who still possesses the grant, dated Jan. 27, 1440. The Tolleshunt Darcy branch of the family was probably founded by John, the second son of the before-named Robert, as he married a daughter and co-heir of the last of the Boys family, former owners of the manor of Tolleshunt Tregoz, as it was then called. The St. Osyth branch was formed by the migration to that place of the Maldon family in the person of Thomas, Lord Darcy, great grandson of the Sir Robert Darcy of Maldon, who purchased of King Edward VI., for 3,974*l.* 9s. 4*d.*, the Monastery of Chiche St. Osyth, together with numerous manors and lands in that parish, and in Great and Little Clacton, Little Holland, Fingringhoe, West Mersea, Abberton, Messing, Southminster, Wigborough, Pilton, and other parishes. The monuments of the Darcies in the Church of All Saints, Maldon, have been, with one exception, ruthlessly destroyed. The one that remains is mutilated; it is a stone mural monument, fixed on the south wall of the Darcy Chapel. It consists of a canopied niche, with a double arch over—the lower one very flat, and the upper one an ogee arch, crocketed and terminating in a bold finial. On either side is a pinnacled buttress, terminating in a pinnacle, also crocketed. The niche is filled in with a marble slab, originally inlaid with brasses; but

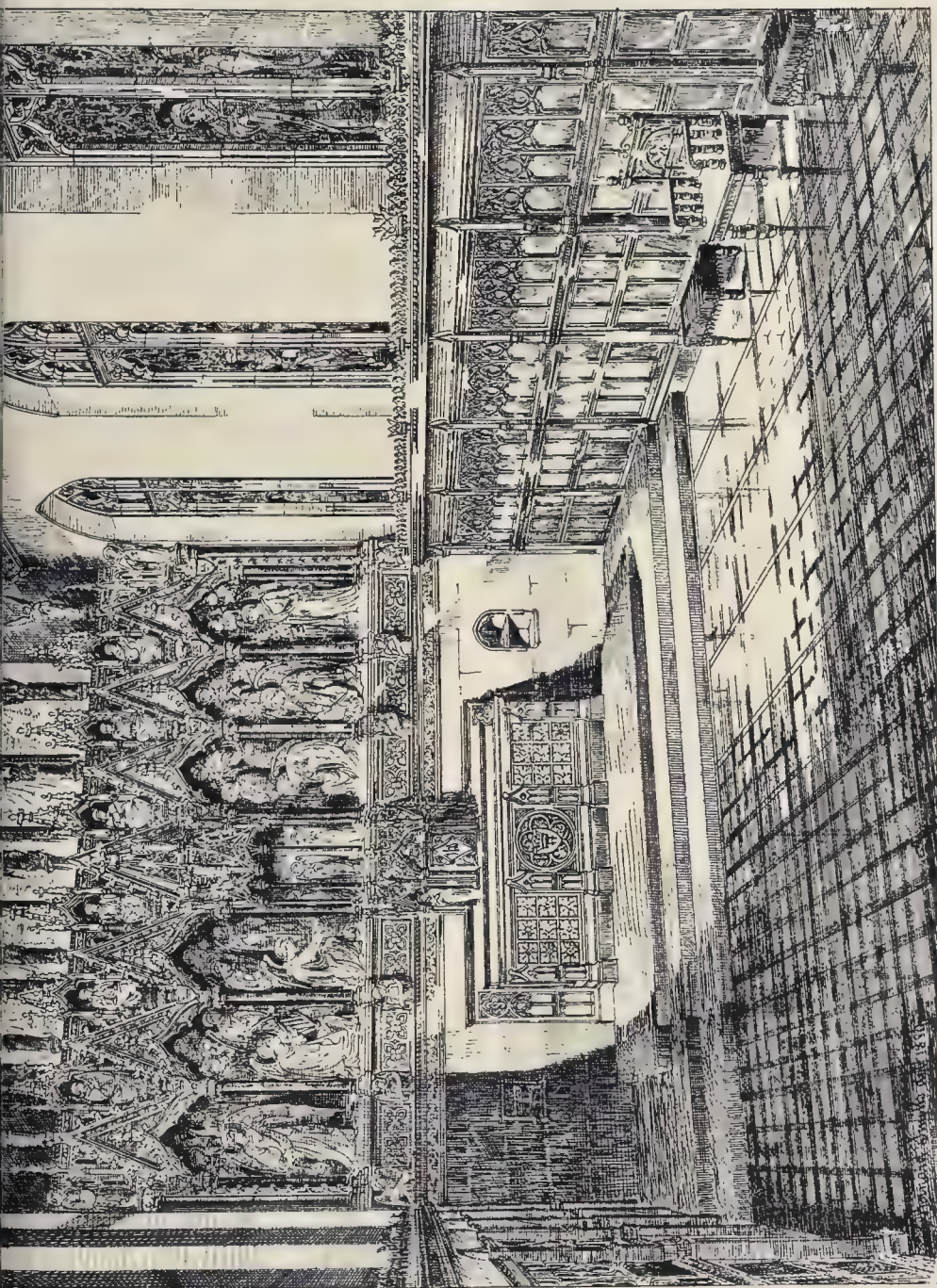




THE BUILDER JULY 27, 1889







CHANCEL OF ST. EDMUNDS (R.C.) CHURCH, BUNGAY.—MR. BERNARD SMITH, ARCHITECT.



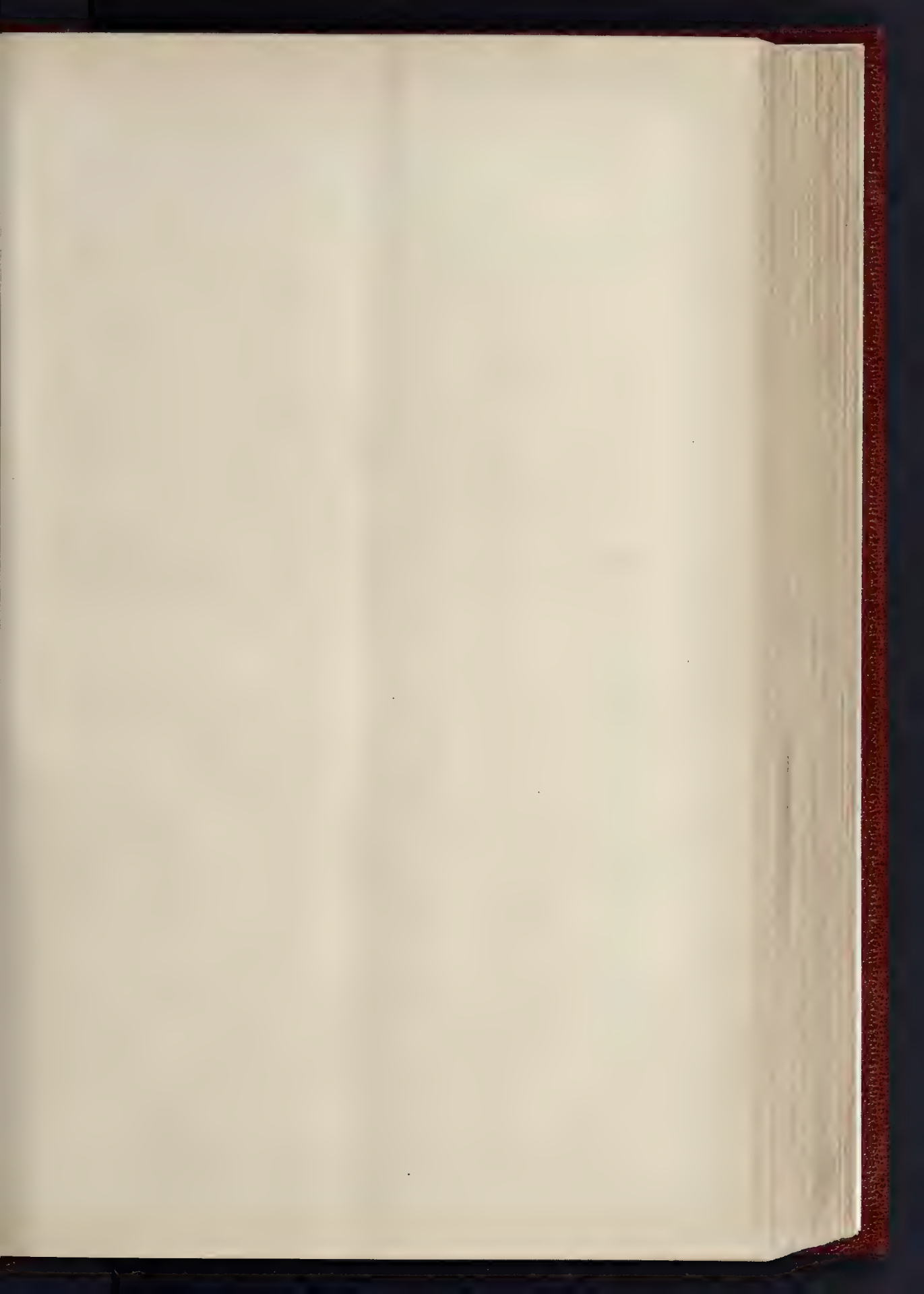


THE BUILDING, JULY 27, 1889. THE BUILDING, JULY 27, 1889.



THE PAVILLON D'HYGIENE; M. GIRAULT, Architect.

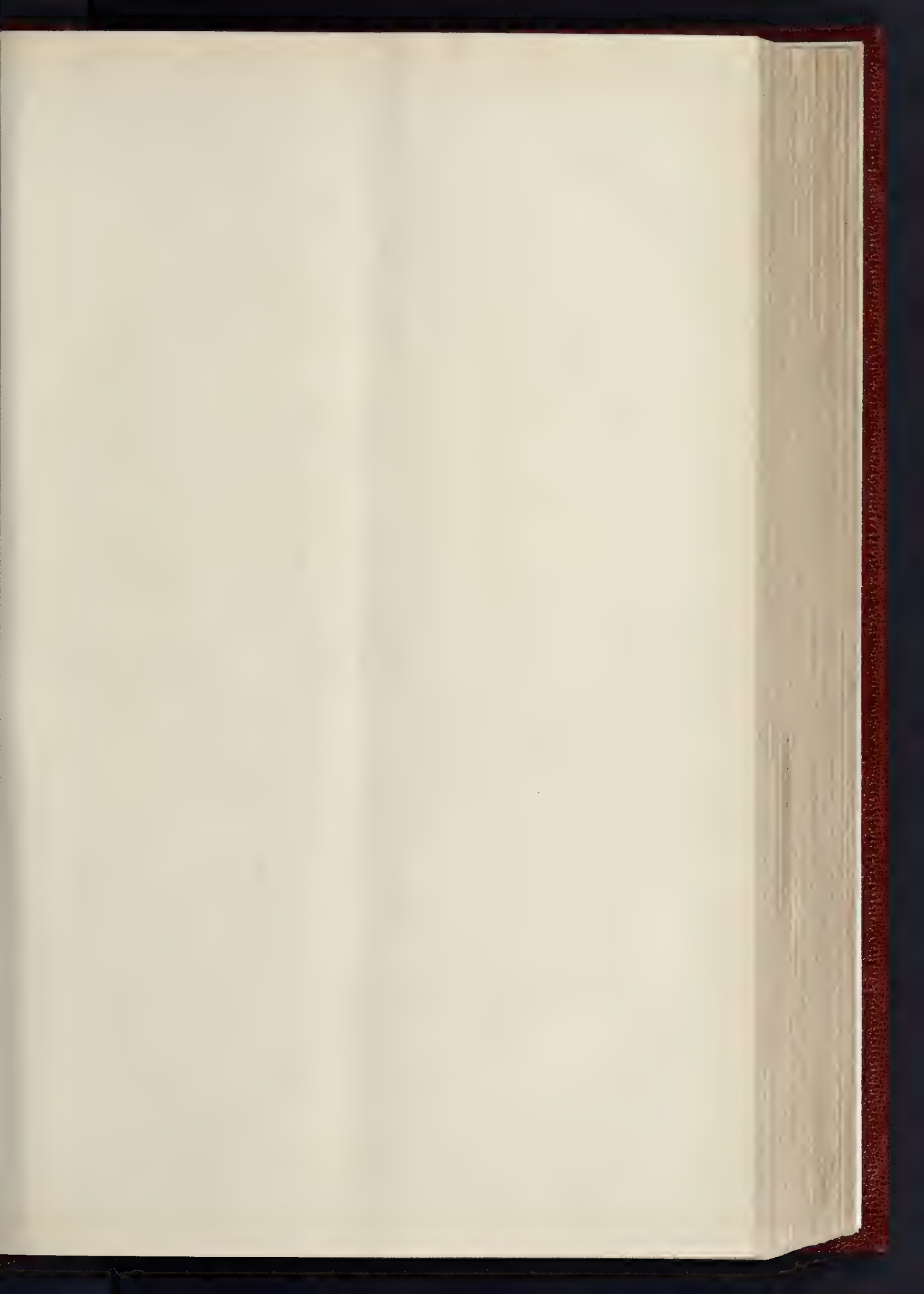




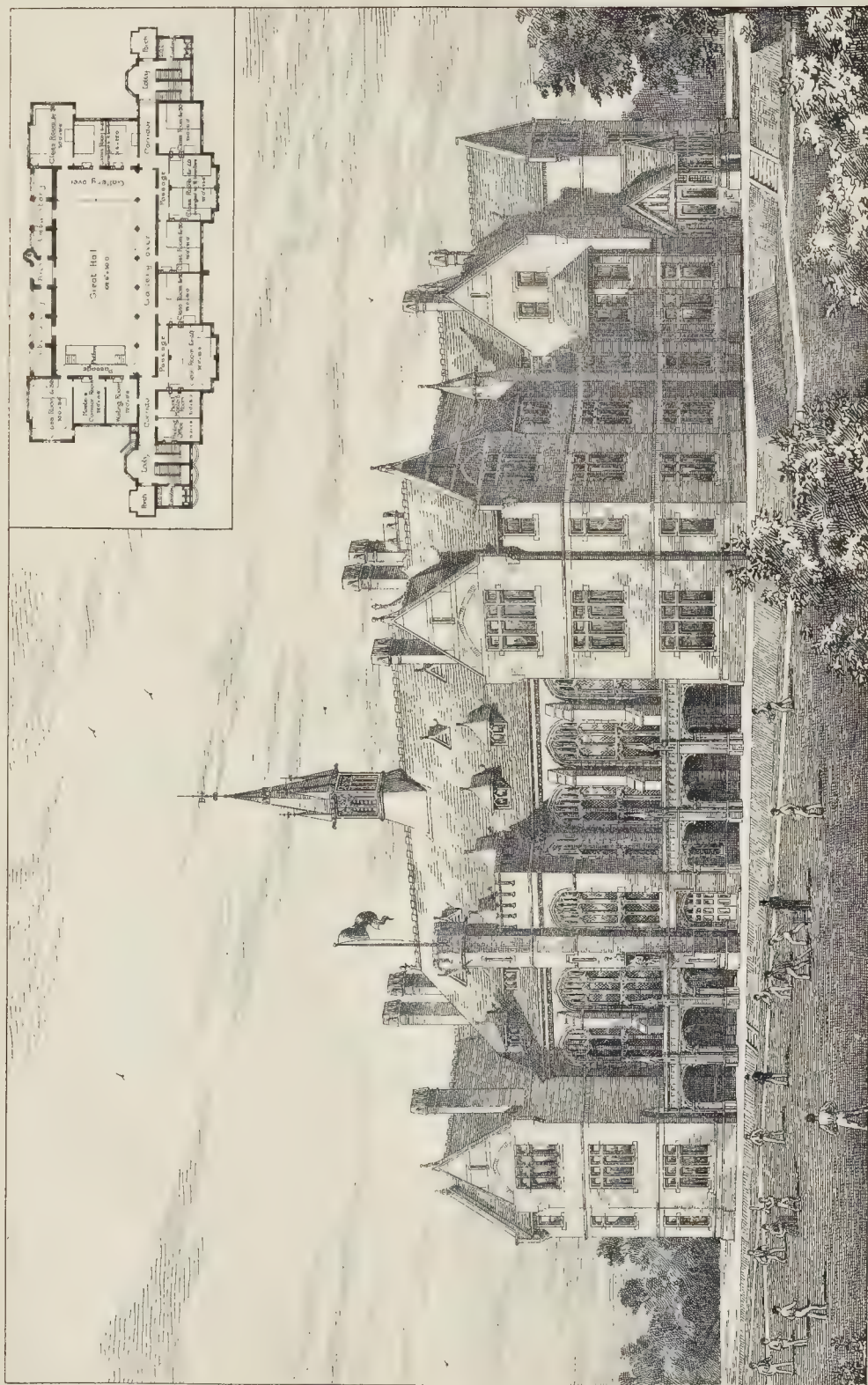


Francis Bedford April 1880





THE BUILDER, JULY 27, 1889







STAIR HOUSE, LAMBERHURST, KENT.—MESSRS. CHRISTOPHER & WHITE, ARCHITECTS.





12 10 8 6 4 2 0

2 feet



Lady Anne Hastings:

Elizabeth Barden:

George, Earl of Shrewsbury.

DESIGNED BY MR. W. RANDOLPH. EXECUTED BY MR. J. H. L. & CO. 22, MARK LANE, LONDON. E.C.







PARIS EXHIBITION ARCHITECTURE.  
THE CENTRAL FACADE AND DOME; M. BOUVARD, ARCHITECT.





these are all reaved: they consist of two effigies, apparently kneeling and facing each other. In Tolleshunt Darcy Church there are several monumental remains of the Darcies, but the principal one is a mural monument to Thomas Darcy and his wife. It is constructed of alabaster and marble. In the centre are the figures of Thomas Darcy and his wife,—the former shown in the armour of the period (he died in 1593), and the lady in the flowing robe of the period, with a tight-fitting bodice with slashed sleeves, a ruff, and a veil dependent from her head; both figures are kneeling on cushions at a faldstool, on which lie two books. Below the effigy of Thomas Darcy are his three sons, kneeling, and below the effigy of his wife are his six daughters, also kneeling. The monument of Thomas, first Lord Darcy, on the south side of the chancel of the Church of St. Oystin, is a sumptuous composition, and executed in alabaster and marble. It is 17 ft. high by 9 ft. wide. The design consists of 'an altar-tomb with panelled front, upon which lie the effigies of Lord Darcy and Elizabeth, his wife,—the daughter of John de Vere, the fifteenth Earl of Oxford. He is arrayed in the half-armour of the period, with puffed breeches, and a ruff round his neck. Below him is the effigy of his wife. All the details of these effigies and their dresses are beautifully executed, and there are remains of colour upon both. The monument of John, the second Lord Darcy, on the north side of the chancel of the same church, in general character and design bears a strong resemblance to the monument of his father just referred to. On the east wall of the south chancel aisle of the same church is a monument to another John Darcy, described in the inscription as "Kinsman and freinde to the Right Honourable Thomas Lord Darcy, Earle Rivers." Originally it was, no doubt, very similar in character to the other two monuments, but the architectural decorations and armorials have nearly all been destroyed. On the south wall of this aisle or chapel is a mural monument, much defaced, to the memory of "Briant Darcie, Esq", late Highs Sheriffe of y<sup>e</sup> Countie of Essex, y<sup>e</sup> third son of Thomas Darcie of Tolleshunt Darcie in y<sup>e</sup> said Countie. The said Bryant died y<sup>e</sup> 25 of Decem. 1587." In conclusion, Mr. Chancellor gave a brief outline of the history of the Abbey of St. Oystin.

On the motion of Mr. Edward Walford, M.A., seconded by Mr. C. F. Hayward, F.S.A., a vote of thanks was passed to Mr. Chancellor for his interesting paper.

We may add that Mr. Chancellor is now engaged in bringing out an illustrated and descriptive account of the monuments of the County of Essex; and that the Society for Preserving the Memorials of the Dead is considering the details of a Bill having for its object the preservation of monuments in churches and churchyards. The secretary of the Society is Mr. W. Vincent, Belle Vue Rise, Hellesdon-road, Norwich.

#### COMPETITIONS.

**Board Schools, Beckenham.**—We understand that Mr. Robson has recommended the Beckenham School Board to accept the plans submitted in competition by Mr. John Ladds, architect, for their new schools in the Arthur-road, Beckenham. They are planned to seat 800 children, and to be enlarged ultimately to seat 1,200. The Board have instructed Mr. Ladds to complete the plans and specifications.

**Board Schools, Sheffield.**—At the meeting of the Sheffield School Board last week, it was reported that the committee had considered the report of Mr. E. R. Robson upon sets of plans submitted in competition for the schools proposed to be erected at Neepsend and Carlisle-street, and they recommended that the plans marked "Hallamshire" should be adopted for Neepsend, and the plans marked "Light and Air" for Carlisle-street. The envelopes were opened, and it was found that "Hallamshire" was Mr. J. B. Mitchell-Withers, and "Light and Air" was Messrs. H. Hodgson and J. E. Benson, of Bank-street. In the first school, the award of £15 to unsuccessful competitors went to Messrs. Hodgson and Benson for a second set of plans, and of £10 to Messrs. Wightman & Wightman. The plans placed second and third in the Carlisle-street competition were both by Mr. O. J. Innocent, so the third prize went to Messrs. Wightman & Wightman, who sent in

under the signature of "The Don." Mr. Robson, in his report, said:—

"I am bound to say I have never had competitions for Board schools which have occupied so much time in the actual investigation. This has arisen from the singular merit of the majority of the plans. In most cases the report turns on the question, 'Which plan is least objectionable?' In the present cases it has been exactly the contrary. I think the architects of Sheffield are to be congratulated on the distinct advances made in their knowledge of the subject. But for the fact that some competitors have had to be excluded on technical grounds, I think it would have been even more difficult to arrive at a conclusion as to which plans were best. I am particularly sorry in the competition for Neepsend that 'The Don' (Messrs. Wightman) had to be so excluded, and am equally sorry in that for Carlisle-street that 'Hallamshire' (Mr. Mitchell-Withers) has met the same fate, for both these sets of plans and designs are evidently the result of skill, pains, and knowledge.

**Congleton Town-hall.**—The Corporation of the borough of Congleton recently invited schemes in competition for the heating and ventilation of their Town-hall, one of the late Mr. E. W. Godwin's works; and the first premium was awarded to Messrs. Wm. Sugden & Son, Leek. These works are now about to be carried out under their direction; also the insertion of new promenade balconies and capacious end gallery (supported by carved and moulded teak posts) in place of the present highly-elevated gangways; concrete and wood-block flooring to the whole of the large assembly-room, and other alterations and additions, are also decided upon.

**Police and Fire Brigade Station, Newcastle-on-Tyne.**—The Corporation of Newcastle-on-Tyne have, on the recommendation of their Assessor, Mr. Murgatroyd, of Manchester, selected the design of Messrs. Quilter & Wheelhouse, of London, for the proposed new Police and Fire Brigade Station at Elswick-lane.

#### SURVEYORSHIPS.

**Chelsea.**—On the 17th inst. there was a gathering at the Chelsea Town Hall of gentlemen concerned in the local government of Chelsea, for the purpose of making various presentations to Mr. G. R. Strachan, C.E., on the occasion of his retirement from the post of Surveyor to the Vestry of Chelsea. The chair was taken by Earl Cadogan. The chief presentation came from the members of the Vestry, and consisted of a writing-table in English oak, a silver tea-service, a gold watch for Mrs. Strachan, and an illuminated address. —Earl Cadogan, in making the presentation, spoke at some length of the services rendered to the parish by Mr. Strachan. Mr. Strachan feelingly acknowledged this testimonial. Just before the beginning of the Vestry meeting a case of drawing instruments was presented to Mr. Strachan on behalf of the officers of the Vestry. In addition to these presentations, Mr. Strachan received from the Vestry workmen an ivory rule and a set of ivory travelling chessmen, together with the following gratifying address: "This testimonial is presented by the workmen of the Vestry of Chelsea to Mr. George Richardson Strachan, A.M.I.C.E., Surveyor to the Vestry, as a mark of respect and gratitude for the interest he has always taken in their welfare, and especially in the origination of the Sick and Accident Fund, which has recently received the sanction of the Vestry. Whilst expressing sincere regret at his retirement from Chelsea, they earnestly hope that future prosperity and success will attend all his undertakings, and that wherever duty may lead, or in whatever circle of friends he may be placed, he may find the same kindly feelings of regard and esteem shown him as in the humble but heartfelt good wishes of the workmen of the Vestry of Chelsea."

**Hornsey.**—At the meeting of the Hornsey Local Board, on the 15th inst., the Chairman moved that the salary of the Surveyor, Mr. T. de Courcy Meade, be raised 100*l.* a year from July 1, that his salary should be increased 50*l.* a year from the 1st of next July, and 50*l.* a year the following July, making in all 700*l.* a year. The chairman spoke in highly-eulogistic terms of the value of Mr. Meade's services in connexion with the Board and district, and the motion was adopted.

**Leicester.**—At the meeting of the Leicester Town Council, on the 17th inst., a letter was read from Mr. J. Gordon, the Borough Surveyor, resigning his appointment, consequent on his recent election as Chief Engineer to the County Council of London. The Mayor said that the duty of the Council would be to refer the matter to a committee, and he moved that the letter be referred to the Highway and Sewerage Com-

mittee and the chairmen of committees to report at the next meeting. The letter would be received with mingled feelings,—not altogether with regret, because they must rejoice that their friend Mr. Gordon had obtained what was termed, he believed, the blue ribbon of his profession. It was highly creditable to Mr. Gordon that he should have been the successful candidate for so important a position, and they were losing a very valuable official,—a man who, during the nine years he had been with them, had more than justified the expectations that were formed of him when he came. Mr. Gordon would be the first to admit that in Leicester he had found a broad and wide field for his work. They were just under the necessity of entering upon some very large undertakings, and that was an excellent opportunity for a man of Mr. Gordon's ability. They would part with him with the deepest regret, but they would always feel that it was a credit to Leicester that they ever had him as their Surveyor. Alderman Kempson seconded the motion, and it was agreed to.

**Windsor.**—At the last meeting of the Windsor Town Council, a resolution was passed that Mr. Thomas Vincent Davison, A.M.I.C.E., the Borough Surveyor, be thanked for the services rendered by him during the period of the Royal Agricultural Show at Windsor, and that an honorarium of 10*l.* 10*s.* be awarded him for his services.

#### ARCHÆOLOGICAL SOCIETIES.

**London and Middlesex Archaeological Society.**—The annual general meeting of this Society was held on the 18th inst., at the offices, 8, Dane's-inn, Strand. Colonel Britten occupied the chair, and the usual preliminary business having been transacted, the Chairman welcomed the members, and said they met altogether under very pleasant circumstances, as the Society was more than ever prosperous. They did not meet at these annual gatherings in large numbers; like all prosperous concerns, their members had every confidence in the management (hear, hear). Mr. T. Milbourn, the hon. sec., next read the report, of which the following is an abstract: The Council, in presenting the thirty-fourth annual report, had again the pleasure of congratulating the members on the continued prosperity of the Society. The work done by them since the last meeting was not so large as desired, but this had occurred through a want of material for evening meetings. The report then gave a list of the various churches visited, with a description of the same, thanks being given to Mr. Stephens, M.P., Dr. Freshfield, Major Lambert, and others for their kindness to the representatives of the Society on various occasions. The general meeting held at Edmonton, East Barnet, and Finchley, on July 26, 1888, proved most successful. This meeting was presided over by Mr. J. W. Butterworth, F.S.A., who had most generously erected a monument in Edmonton Church to the memory of Charles Lamb and William Cowper, to commemorate the visit of the Society. The thanks of the Society were due to the Rev. R. S. Gregory, vicar of Edmonton, for his paper on the history of the church; also to Mr. E. W. Brabrook, F.S.A.; thanks were also due to Mr. S. W. Kershaw, F.S.A., for his paper on East Barnet church; and to the vicar of East Barnet for his reception of the Society, and his remarks on the church; and to Major George Lambert, F.S.A., for his description of Finchley parish church. During the season an evening meeting was held at the Mercers' Hall, by the kind permission of the Master and Wardens, Mr. Howley Palmer occupying the chair. Dr. Freshfield addressed the meeting. The thanks of the society were due to Mr. John Watney, F.S.A., for getting permission to meet in "The Mercers' Hall"; also for his paper on "The History of St. Thomas of Acon, and on the Plate of the Company." The thanks of the Society were due to the Mercers for their hospitality on the occasion. The annual excursion of the London and Middlesex Archaeological Society will take place on August 15, at Colchester. The number of members is:—Honorary, 4; life, 36; annual, 155. On the motion of the Chairman, seconded by Mr. Pittman, the report was adopted. The officers having been re-appointed, the proceedings terminated with an acknowledgment of the services of the chairman.

**Surrey Archaeological Society.**—Respecting the notice of this Society which appeared in the *Builder* of last week, the excursion



announced for Thursday has been postponed, in consequence of the sudden death of Mr. Ronald Leveson-Gower.

#### THE LONDON COUNTY COUNCIL.

The weekly meeting of this Council was held on Tuesday last in the Council Chamber of the Corporation of London, Guildhall, Lord Rosebery in the chair.

**The Question of a Council-Chamber.**—The Chairman, on taking his seat, reported that that was the last day on which the Council could meet at the Guildhall, as the Council Chamber was about to be repaired or redecorated. There would then be an interval of two months, and the Council would have to decide in the meantime where they would meet after that date. He did not think that the room at Spring-gardens would be ready by that time. It was agreed that the next two meetings be held at Spring-gardens, that a vote of thanks be accorded to the Corporation for the use of the Council Chamber during the past three months, and that the Chairman be authorised to apply to the Lord Mayor for permission to continue to meet there after the necessary repairs were completed. Later on in the sitting, the Council Chamber and Offices Committee brought up the following report:—“Your Committee have to report that, under the authority conferred upon them by the resolution of the Council on the 9th instant, they are having bills of quantities prepared with a view to obtaining tenders for the carrying-out of the proposed alterations to the present Council Chamber and Offices at Spring-gardens. An advertisement has been issued inviting tenders for the work, and the time fixed for the receipt of the tenders is Monday, the 29th instant. According to the standing orders, the tenders should be opened by the Council; but if this course were pursued there would not be sufficient time before the 2nd August, the date on which the Council has resolved to adjourn for the summer vacation, for the Committee to meet to consider the tenders and to report to the Council as to the acceptance of one of them, and for the Council at a subsequent meeting to seal the contract. In order to obviate this difficulty it will be necessary for the standing order relating to the opening of tenders over 500*l.*, to be suspended, and for the Council to authorise the Committee to open and consider the tenders at a special Committee meeting on Monday, the 29th, and report their decision to the Council on the following day, Tuesday, the 30th. By this means, on the Council's approving the recommendation of the Committee, the contract could be sealed at the meeting of the Council on the following Friday, August 2. Your Committee accordingly recommend—

“That Standing Order No. 178, relating to the opening of tenders, be suspended to enable the Committee to open the tenders at a special meeting on the 29th inst., and that the Committee be authorised to bring up a report as to the acceptance of one of them at the meeting of the Council on the following day.”

**The Corporate Associations (Property) Bill.**—The Corporate Property, Charities, and Endowments Committee presented the following report.

“Acting on the reference made by the Council on June 21, 1889 (No. 3), we have examined the Corporate Associations (Property) Bill. From the language of the Bill it is not very easy to say what associations are affected by it, but it affects all corporations established for the advancement of commerce, of religion, of the interests of certain trades, or for any other purpose not being the purpose of trading for profit. We conceive that this description includes, and is intended to include, the City Guilds, and, applying its provisions to that important class of corporations, we look to see what result they will bring out. It provides that the property belonging to such bodies shall be held on trust for the members for the time being and their successors; and it leaves any one of them at liberty to dissolve, and to divide that property among its members on condition of its satisfying one of her Majesty's Superior Courts, ‘that by reason of its objects or the shortness of the time during which it has been established the members for the time being are justified in dissolving the same, and in dividing the property or the proceeds thereof among themselves.’ That condition seems to us easy to satisfy, seeing that to a great extent the objects of the Guilds are extinct, and the property they hold is not wanted for those objects. The view lately presented to the Council, and as we conceive accepted by it, was that the Guilds are public bodies, holding property for purposes public in their nature, though the law has not recognised those purposes as enforceable; that there are at all events large portions of their property to the enjoyment of which their individual members are not justly entitled; and that owing to great social changes, Londoners at large are justly entitled to share in that enjoyment. But if this Bill passes into law, it will create a right in the members of the Guilds at least to enjoy the whole income of the Guild property for ever, and probably to divide the corpus. There is no memorandum attached to the Bill for the purpose of explaining its principles or objects. In the absence of



American Street Architecture: House at Boston.—Messrs. Cabot & Chandler, Architects.

such explanation, its principles appear to run counter to those recently adopted by the Council as applicable to the Guilds. With regard to other Associations, we do not know enough of the nature or circumstances of such as may be contemplated, to judge whether the effect on them may be more beneficial. Probably the Bill will be supported by the members of Guilds. We cannot advise the Council to take any action upon it. We merely recommend ‘That a copy of this report be sent to the gentlemen whose names are on the back of the Bill.’” This was agreed to after a short discussion.

**The Housing of the Working Classes.**—The report of the Committee on the Housing of the Working Classes contained the following paragraphs:—

“The attention of your Committee has been directed to the vacant land adjoining Battersea Park, and to its eligibility for the purpose of the erection of dwellings for the working classes. The estate, which the late Metropolitan Board of Works declined to acquire when the park was transferred under the Public Parks and Works Act, 1887, is valued by the Crown officials at 156,630*l.*; and the debt upon it, with the accumulated arrears of interest, amounts to about 180,000*l.* Your Committee instructed the Clerk to communicate with the First Commissioner of Works with the view of ascertaining whether he would be willing to sanction the erection of improved dwellings for the working-classes in Prince of Wales-road, if such a proposal should be made to him by the Council. In reply, the First Commissioner states that the Department would be unable to entertain any such proposal, as the leases of the neighbouring houses contain restrictive covenants against carrying on any trade or business, and they were erected with the distinct understanding that houses of a superior class would be built upon the adjoining land. Your Committee report the facts for the information of the Council.

“Your Committee reported to the Council, on March 12, that the late Metropolitan Board had received official representations under the Artisans' Dwellings Act, 1875, relating to eight unhealthy areas, upon which no decision had been arrived at by the Board. One of these related to an area adjoining Bell-lane, Whitechapel, to which the attention of the Board was repeatedly called by the Secretary of State for the Home Department, the

Whitechapel District Board of Works, the Whitechapel Board of Guardians, the Board of Guardians for the relief of the Jewish Poor, and others. The area was described in 1877 by the Medical Officer for Whitechapel as having a population of about 2,807, with 8·6 square yards to each person, but the present Medical Officer of the district states that the numbers have fallen to 2,140. The inhabitants are for the most part of the Jewish persuasion—many of them foreigners—and the courts and alleys are densely populated. Your Committee appointed a Sub-Committee to consider the condition of the locality, and they have made a thorough inspection of the area, and will shortly present a definite report.

“The Council, on the 26th ult., adopted a suggestion made by your Committee that the Home Secretary should be requested to assent to the appointment of Mr. Shirley F. Murphy, the Medical Officer to the Council, to be the Medical Officer under Section 13 of the Artisans' Dwellings Act, 1875. Your Committee have now to report that the Secretary of State has signified his assent to the appointment, and they are advised by the Solicitor that no further resolution of the Council is required.”

**Gates and Bars.**—The Parliamentary Committee brought up the following report and recommendation:—“On May 21 last it was referred to your Committee to take steps to obtain the necessary powers for the Council to remove all bars, gates, and other obstructions now existing in the London streets and thoroughfares. On a full consideration of the matter, however, it appeared to your Committee that a Bill to remove all bars, &c., would be met with very extensive opposition, and be attended with very heavy costs, whereas if a Bill were framed to deal with a few gates or bars only, the question of compensation, and similar questions, would probably be decided at a more moderate expense. Your Committee have accordingly selected four test cases on two different properties, which they think would be suitable for the purpose. The obstructions referred to are situated in Torrington-place, Gordon-street, Upper Woburn-place, and Regent-place, leading out of Regent-square. As the reference by the Council relates to all bars, &c., it is necessary





American Street Architecture: House at Albany.—The late H. H. Richardson, Architect.

sary for your Committee to ask for fresh instructions, and they recommended—

"That it be referred to them to take steps for the removal of the bars above mentioned, by a Bill to be introduced in the next session of Parliament."

This was agreed to, and after discussing other matters the Council adjourned.

#### AMERICAN STREET ARCHITECTURE.

We publish two examples of entrance fronts to American street residences, one in Boston, from the designs of Messrs. Cabot & Chandler; the other in Albany, designed by the late H. H. Richardson.

The Boston house is a curiously frank example of the adoption of Byzantine forms of detail in modern American architecture.

#### CASES UNDER THE METROPOLITAN BUILDING ACT.

##### A Greenhouse a Building.

At the Dalton Police-court, before Mr. Bros, Mr. Oldis, of Finsbury Park, was summoned by Mr. H. Lovegrove, District Surveyor of South Islington, for erecting a greenhouse addition in rear of a house in Highbury Quadrant.

The defendant pleaded that as he had not built any walls the structure was not a building.

The District Surveyor pointed out that only the necessary woodwork of sashes was exempt, and that he required the enclosure up to sills and the whole of the side next to the adjoining premises to be of brick.

The magistrates decided that the structure was a building, and imposed a small penalty and costs.

##### Surveyor's Fees.

Mr. T. Quin was summoned at the Clerkenwell Police-court, by Mr. H. Lovegrove, District Surveyor for South Islington, before Mr. Corser, for non-payment of fees on some blocks of model dwellings at Canonbury. There was no defence, and the magistrate ordered payment in fourteen days, with costs.

#### THE ERECTION OF FLATS.

SIR,—Mr. T. E. Knightley, the District Surveyor for Hammersmith, having, on the question of fees, been unsuccessful in his contention that each "flat" in buildings under 3,600 square feet in area is a separate building, states, in the *Builder* of the 13th inst., that, "as the law is against him, the public will have to run the risk of cremation, or decimation by epidemics."

Will you allow me to assure the public that Mr. Knightley's predictions are absolutely groundless.

It is well known that in the "dwellings," or small "flats," occupied by the working classes, the fire risk is greatly increased by the use of oil-lamps, &c.; but, notwithstanding this, the cases are almost *nil*, and there is no instance on record of a fire arising in these "flats" having spread to an adjoining tenement; while, with respect to epidemics, notwithstanding theories to the contrary, there appears to be less risk to the residents in "flats" than to the occupants of ordinary houses.

In proof of this I will quote from the records kept by Sir Sydney Waterlow's Industrial Dwellings Society, of which I have the honour to be Secretary. The Society has, in various parts of London, erected nearly 5,000 small "flats," at a cost, in round figures, of 1,000,000., and houses nearly 30,000 persons of the working or labouring classes. The ceilings in nearly all the rooms are constructed with the usual lath-and-plaster on wood joists, some of the buildings being divided at the second or third floor by fireproof materials. During a period of twenty-six years the claims for fires arising in these "flats" have been twenty-eight only, and the cost of reinstatement has averaged less than 5s. each claim.

During the like period the records show no cases of infectious diseases having spread from floor to floor or from block to block, while the death-rate from these diseases is nearly 25 per cent. below that for the Metropolis generally.

In the past year no death from zymotic disease occurred at eighteen out of the thirty-five estates in occupation, and the few deaths at the other estates were chiefly from infantile diarrhoea, measles, and whooping-cough.

JAMES MOORE.

34, Finsbury-circus, E.C., July 18.

#### EXAMINATIONS FOR FOREMEN AND CLERKS OF WORKS.

SIR,—Professor Roger Smith, in his letter in your last issue, drew the attention of mechanics desirous of qualifying themselves for the position of foremen and clerks of works to the advantages offered by the examination conducted by the Carpenters' Company. The thoroughly practical and comprehensive range of the subjects set, and the certificates awarded by the eminent professional gentlemen who conduct the examination, are a sufficient guarantee that the successful candidates are well qualified for the positions. Qualification and prospect of appointment do not, however, always go hand-in-hand. Unless a man has influence, it is too often the case that talent, skill, and ability go to the wall. When vacancies occur in private firms, or in connection with Vestries, &c., it is not usually the best-qualified applicant, but the one who has friends who can exert influence, who succeeds. The Civil Service examination for Clerks of Works is so hedged in by restrictions that not one of the men who have passed the recent severe tests are qualified to compete, for the simple reason that although fully competent, they have not had influence to secure and hold a similar position for five years. I consider it a gross injustice that men who by many years of earnest work and patient study have acquired sufficient knowledge to pass such an examination should be thus debarred, and so have no incentive held out for further study. Why should not a Government professedly desirous of furthering technical education give an impetus to such studies, by placing this examination on the same footing as those for the Customs and Excise? Instead of having a prohibitive fee of 3*l.* and the other unjust restrictions, abolish the same, and encourage artisans to compete by fixing a fee of 5*s.*, and allow all mechanics who have served their time at a trade, and hold certificates in Building Construction and Technology, and who can pass an examination in practical and technical work similar to that set recently by the Carpenters' Company, to compete at the Civil Service examinations. I also hope that public bodies, such as the School Board and the County Council, will fill up positions by public competition open to all qualified men.

A free field and no favour is all that is desired. If such reforms are carried out they will do more to advance technical education than any number of speeches and Acts of Parliament.

A CERTIFICATED FOREMAN CARPENTER.

July 24, 1889.

#### The Student's Column.

##### WATER-SUPPLY.—IV.

##### AQUEOUS ROCKS.

THE rocks composing the earth's crust are divided into four groups (1) *aqueous*, which have been formed or laid down in water; (2) *aolian*, deposited on the land surface after having been wafted about by wind; (3) *igneous*, formed through the agency of heat, and having at least once been in a state of fusion and subsequently cooled down; and (4) *metamorphic*, either of the foregoing modified, or altered by heat in various forms.

We will first say something about aqueous rocks. They comprise *arenaceous* beds, such as sand, sandstone, and grit; *argillaceous*, which include clays of all kinds; and *calcareous*, such as limestone. Their origin is comparable with beds of a like nature forming at the present day on the sea-bottom, in estuaries and rivers. Generally speaking, the arenaceous beds at present in process of formation in the sea, are found on, and in, the vicinity of the shore, commencing with the pebbles and gravel on the beach, passing into grit and coarse sand, and eventually, some little distance out at sea, ending in very fine sand mixed with a slight quantity of clay. The argillaceous beds begin where the arenaceous leave off, at first with sandy clay, which becomes more pure as it recedes from the coast-line, and then it thins out or dies away. This mode of deposition is liable to variation through the comparative absence of materials or the presence of currents, sand-banks, &c., but the principle remains the same.

The student will understand that the materials laid down are derived from the land, and it entirely depends on the transporting power of the water as to their arrangement;



the heavier portions are, therefore, naturally found congregated nearest the place of derivation, and the lightest farthest from it, and by successive accumulations, in time the deposits, especially of the finer materials, become hundreds of feet thick. During this process, animals (or their remains) living in the sea, are covered up by, and entombed in, the sediment. Where the sediment derived from the shore dies out, successive generations of shell-fish, corals, foraminifera, &c., accumulating one above the other on the sea-floor, form thick deposits of organic remains, which, as they become compact, are known as limestones. Limestones, however, are chemically formed also from the precipitation of lime present in great quantity in water, &c.

We know that the relative positions of land and water are ever changing,—even within the historic period we have the clearest proofs of it,—and precisely the same thing has happened over and over again in past geologic epochs, so that what was once the sea-floor is now elevated into dry land, and vice versa. This leads us to observe that the sedimentary rocks in quarries and outcrops yield the remains of organisms (fossils) which flourished in the water at the time the particular deposits examined were laid down, and, if these are carefully studied, it will be seen that each deposit is characterized by a different suite of fossils. The value of this fact is enormous, as it enables us to trace the continuity of deposits over large tracts of country, either at the surface, or when met with at a depth in well-borings. This, as we shall see, is a matter of considerable importance in water-supply questions. If we follow up a series of beds, and map them wherever they outcrop (come to the surface), we find that there is a definite order of succession. Commencing with the youngest beds, as proved by the great similarity of their contained fossil species to recent ones, we see that they lie on others which must, under ordinary circumstances, be older; that these older beds are again underlain by others of greater antiquity, and so on, until we arrive at the oldest known deposit, the fossils in which are totally different from the forms now inhabiting our shores, and we observe that the change in the fossils, from comparatively modern formations to the most ancient forms, is exceedingly gradual, as exemplified by those found in all the intermediate deposits.

Another thing that immediately strikes us is that each bed, or definite horizon, is very changeable in regard to its thickness when traced over large areas, frequently thinning out altogether, dislocations and bendings of the strata are observed, and numerous other phenomena, all of which relating to our subject will be subsequently explained more in detail. Suffice it now to say that the practical application is very direct. A water-bearing bed can, of course, only be drawn upon where it exists. If it thins out, there is an end of the supply. A town may derive its water from a bed which only exists locally; a few miles off, that bed may have disappeared, and the water as well. How often has the ignorance of this fact led to waste expenditure in sinking wells! The character and distribution of a water-bearing deposit should be studied quite as assiduously as the miner does the whereabouts and modes of occurrence of the precious minerals.

Suppose a water-bearing bed changes its lithological character (structure), as it frequently does,—such for instance, as the gradual alteration of a sand into a clay, caused in some such a manner as explained in the earlier part of this article,—it will often be found to give out less and less water as the change is traced up, so that the same deposit may be aquiferous (water-bearing) at one place and quite barren in another.

Again, in predicting the water-bearing qualities of an aqueous rock, we must study its horizon with reference to the water-level of the district. It is quite possible for a bed to be of very regular structure, persistent over a wide area, and a good water-bearer, but the hydrological conditions may not be the same throughout. Perhaps the bed may almost imperceptibly dip, which, even though the water-level may be tolerably constant, carries it above the line of permanent saturation, and is thus deprived of its water. Or, conversely, it, although water-bearing, may dip too deeply into the ground to render it practicable to draw upon the supply.

In order to identify the various beds, each deposit has received a distinctive name. We

cannot now find space to give all of them; but when studying the geology of a district for water-supply purposes it is extremely important to learn these names (many of which are only of local significance), and to be able to apply them to the beds to which they belong. We may, however, give the main divisions of the aqueous rocks, for we shall hereafter frequently have occasion to refer to them:—

TERTIARY (Cenozoic)	Pliocene.
	Miocene (absent in England).
	Eocene.
SECONDARY (Mesozoic)	Cretaceous.
	Oolitic.
	Liassic.
	Triassic.
	Permian.
PRIMARY (Paleozoic)	Carboniferous.
	Devonian.
	Silurian.
	Cambrian.

The oldest rocks are placed at the bottom of this list, and the newest at the top.

As a rule, the oldest rocks outcrop in the western part of England, and the newest in the eastern, so that if we start in a south-easterly direction from North Wales, in the oldest beds (Cambrian) we might pass in upward succession all the divisions, until, having reached the eastern end of Essex, we find ourselves in the newest deposits (Pliocene), at the top of the list. We should encounter en route gravels, sands, and clays of more recent age than the Pliocene resting on the various divisions; these are superficial deposits, which, although useful as yielding small supplies of water for agricultural purposes, &c., are, generally speaking, of minor importance.

### Books.

*Management of Accumulators and Private Electric Light Installations.* By Sir DAVID SALOMONS, Bart., M.A. (London: Whittaker & Co. 1888.)

THE object with which this valuable little book has been written is explained by the author, in the preface to the present edition, as follows:—"Two classes of persons are interested in batteries, namely: the seller and the buyer. The former know comparatively little of their properties; for as the cells are made they leave the works, and their knowledge is confined to laboratory tests, and it is not to their interest to publish all their shortcomings. The user, on the other hand, has rarely the knowledge to examine the question; it therefore remains the privilege of a very few to observe, scientifically as well as practically, the working of batteries, and out of this limited class not many have the time or opportunity to write on the subject; the Author has attempted to fill the gap which lies between the manufacturer of cells and the general user, and trusts it will prove of benefit to both."

Thus, the position the author holds in the electric lighting world is a unique one; he may be described as a professional user. Sir David Salomons first used the electric light at Broomhill in 1874, and whatever criticism may be offered as to the various arrangements employed in the present installation, probably the most complete of its kind in existence, the mere record of the experiences gained after fifteen years' close observation of electric-lighting plant cannot be otherwise than of great value, alike to amateur and professional electricians.

After a brief description of the secondary batteries most generally used, instructions are given for setting up an accumulator, care being taken that each cell shall be easily accessible for inspection and repair; the faults that may develop before and after charging, and the precautions that should be taken at every stage are clearly set forth. Unfortunately this part of the text is by no means free from typographical errors, and although most of them are obvious enough, still such a one as occurs on p. 39, where Pb O<sub>2</sub> appears for Pb O<sub>3</sub>, is likely to lead to confusion in the mind of a reader not familiar with the chemistry of lead cells. The chapter on "Failures: their causes and remedies," should be carefully read by everyone owning or having charge of accumulators; the symptoms of decay, and the directions as to how any faults that develop may be remedied are very clearly described, and the author's long experience is sufficient guarantee for the efficiency of his

methods. It must be remembered that an accumulator is a rather delicate piece of apparatus, and improper usage for only a short time will damage it beyond all chance of repair; on the other hand, if it is treated properly, and means taken to make good any defect as soon as it shows itself, a set of secondary cells will give very little trouble, and work satisfactorily for years. This part of the book is very interesting, as it fully shows why such contradictory reports are given, by different users, about the practicability of employing accumulators on a large scale.

The precise part which sulphate of lead plays in a cell is, we believe, still in dispute, and we wish the author had been a little more explicit on this point. Referring to this subject, he says the compound Pb SO<sub>4</sub> is formed, and calls it "unhealthy sulphate." This formula, which might with advantage be written Pb SO<sub>4</sub>. Pb O, is that of a basic sulphate of lead, which, no doubt, may occur; but it would greatly interest those readers who wish to follow these scientific explanations, to learn how Sir David Salomons made sure he was dealing with a definite compound, and not a mere mixture of ordinary sulphate (Pb SO<sub>4</sub>) and the lower oxide (Pb O).

Indeed, there are very many points of considerable interest raised throughout the book on which a little fuller explanation is needed. The second and larger part of the book deals with installation work, and states at length what is necessary to make everything go smoothly, not even omitting the best grease to use for lubricating purposes. The suggestions are doubtless excellent; but as the aim of the author is to make everything automatic, so that the most stupid attendant can hardly make the light unsatisfactory, the amount of apparatus required is rather appalling, to say nothing of the expense.

The master of Broomhill evidently devotes no little thought and attention to his installation, but few owners have the knowledge or can spare the time to design automatic apparatus for overcoming every difficulty as it arises; we feel sure a better plan, as a rule, would be to spend less money on apparatus, and more in retaining the services of a properly qualified attendant.

The chapter on rules for the prevention of fire risks is one the author's long experience eminently qualifies him for making instructive, but as he sat on the committee responsible for the regulations issued by the Institution of Electrical Engineers, he merely reprints them, not feeling himself in a position to offer any comments.

The table of estimates has evidently been very carefully compiled, and will prove of great service to any person wishing to have a private installation.

One addition to the book would be of immense assistance to the young student of physical science. In the index of terms there occurs this sentence, "Watt = volt × Ampère = Measure of force or energy." Taking the dyne and the erg as the measures of force and energy respectively, will the author state how many dynes there are in an erg, how many ergs there are in a watt, and how many watts there are in a dyne?

The book will well repay careful perusal, and it contains a vast amount of information that is to be found nowhere else in so simple and readable a form.

*Electrical Instrument Making for Amateurs.* By R. S. BOTTONE. (London: Whittaker & Co. 1888.)

THERE is no better method of teaching a beginner the elements of any branch of experimental physics than by encouraging him to make with his own hands some of the simpler instruments required for demonstration, and letting him carry out certain well-selected experiments for himself.

This is essentially a book for schoolboys who wish to know something about electricity, and the list of tools required, given on the first page, should be well within the easy reach even of those not overburdened with pocket-money.

The first part of this useful little work gives most careful and detailed instructions for making electroscopes, Leyden jars, a Coulomb torsion balance, an electrophorus, and five different kinds of electrical machines. Every operation is so described as only to require the tools previously named, except in a few cases, such as for example the Wimshurst machine, where the use of a lathe is suggested, a tool the author says in the earlier pages he does not



expect the amateur to possess, and a boy endowed with some little patience and ingenuity should find no difficulty in producing the instruments according to the instructions given. Perhaps the young amateur would find himself in possession of a more useful set of apparatus had the construction of some other instruments been given in place of the less efficient forms of electrical machines, but a lad who had acquired sufficient skill to construct a workable Holtz or Wimshurst machine would, doubtless, be able to devise for himself ways of reproducing some of the instruments illustrated in elementary treatises on electricity and magnetism, or to be seen in the shop-windows of philosophical instrument-makers.

The second part of the book, describing "dynamic or current instruments," shows a sad falling-off, and is very inferior to the first portion. The author, beginning with medical and induction coils, carries the student as far as the construction of the frame-work, the core, and the winding of the primary and secondary coils. The contact-breaker is merely mentioned, so we presume the author means it to be bought ready-made; but this is no reason why the various connections should be omitted from the diagrams, and no proper description given in the text. At this stage the amateur is apparently supposed to become possessed of an excellent stock of tools, and be as good a workman as the average mechanic; this being so, he can construct two forms of small magneto-machines. Next follows a paragraph headed "The Dynamo." This is introduced, presumably, to draw attention to the fact that the author has written a book called "The Dynamo: How made and how used," for beyond getting the frame and field magnets cast for an antiquated form of Gramme machine, we defy the ablest amateur to construct a dynamo from the description given. The rules laid down for designing a dynamo to do any particular kind of work are two in number and are simplicity itself; the length of wire on the armature is determined by allowing 1 yard for each volt required, the cross-section is calculated by allowing 2,000 amperes per square inch of cross-section. And yet electrical engineers require years of study and training before they can successfully design dynamo machines!

The forms suggested of ammeter, voltmeter, and galvanometers are practicable, but the directions given for graduating these instruments are essentially amateurish; for example, to find the deflection given by one ampere on the ammeter, ten quart Daniell cells are connected up with the ammeter and a copper-depositing cell, the experimenter then adjusts matters until exactly 18.35 grains of copper are deposited in one hour. If the author has ever graduated an ammeter accurately in the way he describes, he must be the most skilful of living experimenters.

In the section on voltmeters, the author says, "I shall deviate somewhat from the plan hitherto followed in these pages, and devote a few lines to the consideration of what E. M. F. really is. According to the present state of our knowledge, the phenomena which we group together under the name of 'electricity' are simply manifestations of a peculiar mode of motion in the ultimate particles of bodies, called *atoms*." Having enumerated "many means of setting up this motion," the following words describe what E. M. F. really is: "Now the means employed, whether they be friction, motion in the field of a magnet, chemical action, or heat, are called, when viewed under this aspect, 'electro-motive force,' or that which sets up an electrical condition." This is a fair example of the author's "theory" which is scattered about the latter part of the book, though, fortunately, he partially returns to his old style when dealing with batteries, thermopiles, and the telephone.

So long as Mr. Bottone is describing to the amateur how to make rough but practicable instruments, his style and methods are excellent in every way; but he would have done well had he submitted the theoretical parts of his otherwise valuable little book to the candid criticism of some competent electrician.

**The Marble Church at Copenhagen.**—The exterior of the great marble church at Copenhagen, upon which work has been in progress for several years, is somewhat approaching completion, the four huge marble columns forming part of the frontage towards Bredgade being now in course of erection.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

10,343, Combination Mantel and Chimney-pieces, &c. J. R. Crosthwaite.

The object of this invention is to form side-plates of iron, which shall make a framework for tiles which are freely employed in the decoration. When the tiles are fitted, the joints of the tiling are utilised, strengthening pieces being employed crossing the framework. Special forms are also used in the construction of the lintel and jambs, by which tiles or other ornamental work can be introduced on the iron framework.

10,586, Paving, A. McLean.

In the paving-blocks which are the subject of this invention, made of cement or concrete, rings, strips, or small blocks of lead are inserted so that they lie flush with the wearing surface. The invention is also applicable to asphaltic, and will prevent the paving from wearing out so soon.

4,174, Burglar-proof Fastenings for Windows. F. T. Vine, B.A.

The object of this invention is to secure the window so that it may not be undone by a burglar or thief from the outside, even if the person should break a pane of glass which is not of sufficient size to admit the body. To each of the lower and upper sashes of the window a strong chain or jointed metal bar is fixed so that the same cannot be unfastened, the other end of the chain being attached by any suitable detachable fastener to the interior wall of the room at such a distance that it cannot be reached by an arm passed through the window or a broken pane. The chain will also permit of the window being opened to allow a certain amount of ventilation.

5,312, Chimney-top. T. Jutin.

In this invention a chimney-top, or terminal of iron, or of fire-clay and iron is used. The fire-clay portion is a pipe of from 4 ft. to 8 ft. long and from 9 in. to 12 in. in diameter, with a broad flange on the top to hold the windguard, which is attached by bolts and nuts. This windguard, which is a part of the invention, has circular louvres, fitted about an inch apart, the whole being removable when necessary.

5,788, Opening, Regulating, and Fastening Windows, &c. R. Adams.

This invention bears reference to a previous specification, and relates to opening, &c., windows and analogous articles in groups, or singly, by the use of a serrated rack, a lever, and a lock-fastening.

7,164, Chimney-pot and Fixing. J. Kimm.

The object of this patent is to prevent danger from the chimney-tops or pots being blown down and damaging the roofs, &c., or of falling on and wounding the passengers below. The pots are set outside the bricks or stones of the chimney, and secured, or collared, with mortar or cement in the ordinary way. The pot is constructed with a collar, or base, the outer edge and bottom being made flat so as to rest on the top of the bricks, and forming a right angle with the base, which is inserted inside the chimney. When set in this way the pot will be absolutely immovable in a gale of wind.

## NEW APPLICATIONS FOR PATENTS.

July 8.—10,969, C. Heard, Mill for Grinding Wet Slurry.—10,977, F. MacGauran, Gate-fittings.—10,979, H. Munday and H. Walker, Flap Valves for Sewers or Drains.—10,986, C. Brown, Grip Hinge for Swing Frames.

July 9.—10,997, J. King, Material for the Treatment of Walls, &c.—11,036, T. Tucker, Fastener for Windows.—11,047, L. Williams, Window-sash Fasteners.—11,052, F. Träbert, Centering Supports for Arched Constructions.

July 10.—11,117, J. Fryer, Extracting Cowl or Ventilator.—11,128, G. Batchelor, Drying Slurry by the Waste Heat from Cement Kilns.

July 11.—11,145, H. Johnson and T. Wilson, Air-inlet Ventilator to fit in Sash Windows.—11,146, H. Johnson and T. Wilson, Exhaust Ventilators for Chimney-flues.—11,190, T. Descon, Preventing Sliding Window-sashes from being opened from the exterior side beyond a given point.

July 12.—11,221, R. Davies, Brick Presses.—11,229, F. Taylor, Nails or Fasteners.

July 13.—11,224, J. Kane, Sowing Casement-windows.—11,252, H. Trimby Self, Counter-sinking Screw for Wood.—11,258, F. Baker and W. Tetlow, Automatic Door.—11,281, J. Dean, Water-closets.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

15, W. Bird, Attaching Door Knobs to Spindles.—8,051, W. Scott, Paper-hangings, &c.—8,132, B. Cordingley, Plug-cock for Lavatories, &c.—8,532, O. Elphick, Lavatories.—8,625, J. Redpath, Cooking-ranges or Fireplaces.—8,852, F. Brown, Covering Floors, Walls, &c., in Wood, Mosaic, or Parquetry Work, (or Imitations of Same).—9,011, J. Downes, Chimney-top.—9,114, P. Stein, Double Latch-lock.—10,000, S. Deards, Glass-roofs and Skylights, and Metal Bars for Same.—10,088, The Broselye Tiles Company and J. Crump, Earthenware Quarries or Tiles.—10,156, J. Simple, Drain Sewer-pipes.—10,378, C. Coops, Paving.—10,386, R. Kerr, Walls and Other Surfaces of Brick, &c.—10,531, T. Birnbaum, Gas Brackets, Chandeliers, &c.—10,562, H. Brockmann, Combined Garden Tile and Drain Pipe.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to Opposition for Two Months.

10,456, J. Steevenson and S. Eddington, Mould for making and Pressing Bricks.—12,173, C. Young, Automatic Bolt for Double Doors.—12,192, T. Hargreaves, Safety Window Fastenings.—12,470, C. Falconar, Framing Sash Windows, Doors, or Shutters.—12,718, T. Sharples and H. Graham, Windows.—13,040, H. McKibbin, Window-frames or Sashes and Fasteners therefor.—13,059, W. Jarvis, Wall-blocks for Buildings.—13,170, J. Kaye, Opening and Closing Fanlights, &c.—13,819, A. Greg, Machine for Sawing Timber.—235, C. Johns, Core of Smoky Chimneys.—954, C. Widmark, Cement.—5,915, G. Ewart and Others, Metal Roofing.—8,642, T. Caunt, Sash Window-frames and Means of Opening and Closing the Sashes.—9,000, E. Mann, Raising and Lowering Window Sashes, &c.

## RECENT SALES OF PROPERTY:

## ESTATE EXCHANGE REPORT.

July 9.—By SEDGEWICK, SON, & WHALL. Bushey.—Fourteen plots of land, &c. £341

July 10.—By A. RICHARDS (at Edmonton). Tottenham, Bruce-grove.—Six plots of land, &c. 600

F. house and shop in High-road, r. £32 p.a. 520

July 12.—By Messrs. COBB (at Sittingbourne). Sittingbourne, near—F. enclosures of land, 107a, 3r. 32p. 3,150

Filmer's Farm, 31a, 2r. 32p., f. 2,600

July 15.—By HERRING, SON, & DAW. Dalwich.—322, Friern-rd. 1,800

By W. & F. HOUGHTON. Stratford.—44 to 54, even, and 66, 68, and 70, Holham-st., u.t. 81 yrs., g.r. £31.10s., r. £162.2s. p.a. 865

By H. A. HENDERSON. Clapton.—40, Powell-rd., f. r. £17 p.a. 490

By F. CHAMBERS. Essex, Aldborough Hatch.—White's Farm, 23a, Or. 25p., f. 1,400

Ilford.—Ilford Nursery and 4a, 2r. 16p., f. 1,140

Barkegate.—Two enclosures of land, 7a, Or. 14p., f. 325

Barking.—7, Heath-st., u.t. 58 yrs., g.r. £3.8s., r. £25 p.a. 200

Hacton.—39 and 41, York-st., u.t. 33 yrs., g.r. £5.12s., r. £45 p.a. 383

By HARDING & LOW. St. Albans.—The Kingsbury Brewery and thirty-two inns, public-houses, and beer-houses 24,100

By FOSTER & CHAMBERLAIN. Hoxton.—43, Fittell-st., f. r. £80 p.a. 1,580

132 to 164 even, New North-rd., u.t. 37 yrs., g.r. £46, r. £189 p.a. 1,260

Killing.—1 and 15, Oxford-rd., u.t. 73 yrs., g.r. £14, r. £31 p.a. 740

July 16.—By H. SCRIBTON. Reehampton.—1 to 20, Elizabeth-pl., f. r. £410 p.a. 4,550

Keenington.—5, Stratford-rd., f. r. £95 p.a. 880

By A. CHANCELLOR. Richmond, Kew-rd.—The residence called "Park-side," u.t. 81 yrs., g.r. £33.10s. 1,950

By W. A. BLACKMORE. Westminster.—33 and 35, Romney-st., f. r. £104, 650

Remford.—5 to 13, Moore-st., u.t. 88 yrs., g.r. £39, e.r. £28 16

By KING & CHASEMORE. Sussex, Paygate.—A f. cottage and 13a, Or. 29p. 820

The Beaches and 3a, Or. 49p., f. 1,890

Numerous enclosures of land, 178a, 3r. 39p., f. 5,760

By DEVENHAM, TOWN & CO. Notting-hill.—107, Portland-rd., u.t. 60 yrs., g.r. £7 370

St. Pancras.—20 to 26, Charrington-st., u.t. 37 yrs., g.r. £40, r. £175 1,870

1 to 6, Penryn-st., u.t. 61 yrs., g.r. £25.10s., r. £190 2,260

12, 14, 17, and 18, Penryn-st., u.t. 61 yrs., g.r. £15.10s., r. £134 1,510

12 and 13, Platt-st., u.t. 64 yrs., g.r. £6, r. £74 800

25 and 26, Medburn-st., u.t. 64 yrs., g.r. £3, r. £64 780

41, 42, 43, and 44, Goldington-st., u.t. 61 yrs., g.r. £22, r. £103 1,345

153 and 155, Pancras-rd., u.t. 56 yrs., g.r. £26.10s., r. £105 720

22 and 23, Drummond-crescent, and a block of stabling, u.t. 12 yrs., g.r. £60.10s., r. £270 p.a. 1,180

Camden Town.—45 and 47, Georgiana-st., u.t. 61 yrs., g.r. £16, r. £72 720

5 and 6, Canal-rd., u.t. 10 yrs., g.r. £14, r. £16.10s. 120

L.g.r. of £20 p.a., u.t. 50 yrs. 310

L.g.r. of £47 p.a., u.t. 30 yrs., with short reversion to r. £9.0 p.a. 1,710

By TRUSCOTT & MARLEY. East Cowes.—"Maresfield," with grounds, f. 1,109

St. John's Wood.—42, Finchley-rd., u.t. 30 yrs., g.r. £16 2,350

Bromsbury.—The residence known as "Coverdale," u.t. 88 yrs., g.r. £29, r. £130 p.a. 1,450

Wimbledon.—201, Dumont-rd., u.t. 85 yrs., g.r. £6, r. £27 p.a. 215

By SEDGEWICK, SON, & WHALL (at Watford). Watford.—64, Church-rd., f. r. £11.14s. 609

Clarendon-rd.—A plot of land, &c. 163

July 17.—By TURNER, RUDON, & TURNER. Lingfield.—The residence "Angleisle," and 7a, Or. 35p. 750

Two cottages, and 19a, 2r. 27p., of which 14 acres are l. and rest f., r. £32.8s., p.a. 670

The f. cottage "Billhurst," and la. l.r., r. £12.10s. p.a. 667

By M. HUBBARD. Belgrave.—33, South Eaton-pl., u.t. 35 yrs., g.r. £9, r. £75 p.a. 835

By H. GAFFIN. Battersea.—53, 55, and 67, Alford-st., with stabling, u.t. 69 yrs., g.r. £7, r. £117 p.a. 750

By FAREBROTHER, ELIS, & CO. Richmond.—12, Down-ter, f. 225



**MEETINGS.**

SATURDAY, JULY 27.

*Architectural Association.*—Fifth Session visit to Maidstone and Leeds Castle. (See advt. in last week's Builder.)

MONDAY, JULY 28.

*British Archaeological Association.*—Opening meeting of Annual Congress, at Lincoln. (For programme, see Builder for July 20, p. 47.)

TUESDAY, JULY 30.

*Society of Engineers* visit to the Outfall Sewage Precipitation Works at Crossness.

*British Archaeological Association.*—Lincoln Congress (continued).

WEDNESDAY, JULY 31.

*British Archaeological Association.*—Lincoln Congress (continued).

THURSDAY, AUGUST 1.

*British Archaeological Association.*—Lincoln Congress (continued).

FRIDAY, AUGUST 2.

*British Archaeological Association.*—Lincoln Congress (continued).

SATURDAY, AUGUST 3.

*British Archaeological Association.*—Lincoln Congress (continued).

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**Miscellaneous.**

**Removal of a Glasgow Land-mark.**—The old Athenæum buildings, whence the club or society of that name removed to new quarters in St. George's-place, last year, are now in process of demolition, the site being required by the Government for an enlargement of the General Post Office. The "Athenæum," which faced to Ingram-street, and against the rear of which the new General Post Office, George's-square, was built a few years ago, dates back to 1796-98, when it was erected by a company of Glasgow proprietors associated on the tontine principle, under the title of the "New Assembly and Concert Rooms." The site at that time was almost suburban, although now it is in the very heart of the city, and within a step of the Royal Exchange. Its history is intimately connected with the fashionable gatherings of the West of Scotland, during the closing years of last, and the first thirty years of this century, but in the year 1847 it became the home of the "Glasgow Athenæum," a literary, scientific, and educational society of singular usefulness and success, and for forty years thereafter remained as such, forming one of the city's secondary centres of progress and culture. The building possessed a frontage which was reckoned handsome and effective;—Grecian in style; and of some considerable time after the opening of the present century its value as a street feature was further enhanced by detached wings of corresponding design. The central, or original erection had a rusticated basement story, with a deep square projection from the middle of the front, supporting four Ionic columns with pilasters and entablature. The assembly-room, subsequently the Athenæum news-room and lecture-hall, was 37 ft. in height and measured 80 ft. by 35 ft. After being vacated by the Athenæum the building was from time to time utilised by the Post-office authorities at seasons of business overflow, but it is now to be replaced by an entirely new erection of suitable interior plans, and added permanently to the Post-office block. The facing stones, columns, pilasters, and entablature of the old frontage, however, are carefully preserved, with a view to partial re-erection and preservation in one of the city parks.

**The English Iron Trade.**—The English iron market is getting much more active, and its tendency continues upwards. Pig-iron is in better inquiry, and higher prices are the rule. Scotch warrants are still advancing, and have carried up with them the rates quoted for makers' iron, the various brands of which are from 6d. to 1s. 6d. a ton dearer. Producers of Cleveland pig also want 1s. a ton more for their iron, but prompt business has been done in some instances at a rise of 6d. on the week. Bessemer has likewise gained another 6d. In Lancashire and the Midland districts the improvement in prices and demand continues. The demand for finished iron is more active this week, and its value is fully maintained. Steel is also very firm, and there is a large outlay, with extensive orders held in reserve. Shipbuilding, now that a good many orders have been placed by the Admiralty, is starting on another period of briskness and prosperity. In all departments of engineering there is

EAST HAM (Essex).—For repairs, &c., to eight cottages, for Mr. G. B. Graburn:—  
Burgess & Algar, Bromley-by-Bow\*. £100 0 0  
\* Accepted.



## CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Waterworks	Faringdon Union R.S.A.	F. H. Barfield, F.S.I.	Aug. 2nd	ii.
Wrought-iron Girders, &c.	Met. & Met. Dist. Rail. Joint Committee	J. J. Hanbury	do.	ii.
Sanitary Works, &c.	St. George-in-the-East Guardians	Wilson, Son, & Aldwin	do.	xii.
Paving, &c.	East Dereham Loc. Bd.	F. W. Skipper	Aug. 6th	ii.
Wrought-iron Girders, &c.	Toxteth Park Loc. Bd.	J. Price	Aug. 7th	xii.
Quay Wall	Manchester Corp.	G. H. Hill	Aug. 9th	ii.
Paving Street	Belfast Corporation	Official	Aug. 12th	xii.
Removal of Dust and Refuse, &c.	Finchley Local Board.	do.	Aug. 27th	xii.
Private Street Improvements.	St. George-the-Martyr	do.	Sept. 2nd	ii.
New Road	Bromley Local Board.	H. S. Creggan	do.	ii.
Stoneware Piping	do.	Official	do.	ii.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
County Surveyor	Notts County Council.	500 <i>l.</i>	Aug. 12th	xvi.
Resident Engineer	Manchester Corp.	450 <i>l.</i>	Aug. 20th	xvi.
Civil Engineering Draughtsman	Rail Corporation	100 <i>l.</i>	Not stated.	xvi.
Temporary Clerk of Works	Royal Engin. Soc.	10 <i>l.</i>	do.	xvi.
Temporary Foreman of Works	do.	6 <i>l.</i>	do.	xvi.

EDMONTON.—For alterations and additions at the Strand Union Schools, Millfield House, Edmonton, for the Guardians of the Strand Union. Mr. W. S. Cross, architect. Quantities by Mr. H. E. Pollard:—  
 Putnam & Fotheringham.....£11,740 0 0  
 Brass & Sons.....11,327 0 0  
 Hall & Biddell.....11,367 0 0  
 Macey.....11,220 0 0  
 Clemence.....10,875 0 0  
 D. Laithe.....10,662 0 0  
 Hart Bros.....10,553 0 0  
 Holliday & Co.....10,333 0 0  
 Patrick & Son.....10,270 0 0  
 Holloway.....10,023 0 0  
 C. Darrell.....9,763 0 0  
 C. Wall.....9,198 0 0

HORNSLEY.—For new road, sewer, surface-water drain, conduits, &c., for the British Land Company, on their estate at Harringay Park. Mr. Henry B. Michell, surveyor:—  
 Paill & Sons.....£1,340 0 0  
 Wilson.....1,321 10 0  
 Denmore.....1,300 0 0  
 Nowell & Robson.....1,255 0 0  
 Killingback.....1,250 0 0  
 Bloomfield.....1,232 0 0  
 Pizze (accepted).....1,200 0 0

LONDON.—For the erection of new business premises, Southwark, S.E., for Messrs. Alfred Higgit & Co. Mr. Chas. J. C. Pawley, architect, 2, Prince's Mansions, Victoria-street, Westminster:—  
 W. Goodwin, Hatton-garden, E.C. ....£3,885 0 0  
 F. Dawes, Peckham, S.E. ....3,750 0 0  
 Tuttle & Appleton, Wandsworth, S.W. ....3,845 0 0  
 Ward & Co., Peckham, S.E. ....3,639 0 0  
 H. Piper, New Cross, S.E. ....3,585 0 0

LONDON.—For the erection of stabling, shed, cottage, &c., for the London General Omnibus Company (Limited), at Fernhead-road, Harrow-road, N.W., under the superintendence of Mr. G. T. Lanham. Quantities by Mr. A. J. Bolton:—  
 Tuttle & Appleton.....£1,378 0 0  
 Stephenson.....1,354 0 0  
 Knight.....1,680 0 0  
 Evans.....1,679 0 0  
 Britton.....1,678 0 0  
 R. & E. Evans.....1,667 0 0  
 Geo. Parker.....1,630 0 0  
 Garrud.....1,617 0 0  
 Toms.....1,554 0 0  
 Hunt.....1,526 0 0  
 Haynes.....1,510 0 0

LONDON.—For the erection of additional story on tables for the London General Omnibus Company (Limited), at Windsor Castle-road, Hammermith, under the superintendence of Mr. G. T. Lanham. Quantities by Mr. A. J. Bolton:—  
 Harris & Wardrop.....£1,970 0 0  
 Haynes.....1,968 0 0  
 Garrud.....1,927 0 0  
 Evans.....1,867 0 0  
 Knight.....1,883 0 0  
 Parker.....1,665 0 0  
 Britton.....1,631 0 0  
 R. & E. Evans.....1,598 0 0  
 Hunt.....1,645 0 0  
 Toms.....1,524 0 0  
 Stephenson.....1,455 0 0

LONDON.—For remodelling bar, cabinet, new saloon, &c., counters, piewtering, and decorations at the "Favourite" tavern, Horseley-vale, N., for Mr. A. Hutchinson. Messrs. G. Carter & Son, surveyors, 51, Holloway-road, N.:—  
 Carter (accepted).....£330 0 0

LONDON.—For repairs, decorations, and alterations at the "Lord Nelson" tavern, Copenhagen-street, N., for Messrs. Patrick and Manning. Messrs. G. Carter & Son, surveyors, 51, Holloway-road, N.:—  
 Kitchen (accepted).....£141 0 0  
 New Counter, Beer-Engines, Piewtering, &c. Sanders & Son, Oxford-street (accepted).....£125 0 0

LONDON.—For erecting Colet House Preparatory School, West Kensington. Mr. W. H. Spaul, architect. Quantities by Mr. J. Gandy:—  
 Dove Bros.....£16,915 0 0  
 Putnam & Fotheringham.....16,470 0 0  
 Holland & Hansen.....16,990 0 0  
 Jno. Mowlem & Co.....16,678 0 0  
 Brass & Co.....16,673 0 0  
 D. Charteris.....16,597 0 0  
 Perry & Co.....14,998 0 0  
 Kirk & Randall.....14,617 0 0  
 Stephens, Bastow, & Co. (accepted) 14,459 0 0

LONDON.—For superstructure of premises in Throgmorton-avenue, for Mr. John Morris, on land belonging to the Carpenters' Company, and for Mr. Geo. Fleming, on land belonging to the Drapers' Company. Messrs. Davis & Emanuel, architects. Quantities by Mr. W. Matthews:—  
 A\* B\* Total.  
 Cunbitt & Co.....£11,830 £11,240 £23,070  
 Mowlem & Co.....11,816 11,160 22,976  
 Abby & Horner.....11,600 11,060 22,660  
 Trollope & Sons.....11,481 10,980 22,471  
 J. T. Chappell.....11,335 10,732 22,067  
 Collis & Sons.....10,998 10,575 21,573  
 Building on the Carpenters' Company's land.  
 Building on the Drapers' Company's land.

LONDON.—For the erection of new police-station at Norwood-green, for the Receiver for the Metropolitan Police District. Mr. John Butler, Surveyor to the Metropolitan Police:—  
 Lodge.....£3,310 0 0  
 Hart.....2,960 0 0  
 Aylis.....2,969 0 0  
 Scrivener & Co.....2,937 0 0  
 Ansell.....2,868 0 0  
 Brass & Sons.....2,850 0 0  
 Holland & Hansen.....2,855 0 0  
 Perkins.....2,853 0 0  
 Grover & Sons.....2,850 0 0  
 Chappell.....2,849 0 0  
 Loden & Sons.....2,787 0 0  
 Lathby Bros.....2,700 0 0  
 A. & R. Hanson.....2,688 0 0  
 Farnidge (accepted).....2,637 0 0

LONDON.—For alteration of dispensary and the erection of residence for the Medical Officer at the infirmary of the Whitechapel Union, for the Guardians. Mr. Bruce J. Capell, architect. Quantities supplied:—  
 Ward & Co.....£2,578 0 0  
 Catmer.....2,485 0 0  
 Wood.....2,269 0 0  
 Hockley.....2,205 0 0  
 Greger.....2,194 0 0  
 J. O. Richardson.....2,108 0 0  
 Edwards.....2,063 0 0  
 Hunt.....1,983 0 0  
 Duggan.....1,842 0 0  
 Lob & Oliver.....1,764 0 0

LONDON.—For the enlargement of Flasey-road Board School, for the School Board for London. Mr. T. J. Bailey, architect:—  
 Parker.....£1,449 0 0  
 Tyerman.....1,383 0 0  
 Goodman.....1,360 0 0  
 Longley & Co.....1,339 0 0  
 Wm. Downs.....1,337 10 0  
 Staines & Son.....1,329 0 0  
 Knight.....1,287 1 0  
 Kirk & Randall.....1,228 0 0  
 J. O. H. Randall.....1,204 0 0  
 Charteris.....1,197 0 0

LONDON.—For the enlargement of Gravel-land Board School, for the School Board for London. Mr. T. J. Bailey, architect. Quantities by Messrs. Arding, Bond, & Buzzard:—  
 Parker.....£1,250 0 0  
 Longley & Co.....1,241 0 0  
 Wm. Downs.....1,190 0 0  
 Goodman.....1,144 0 0  
 Williams.....1,123 0 0  
 Charteris.....1,100 0 0  
 Holloway.....1,070 0 0  
 J. O. Richardson.....1,029 0 0

LONDON.—For new staircase at the Norwood Schools for the Lambeth Board of Guardians. Quantities by Messrs. Fowler & Huggan:—  
 Hall, Beddall & Co.....£220 0 0  
 F. & H. F. Higgs.....245 0 0  
 B. E. Nightingale.....243 0 0  
 W. Lye.....238 11 4  
 A. & W. Gurner.....230 0 0  
 A. W. Dawson & Co.....225 0 0  
 J. O. Richardson.....219 0 0

LONDON.—For rebuilding No. 13, Langham-street, Portland-place, W., for Mr. L. W. Thomas. Mr. C. H. Worley, architect. Quantities by Mr. R. C. Glead:—  
 Collis & Sons.....£2,795 0 0  
 Holliday & Greenwood.....2,612 0 0  
 Stevens.....2,598 0 0  
 Lawrence & Sons.....2,583 0 0  
 W. Downs.....2,534 0 0  
 Brickell, Poplar.....2,395 0 0  
 Green & Lee.....2,343 0 0

LONDON.—For erecting stabling in Vauxhall-walk, for Messrs. H. Myer & Co. Mr. John A. J. Woodward, architect, 10, Crown-villa, Kennington Oval:—  
 Nightingale.....£791 0 0  
 Ansell.....777 0 0  
 Hooper.....730 0 0  
 Ford.....720 0 0  
 Marsland.....685 0 0  
 Tyerman.....680 0 0  
 J. Beale, Westminster Bridge-road.....690 0 0

LONDON.—For alterations to two houses, No. 210 and 212, East India-road, for Mr. Philip Leiben. Mr. Clark, architect, Poplar:—  
 Higgs.....£267 0 0  
 Holland.....500 0 0  
 Walker.....497 0 0  
 King.....498 0 0  
 Hearle.....483 0 0  
 Triggs, Prescot-street.....448 0 0  
 Linn.....470 0 0  
 Dames.....390 0 0

LONDON.—For erecting two new class-rooms, seven new water-closets, and other works, in connection with Holy Trinity Schools, Carlisle-place, Lambeth, for the Rev. G. Weirall, M.A. Mr. Thos. Seward, architect, 65, Banhill-road, S.E.:—  
 W. Downs.....£640 0 0  
 Loden.....569 0 0  
 Laphorne.....557 0 0  
 Hills & Hills.....639 0 0  
 J. Beale, Westminster Bridge-road.....471 0 0  
 Accepted.

LONDON.—For erecting new armoury and officers' room at the Headquarters of the 2nd Tower Hamlets R.V. Mr. Theodore Moore, architect, 144, Mile-end-road, E.:—  
 Little & Senecal.....£215 0 0  
 Triggs (accepted).....279 0 0

LONDON.—For re-building two cottages, Eagle-place, Mile-end. Mr. Theodore Moore, architect, 144, Mile-end-road:—  
 Leatherdale.....£250 0 0  
 Lusk (accepted).....189 0 0  
 LONDON.—For alteration and additions to the "Royal George" public-house, Charing-cross-road, for Messrs. H. Richardson & Co. Mr. J. T. Alexander, architect, 40, Great James-street, Bedford-row, W.C.:—  
 Wilkinson.....£3,243 0 0  
 Maddock Bros.....3,181 0 0  
 Chappel.....3,189 0 0  
 J. L. Green.....3,189 0 0  
 Putnam & Fotheringham.....2,973 0 0  
 J. Beale, Westminster Bridge-road.....2,794 0 0

LONDON.—For alterations to the "Old Bell" public-house, High-road, Kilburn, for Mr. S. Shapcott. Mr. J. T. Alexander, architect, 40, Great James-street, Bedford-row:—  
 Marks.....£273 0 0  
 J. Beale.....493 0 0  
 Aldrey.....487 0 0  
 Higgs.....319 0 0

LONDON.—For alterations and repairs to the "Masons Arms" Hotel, Harrow-road, for Mr. Lander. Messrs. Treacher & Fisher, architects, 30, Coleman-street, E.C.:—  
 Marks.....£1,117 0 0  
 Allen.....1,111 0 0  
 J. Beale.....963 0 0  
 Walker.....945 0 0  
 Spencer & Co.....930 0 0  
 Tuttle & Appleton.....912 0 0

LONDON.—For alterations to the "Rising Sun" public-house, York-road, Lambeth, for Mr. George Gabb. Mr. Geo. Treacher, architect, 30, Coleman-street, E.C.:—  
 Ansell.....£780 0 0  
 Jennings.....780 0 0  
 Manslay.....714 0 0  
 Crocker.....673 0 0  
 J. Beale.....658 0 0  
 Spencer & Co.....650 0 0  
 Tuttle & Appleton.....645 0 0

LONDON.—For new choir vestry to St. Mary's Church, Kilburn. Messrs. Francis & Sons, architects, Palmerston-buildings, E.C.:—  
 F. Austey.....£333 10 0  
 Wiggins & Head.....327 0 0  
 S. Dainton.....310 0 0  
 J. Allen & Sons.....296 0 0  
 Collis & Sons.....282 0 0  
 E. A. Yerbury, St. Margaret's, Kilburn (accepted).....244 0 0

LONDON.—For sundry repairs, &c., to Lady Holles' Girl School, Mare-street, Hackney. Mr. F. Hammond, architect, 1, Circus-place, London-wall:—  
 Larks & Son (accepted).....£165 0 0  
 LONDON.—For bar-fittings, &c., at the "Hope and Anchor" public-house, Brixton, under the superintendence of Mr. W. Eve, F.S.I., 10, Union-court, E.C.:—  
 Sanders & Son.....£144 5 0  
 Lancelotti.....360 0 0  
 Chappell (accepted).....320 0 0

**LONDON.**—For rebuilding premises in rear of Nos. 55, 56, and 57, Red Cross-street, City. Mr. F. Hammond, architect, 1, Circus-place, London-wall.—

Hosgood .....	24,325	0	0
Dove Bros. ....	3,975	0	0
Lawrence & Son ..	3,830	0	0
Brass & Son (accepted) ..	3,773	0	0

**LONDON.**—For proposed rebuilding of No. 29, Hertford-street, Mayfair, W., for Mr. G. H. Haines. Messrs. Haines & Darling, architects. Quantities by Mr. F. Hingston:—

	Estimate	Credits.	
Colls & Sons .....	£1,892	£54	£1,838
Holland & Hannen ..	4,684	60	4,624
Grover .....	4,475	61	4,414
Hall, Beddall, & Co. ..	4,374	80	4,294
Peto Bros. ....	4,380	60	4,320
Higgs & Hill .....	3,830	1,500	2,330
Stephens, Easton, & Co. ....	3,777	4	3,781
Kieman & Sons .....	3,672	68	3,604

**LONDON.**—For repairs, &c., to the "King's Arms" public-house, St. George's-road, Southwark, for Mr. Fred Eade:—

J. Beale, Westminster-bridge-road ..	£290	0	0
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Accepted. [No competition.]

**LONDON.**—For sinking and building brick fan-pits and drainage works, for Messrs. Edwin Ellis & Co., Hersey-lane, Bermondsey, S.E.:—

Brown, Bromley .....	2,618	0	0
Wells, Bermondsey ..	495	0	0
Stanley Ellis, Guildford (accepted) ..	430	0	0

**MANCHESTER.**—For four houses at Stand, for the Misses Farrar. Mr. J. D. Harker, architect, 78, King-street, Manchester:—

John Jackson & Sons, Whitefield ..	£2,280	0	0
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Accepted.

**PLUMSTAD.**—For alterations to Brewery Stores, Plumstead, for Messrs. Mitchell & Beasley, Meirs. Inkpen & Mackenzie, architects:—

Stirkland & Chandler ..	£725	0	0
J. O. Richardson .....	665	0	0
Kirk & Randall (accepted) ..	637	0	0

**SOUTHAMPTON.**—For erecting head-quarters for the Gordon Boys' Messenger Brigade, Ogle-road, Southampton. Mr. W. H. Mitchell, architect:—

Brunson & Sons .....	£1,135	0	0
Chapman .....	1,045	0	0
H. Stevens & Co. ....	975	0	0
Bull & Sons .....	865	0	0
Jonas Nichols (accepted) ..	920	0	0

**SWINDON.**—For proposed Public Offices, Swindon, for the Swindon New Town Local Board:—

Edmund Chambers, Swindon ..	£10,248	0	0
D. C. Jones & Co., Gloucester ..	9,279	0	0
A. Krauss, Bristol .....	9,217	0	0
G. Wiltshire, Swindon .....	9,031	0	0
J. Barrett, Swindon .....	8,803	0	0
W. Jones, Gloucester .....	8,960	0	0
Stephens, Easton, & Co., Bristol ..	8,465	0	0
G. Grimwood & Sons, Sudbury ..	8,490	0	0
P. Martin, Maidenhead ..	8,196	0	0
J. Reed, Plymouth .....	8,113	11	3

**Bull Inn, Tottenham.**—One of the firms tendering writes to say that there was a competition for this job, and that there were four other tenders besides Mr. F. Blandford's, which was stated to have been accepted.

**SUBSCRIBERS IN LONDON AND THE SUBURBS**, by prepaying at the Publishing Office, 15s. per annum (or 4s. 8d. per quarter), can ensure receiving "The Builder" by Friday Morning's post.

#### TO CORRESPONDENTS.

S. C. (we cannot assist you unless we get an opinion from a clinical expert on the constitution and probable action of your material). S. C. (we cannot insert them without the amount). W. M. & C. (we cannot insert them without the amount). All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline printing out books and giving addresses. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the writers. Letters or communications (beyond mere news items) which have been duplicated for other journals, are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

#### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "The Builder, London."

THE INDEX and TITLE-PAGE for Volume LVI (Jan. to June, 1889) were given as a Supplement to our number for July.

A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office. CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also READING ROOMS, with Straps, price 9d. each. THE FIFTY-SIXTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence. SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 2s. 6d. each.

#### CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS. Six lines (about fifty words) or under ..... 4s. 6d. Each additional line (about ten words) ..... 5s. 6d. Terms for Series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

#### SITUATIONS WANTED.

FOUR Lines (about thirty words) or under ..... 2s. 6d. Each additional line (about ten words) ..... 5s. 6d.

#### PREPAYMENT IS ABSOLUTELY NECESSARY.

\* Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to DOUGLAS FOULDRINE, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on FRIDAY, and for the front page by the same hour on WEDNESDAY.

**SPECIAL.**—ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY morning.

The Publisher cannot be responsible for DRAWING, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder" may have Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. Fee of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

#### READING CASES.

Now ready. SIXPENCE EACH. (By post, carefully packed, 1s.)

#### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum. Foreign, to all parts of Europe, America, Australia, and New Zealand, 18s. per annum. To India, China, Japan, &c., 30s. per annum. Remittances payable to DOUGLAS FOULDRINE, Publisher, No. 41, Catherine-street, W.C.

## HOWARD & SONS

25, 26, 27, BERNERS STREET, W., MANUFACTURERS AND CONTRACTORS

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### The Report of the Committee on Town Holdings.



THE long-expected Report of the Committee of the House of Commons on Town Holdings, which was appointed in 1886, and which sat in that year as well as in 1887

and 1888, has at length been issued. In one sense it is a partial report only, since the important subject of the imposition of "a direct assessment on the owners of ground-rents, and on the owners of increased values imparted to land by building operations or other improvements," is not dealt with in the Report. Further evidence is to be given before the Committee can come to a conclusion on this matter. The Committee itself was a very large and representative one. It consisted of twenty-five members, including among the number men so Conservative and so well acquainted with the subject as Sir John Ellis and Mr. Elton, Q.C., and Radicals so pronounced as Mr. H. Lawson and Mr. Conybeare. It will, therefore, be difficult for the advocates of the present state of things or of changes to take much exception to this Report. It seems to us to represent the views of most candid and businesslike men, and to show that the Committee have considered the subject with the solid good sense which characterises Englishmen when they give up party politics in the serene atmosphere of a Committee-room.

The Report, as now issued, is easily divisible into two parts. For the present we omit altogether any consideration of the portion which deals with Ireland, except in so far as it is affected by any general principles laid down in the body of the Report. These two parts are, firstly, what is popularly called leasehold enfranchisement; and, secondly, compensation for goodwill and improvements. It is on the latter part we propose to touch first. As regards goodwill, the conclusion of the Committee is that, independently of improvement, it is of an ephemeral character. Therefore the Committee say no more about it. We now come to a limited class of improvements, viz., those of a sanitary nature. These we have always urged it should be in the power of a tenant to do, and for them he should receive compensation.

In regard to this the Committee recommend as follows:—"The Committee further recommend legislation to secure to tenants, whether under existing or future contracts, the right to compensation at the expiration of the lease, on an equitable basis, for alterations made for improving the sanitary condition of their premises." This is a sound and proper recommendation, but care will have to be taken in any such measure that only necessary and reasonable sanitary repairs are to be paid for by a landlord, for hobbies and sanitary extravagances ought not to be forced on him. It is, however, an immense step in advance to find sanitary needs thus recognised by a representative Committee of the House of Commons, and it shows how the subject has grown in public opinion. Nothing in the above paragraph points to the need for any previous notice in writing to the landlord, and consent from him, before the tenant executes sanitary repairs; in many cases the necessity of such a consent would practically put a stop to the execution of the work at all. But if necessary sanitary work is not done by a landlord, the tenant should have the right to do it, and be recouped by the landlord at the end of the term, whether the latter consents or not. We lay some stress on this point of a written consent because we find it strongly marked in another paragraph of the Report which deals with "substantial improvements." The recommendation of the Committee on this head is as follows:—

"A suggestion of a comparatively limited character has been made to the effect that under either an existing or a future contract of tenancy, a tenant, whether of business premises or of a dwelling-house, effecting substantial improvements with the previous written consent of the landlord, shall be entitled to claim compensation at the expiration of the tenancy. We see no objection to this proposal, and think it might have some effect in facilitating the making of improvements."

But a sanitary alteration is a substantial improvement, and we feel some doubt whether or not the question of sanitary improvements is included in this paragraph. We are inclined to presume not, and for the reasons already given, we should hope it is not. For an Act based on the paragraph we have just quoted would do little more than enunciate what is now the law in the case of many reasonable landlords and tenants, who make arrangements by contract beneficial to each.

We now approach another, and in some

respects more important, head in reference to improvements, viz., those of purely business premises:—

"With regard to future contracts of tenancy the Committee feel that no injustice would be involved in such an alteration of the law as would entitle the tenant of trade or business premises, on the expiration of his tenancy, to compensation for such improvements as he may have *bona-fide* made for the purpose of carrying on his trade or business, and as may have added to the permanent letting value of the premises. This would, in our opinion, promote the making of improvements, and would secure to the tenant the increased value of the premises, which he has undoubtedly created by his own expenditure. At first such a change in the law might give rise to many inconveniences and, perhaps, hardships; but, when the practice was once established, the questions arising would probably, in the majority of cases, be settled by agreement or by some system of reference, without a necessity for legal proceedings. The right to compensation should, we think, be limited to the case of trading and business premises. As regards alterations and improvements to dwelling-houses, great difficulty would often arise in deciding whether the value of the house had actually been increased by the expenditure, nor is there the urgency upon the tenant of a residence to improve or enlarge it, as there often is on the owner of a business to alter his premises in order to accommodate a growing trade.

The exercise of this right would have to be strictly safeguarded, so as to prevent its being used by a tenant to annoy or embarrass the lessor. With this object, it would be proper for the tenant, before effecting any improvements for which he intends to claim compensation, to give full notice to the landlord of the nature of such improvements, and of the amount proposed to be expended upon them, so as to give the landlord an opportunity to check the alterations of the property, and if they are injurious to him, to stop them. The landlord should be allowed, if he thinks fit, to execute the suggested improvements himself, on the tenant paying him, by way of increased rent, a fair rate of interest on the capital so expended.

In no case should a tenant be entitled to compensation for improvements if his landlord is willing to renew his lease at a fair rent, independently of the value of such improvements, and care would have to be taken not to give a right to compensation against a landlord who may himself be only a lessee, unless he has a corresponding right against the freeholder.

It appears to the Committee that many reasons may be adduced in favour of legislation based on the principles just described; but, the subject being one of great difficulty and complexity, the Committee, while considering it their duty to indicate the nature of a possible remedy for grievances, the existence of which they recognise, are not prepared to do more than record their opinion that a carefully-framed measure on this subject, based on the principles just mentioned, would probably be of public advantage."

We have quoted this part of the Report in



*extenso* because it cannot be summarised accurately so as to give a proper impression of it. Its importance is great. It would introduce quite a new principle into the relation of landlord and tenant in towns, a principle which has been recognised hitherto only in agricultural tenancies. It shows that when a principle is introduced into one class of contracts it is almost certain sooner or later to extend to others of an analogous character. It will be observed (to criticise the portion of the Report quoted above) that notice is to be given to the landlord, who may thus be able "to stop" the improvements if they are injurious to him. The question which naturally arises is, Do the Committee intend the landlord to have in all cases a veto on the proposed improvement? Is his consent to be a condition precedent to their execution? If it is, the proposed legislation would have very small application; if it is not, the reverse will happen. For under the existing state of things a tenant can always apply for his landlord's consent, and if so, it is difficult to see how, if consent is necessary, the position of the tenant will be much bettered. Consent is necessary under the provisions of the Agricultural Holdings Act, but that Act has done little more than put into an Act of Parliament arrangements which were constantly made before it came into operation.

It will be thus seen that the Report of the Committee on this branch of the subject suggests legislation under several heads. It suggests (a) compensation for sanitary improvements without the consent of the landlord,—so, at least, we are inclined to read the Report; (b) compensation for material improvements in dwelling-houses with the landlord's consent; and (c) compensation for improved value of business premises in consequence of alterations which a landlord has the power to "stop." Assuming that in the near future the recommendations of the Committee are embodied by the Legislature in an Act of Parliament, so far as refers to towns, it is certain that at no very distant date such legislation must be applied to the whole country. The occupier of business premises in a village will demand the same rights as his fellow in the town, and the occupier of a country house in Middlesex will ask for the same rights in regard to sanitary improvements as the householder in Bayswater or Kensington.

Having thus pointed out the salient portions of the Report of the Committee on one main branch of the subject sent to them for investigation, we have now to deal with the interesting and lengthy comments which are concerned with the subject of leasehold tenure and leasehold enfranchisement. Part of this section of the Report is a summary of building tenures and their distribution throughout England, and the variation of tenure is remarkable. We find, for example, that "In Warwickshire, Birmingham is mainly a leasehold town, the Corporation estates being granted on 75 years' leases, and other large estates on 99 years' terms. The other towns are freehold." This is but one example, but it will be found on examination that, as a rule, most provincial towns are either erected mainly on freehold or mainly on leasehold tenures. Of course, there are noticeable exceptions to this rule; but, looking at England as a whole, this rule appears to be deducible from the results of the Committee's investigations. Thus, Plymouth, Exeter, Barnstaple, and Tiverton are freehold towns; while Cardiff, Merthyr Tydfil, Newport, and Carmarthen are held on 99 years' leases. At some future time, perhaps, a social inquirer may investigate the subject, and some results may be obtained showing if tenure has had any and what effect on the moral and political character of the people.

With this diversity of tenure throughout the country, it was quite certain that the committee-room in which this particular Parliamentary body held its sittings would be the battle-ground of the upholders of the two different systems. To put it more accurately, the leasehold system was on its trial for, as we all know, social and legal

reformers have for a long time made the condemnation of the leasehold system a favourite cry. It has been held responsible not only for structural defects in houses, for bad building, but for moral, physical, and sanitary defects. On the whole, the victory is clearly with the leasehold system; that is to say, the Committee do not find that it is worse than the freehold system. In one respect, indeed, it is pronounced to be the superior to the freehold system, namely, in regard to the facilities which it gives for the more rapid development of land.—"The Committee agree with the opinion that the plan of letting land for building upon an annual rent, which is a leading feature of the leasehold system, possesses considerable advantage and convenience; and they have on the whole come to the conclusion that, except in places where the sentiment of the district is strongly opposed to leasehold, houses are built and building estates are developed more rapidly on the leasehold system than on that of freehold purchase, and that, in consequence of the large supply of houses thus caused, occupiers obtain the benefits of lower rents and greater opportunities of selection; but there is no evidence that towns where the freehold system prevails have suffered in consequence." It must be confessed that this last sentence is somewhat ambiguous, and rather in contradiction, as it appears to us, of the previous assertion. For if, under a leasehold tenure, houses are built and building estates are developed more rapidly, and the people are consequently thereby benefited, then it follows that localities must be injuriously affected where the leasehold tenure does not prevail; or, on the other hand, if this is not so, then the first statement is too favourable to leasehold tenure. But, broadly stated, the opinion of the Committee is in favour on this point of leasehold tenure,—that is to say, it is placed, at the lowest, on equal terms with freehold tenure.

But facility in developing estates, and a large supply of houses, would not counterbalance the disadvantages, sanitary and moral, if they exist, which have been placed in array against the leasehold system. An immense mass of evidence has been laid before the Committee on the subject of bad building and state of repair, and the verdict is again in favour of leasehold tenure; or, again, to speak by the card, the accusations against it are held not to be proven. The conclusion of the Committee on this head is most important, being the first competent and thoroughly considered judicial opinion on the point. As such it should silence the opponents of the leasehold system, for no candid man can fail to bow, to some extent at least, to the authority of the conclusion which the Committee has reached. It is as follows:—

"After carefully considering the evidence of the witnesses who maintain the advantages of the freehold and leasehold systems respectively, as regards the character of houses erected under them, we cannot fully adopt the conclusion contended for on either side. We are unable to satisfy ourselves that, as a general rule, the nature of the tenure under the freehold and leasehold systems has any considerable effect in determining the class and quality of houses erected. We think that any system under which the builder obtains the land without any expenditure of capital, to some extent affords facilities for the operations of the less substantial and more speculative class of builders, but there is no evidence to show that this class of builder is not found carrying on operations in freehold towns; nor does the evidence lead to the conclusion that a comparison between freehold and leasehold towns would clearly indicate that leasehold tenure has had a bad effect on the class of houses erected in, and the general sanitary condition of the towns in which that tenure prevails.

These conclusions refer to the comparison between freehold tenure and leasehold of ninety-nine years or thereabouts. As regards shorter terms, however, we are of opinion that a man, erecting a house on a term of sixty years and under, is likely to build less substantially than if he possessed a more permanent interest, and we think that the evidence shows that the prevalence of such short terms has a tendency to affect injuriously the character of houses built under them. We are, however, unable to say that a similar result ensues in the case of longer terms, such as ninety-nine years, except in such instances as that of a man erecting a house for

his own occupation, when he would be likely to spend more money on the building if he obtains a long term or the freehold.

We consider that the class and quality of the houses depend in the main on a number of conditions, such as the situation of the property, the class of dwellings for which there is a demand, the character and means of the builder, the amount of supervision exercised by the local authorities, and a variety of other circumstances, which are irrespective of tenure.

Your Committee are further of opinion that the state of maintenance and repair of houses mostly depends, not upon the tenure, but upon the character and position of the landlords, the lessees, and occupiers; for although it is undoubtedly the case that a freehold occupier has a stronger motive to keep his property in order than the leaseholder, yet on the other hand there is the power and interest which the ground landlord has to enforce the covenants to repair contained in the lease.

A great deal has been said with reference to the condition of leasehold houses, tenanted chiefly by the working classes, held on the "fag ends" of leases—i.e., on terms that have only a few years to run. In these cases it is alleged that houses commonly get into the hands of a class of middlemen whose object is to make the largest possible profit, getting the highest rent that can be obtained for them, and spending as little as they can help in maintenance and repairs. We have received but little specific evidence on this branch of the question, but opinions have been expressed by many of the witnesses that the bad state of repair of houses so held is attributable to the leasehold system. We think there is no doubt that the holder of the fag end of a lease has a strong interest not to spend more on the repairs of his house than he is positively obliged to do, and although in most cases the landlord has the legal power to compel repairs, yet there seem often to be great practical difficulties in the way of doing so, besides which he is often merely waiting for the expiration of the lease to clear the site and rebuild. The local sanitary authorities also are naturally reluctant to exercise compulsory powers in respect to such houses, and to put the lessee to a large expense which he would have no time to recoup himself for during the remainder of his lease. For these reasons we think that the division of ownership existing under such circumstances conduces to the bad condition in which many of the dwellings occupied by the working classes in towns are found, and that it facilitates the operations of a low class of middlemen as landlords. It must, however, be remembered that all houses in the course of time wear out, and there is abundant evidence that freehold houses of a similar class to those referred to, are apt to get into an equally bad condition. This has been proved as regards London, and would, we think it probable, be found to be the case in most other towns, having a large population of the poorer classes. Property of this class, whether freehold or leasehold, tends to get into the hands of a class of speculators, who extort the highest rents they can obtain from the occupiers, and expend as little as they can in repairs, consistently with keeping the houses tenanted. We are of opinion that the principal remedy for this state of things must be looked for in a rigid enforcement of sanitary powers by local authorities. We may also observe that the falling-in of the leases in the neighbourhood sometimes gives opportunity to a ground landlord to put an end, by rebuilding, to an unsatisfactory state of things, which in the case of a number of small freehold owners, might continue almost indefinitely. To the above observations we would add this qualification, that a working man building for himself on freehold land will probably spend more money on his house than if he held it on a lease, though, as the vast majority of houses are supplied to the community by builders, this observation is of limited application. We think a working man owning his house will probably feel a greater interest in its maintenance, and will, therefore, in most cases, keep it in better order and condition if it is his own freehold than where he only possesses a limited or terminable interest.

Many of the cases where property held on the leasehold system is in a very bad condition are cases where the property is held under old leases, which do not reserve sufficient powers to the lessor to prevent encroachments by building, and to enforce a proper state of repair. As regards high-class residential property the evidence tends to show that it is built equally well on leasehold as on freehold. Illustrations of this are given in reference to estates in Birmingham, Liverpool, Nottingham, and the West-end of London. The same remark would apply to the state of maintenance and repair of such property.

We have given this part of the Report at length, because it is in our view perhaps the most important part.

There are one or two subsidiary points which have yet to be touched on before we arrive at the question of the enfranchisement of leaseholds. One of these is as regards the laying out of estates for building, which then



advocates of the leasehold system urge is best done when this tenure is in use. It is sufficient to give the conclusion of the Committee without further comment.

"The Committee, while acknowledging the advantages of building land being dealt with on a consistent plan, and as a whole, and the good effect which a far-seeing freeholder will exercise over the development of his property on the leasehold system, have no evidence to lead them to believe that building land is not equally well laid out and developed in the large towns where the freehold system is prevalent, and the evil apprehended from every man building according to his own plan on his own freehold area, in the opinion of the Committee, to be met by the supervision of the local authorities, who should have ample power to ensure both good building and the proper laying out of the building land."

The rest of these subsidiary points relate to rebuilding, since it is alleged that the leasehold system, by providing that after a term of years the houses shall revert to the freeholder, encourages the periodical building of new houses. The conclusion of the Committee is very short:—"The Committee are of opinion that in most cases when a large area reverts at one time to the ground landlord this circumstance facilitates and promotes the improvement and rebuilding of houses in such areas." This is not altogether a finding in favour of the leasehold system, since it is obvious that a house which it is advisable to pull down after it has been in existence for eighty or ninety years cannot in the first instance have been very substantially built. On the other hand, when houses have increased, of course this opportunity for rebuilding and altering the class of houses is of value and importance.

We now pass to the subject of leasehold enfranchisement. The report of the Committee on this much-debated subject is of a temperate character, but it necessarily follows that, as they have come to the conclusion that the leasehold system is not as bad as its enemies would have us believe, the necessity for leasehold enfranchisement cannot be as urgent as its advocates contend. We will first of all give the conclusion arrived at by the Committee, which is as follows:—

"While we are unable, for the reasons we have above stated, to recommend the adoption of any general scheme of compulsory leasehold enfranchisement such as those which have been proposed to us, we are of opinion that there are places where some plan for facilitating the acquisition by leaseholders of the freehold of their houses might with advantage be put into operation, as regards limited areas, in which there are a large proportion of occupying leaseholders of the industrial classes (including clerks and small traders) who are able and willing to purchase the reversion of their properties. No proposal for such a local application of the principle of the enfranchisement has been laid before us, but a consideration, on the one hand, of the disadvantages of the existing state of things, which are undoubtedly very strongly and generally felt in some localities, and, on the other hand, of the injury and disturbance of rights which would, we believe, ensue from any scheme of universal application, such as suggested, leads us to the belief that the best practical solution of the important question of how to enable the classes above-mentioned to become more generally owners of their houses, is likely to be found in the exercise by local bodies of powers to be conferred upon them under certain defined circumstances. For instance, if it should appear that there are areas occupied exclusively, or very largely by the dwellings of these classes, where the majority of the occupiers are leaseholders and are desirous of purchasing the freehold of their houses, and if in such cases the local authorities should be of opinion that habits of thrift and industry would be promoted, and the prosperity of the district enhanced by enfranchisement, and should have reasonable grounds for believing that the powers to be conferred upon them could be exercised without loss, we think the local authority might properly be empowered to acquire by agreement, or, if necessary, by compulsory purchase, the reversionary interests in the property within the area in question, and to sell the reversions of their houses to such of the occupying leaseholders as had agreed to enfranchise, either at a price paid down at once, or payable in instalments over a period of years. The part of the property not so disposed of the authority should be empowered either to sell (subject to the right of pre-emption to the original owner being reserved) by public auction or by public tender, or to retain at its discretion. It might be proper that the exercise of these powers on the part of the local authority should be preceded by an inquiry

under the direction of the Local Government Board.

Although we are conscious that there are many objections which may be made to this plan, and that difficulties would probably attend its practical operation, yet we consider that it would be free from some of the gravest objections which, in our judgment, attach to any enfranchisement scheme indiscriminately applied to the whole country. It would greatly diminish, if not entirely remove, the risk of subjecting the owners of ground rents and reversions to the constant liability to the piecemeal purchase of their property; it would greatly reduce the difficulties arising in connexion with compensation for severance, and the costs both of ascertaining the interests of the freeholders and other reversions, and of investigating their titles; and it may be assumed that optional powers of the kind described would not be put in force, to the detriment of the community, by interfering with the interests, either present or prospective, of municipal corporations or public charities.

The application of a process of the kind proposed would also be gradual, and, to some extent, tentative, and would, in our opinion, be likely to afford valuable evidence upon the balance among the industrial classes of a desire to purchase the freehold of their houses, upon their ability to do so, and upon other questions connected with this branch of our inquiry, which are at present largely matters of speculation.

The Committee, therefore, recommend to Parliament the enactment of a measure for empowering local authorities to facilitate enfranchisement in the manner already described."

The reasons for this very cold recommendation of leasehold enfranchisement are obvious when the portions of the report anterior to this conclusion are studied. These we will briefly summarise. The Committee are of opinion that the leasehold enfranchisement "would not materially benefit the working-classes in London and in most large towns," because they are usually lodgers or occupiers as weekly tenants or on tenures too short to bring them within its scope. In other places, such as Woolwich, and in some of the mining districts of Wales "there is a strong and bona-fide desire on the part of the working population to acquire the freehold." The value of such a desire in encouraging thrift is cordially recognised by the Committee, and it is to meet the case of communities where the desire is general that a practical measure of leasehold enfranchisement is recommended. On the other hand the Committee equally recognise the injury which may be done to reversionary interests and to thrifty men, "persons of moderate means and retired tradespeople" who have invested their savings in ground-rents if any wholesale measure of leasehold enfranchisement were to become law. Again also the Committee find equal difficulty in ascertaining any fair mode of compensating reversioners by fixed tables, and they desire to put on record their "decided opinion that it is essential as a matter of common fairness that the reversioners shall receive the full value of their interest in the property, compensation for injury which they may suffer in respect of adjoining and other property, and all the costs necessarily incurred."

We have now given our readers the main points of the report, so far as they relate to England and Wales. There are some comparatively minor recommendations of some value to enable trustees of places of worship, co-operative societies, and public authorities, to become owners in fee of leasehold sites. These are based on principles long familiar in the case of railway undertakings and similar enterprises. On the whole, the report is likely to lead to some useful and unsensational legislation. It will be a long-standing barrier in the way of any wholesale scheme of leasehold enfranchisement, and it has shown that many of the complaints against the leasehold system are unfounded.

**University of Glasgow.**—The Chair of Civil Engineering and Mechanics in the University of Glasgow, in the gift of the Crown, is about to become vacant by the retirement of Professor James Thomson, C.E., LL.D., D.Sc., F.R.S., whose health has been failing of late. Professor Thomson, who has held the appointment since 1873, formerly occupied one of the Chairs in Queen's College, Belfast.

## CONCRETE FLOORS.—II.\*

BY FRANK CAWS, ARCHITECT.

**A**S before noted, the behaviour of glass window-panes very well illustrates the behaviour of cement concrete. The behaviour of cast-iron is likewise very similar to that of concrete. The reason for this similarity appears to lie in the fact that the compressional strength of each of the three materials is largely in excess of the tensile strength; being, for cast-iron, about 7 to 1, for neat cement about 10 to 1, and for glass about 11 to 1. For cement-concrete the proportion of compressional to tensile strength will vary according to the nature and relative quantity of the aggregate. The concrete for floors, mixed as before described, is a much tougher or softer material than pure cement, and immensely tougher or softer than glass; that is to say, much less brittle, softer, and more flexible. Probably the compressive strength of such concrete is about eight times its tensile strength, as remarked in Part I. The principle appears to be universal that, all other things being equal, the most inflexible materials are those whose compressive strength most exceeds their tensile strength, and the most flexible materials are those whose tensile strength most exceeds their compressive strength. Thus glass, with 11 of compressive to 1 of tensile strength, is very much more brittle than cement concrete, with 8 of compressive to 1 of tensile strength; though the actual strength of glass is about twenty times that of cement-concrete in tension. The marvellous difference between the toughness or softness of the concrete and of the glass is shown by the fact that concrete can be cut with a chisel, while glass can only be cut by a diamond.

But, notwithstanding the great difference between the flexibility of cement-concrete and of glass, as already suggested, the likeness between the behaviour of window-panes and of concrete floor slabs affords a valuable index to the real strength of the latter. No practical builder would hesitate to put in window-panes 1 ft. square of ordinary sheet glass  $\frac{7}{16}$  in. thick (i.e., 21 oz. per super-foot) to withstand the heaviest wind pressure,—of, say, 84 lb. per foot; nor would he hesitate probably to make that same pane of glass serve as the floor of a parlour aquarium to sustain 16 in. depth of sea-water,—i.e., about 84 lb. per foot load. We know that shop windows of plate-glass from 8 ft. to 12 ft. square by not exceeding  $\frac{1}{2}$  in. thick (and generally of less thickness), safely sustain, as a rule, the pressure of the heaviest storms of wind encountered in the streets, reaching an occasional maximum, probably, of about 42 lb. per foot. [Of course, it may be said the glass has not, when so set on edge, to bear the leverage of its own weight, as it would have to do if laid flat. But its own weight would only represent a very small fraction of the total load, when 84 lb. per foot wind-pressure was at work,—about  $\frac{3}{4}$  per cent., in fact.] And when, as rarely happens, shop windows are blown in, the weakness proves oftener to lie in the imperfect bedding and fixing than in the glass itself. The tensile strength of sheet glass of good ordinary quality is about five times that of matured neat cement, and about twenty times that of matured cement concrete, mixed one of best Portland cement to four of good, hard, well-burnt brick aggregate.

The strength of slabs is inverse to their breadth or diameter, and is as the square of their thickness.

If the glass pane, 1 ft. square by  $\frac{7}{16}$  in. thick, had possessed only  $\frac{1}{5}$  of its strength we should set it to carry a pressure, not of 84 lb., but of  $\frac{84}{5}$  equal, say, 4 lb. per ft. And if it were 1 in. thick it would carry 100 times as much, because 10<sup>2</sup> equal 100.

Thus we may theoretically adopt as a unit base of calculation for the strength of concrete slabs (subject to an ample allowance for practical contingencies), a slab 1 ft. square by 1 in. thick, carrying 400 lb. safely, equally



distributed, all the four edges of slab being well bedded on an unyielding foundation.

If now we make the slab ten times as large, while keeping it still 1 in. thick, we shall have a slab of 10 ft. square by 1 in. thick sustaining a safe load of 40 lb. per foot. If we increase the thickness from 1 in. to 4 in. we shall increase the strength sixteenfold, thus making the safe load 640 lb. per ft.

Thus we ascertain that a slab of concrete of matured strength, mixed in proportions four to one, as before described, if about 17½ ft. square by 6 in. thick, will sustain an equally-distributed load of 84 lb. per square foot, including its own weight of, say, 60 lb. per square foot, as safely as a 21 oz. window-pane, 1 ft. square, will sustain a hurricane pressure of 84 lb. per foot.

Constructionists who refuse to believe concrete-floor slabs of vast size are capable of carrying their own weight and heavy loads, overlook the fact that glass slabs, so to speak, in shop windows are commonly found exhibiting a degree of strength much more remarkable than that of a concrete slab 17½ ft. square by 6 in. thick.

The enormous difference between the resistance to flexure of a slab bedded on all its edges and a beam bedded only on its two ends, though of the utmost practical importance, appears to have escaped the notice of writers and compilers of constructional literature.

In proof of the enormous difference referred to, the following very homely experiment will suffice.

Take any rectangular picture on a cardboard mount—say, for example, an ordinary *carte-de-visite*, out of its frame; and, having first removed the glass, place the frame, face downwards, flat upon the table, and lay across the narrower way of the frame the *carte*, letting its two ends rest on the frame, thus constituting the *carte* a beam, *pro tem*. Now place a threepennybit on the middle of *carte*, and upon that a sixpence, then a shilling, and then a pile of coppers, building up the latter slowly and carefully till the cardboard beam has deflected so far as just to touch the table in the middle of span. Now relieve the *carte* of weights, and, if it be fairly elastic, it will return to its normal flatness. Now replace the *carte* on the rebate of the frame, so that all its four edges are fairly bedded thereon, and repeat the experiment with the coins. The *carte* is no longer a beam, it is a slab now, and the heap of coins which caused the beam to deflect till touching surface of table, produce scarcely any visible effect on the slab. An enormous increase of load is necessary to cause the slab to yield to nearly such an extent as the beam; and when, under this vastly multiplied load, the slab eventually gives way, it is awkwardly creased or crinkled and crippled, in a totally different manner from the beam flexure, and its elasticity will not restore the slab to flatness, when once it has been so crippled and crinkled. It will be found that at least sixteen times the load is needed to produce the same deflection of slab as of beam. Again, as a final experiment, if the *carte*, without being crippled or bent beyond its elastic power of recovery, is not only allowed to rest on its four edges, but is also pinned, or gummed, or otherwise well fastened down to those edges (*encastré*, in fact), then the experimenter will find a very considerable further increase of resistance to flexure has been thus obtained; probably, in most cases, about 50 per cent. additional stiffness to that of the slab at first described.

The laws of stress and strain pay as much respect to, and are as much respected by, the humble *carte-de-visite*, as to and by the mammoth bridges and roofs of the most ambitious engineering; and the wise student will learn no less from the common than from the rare examples accessible to his investigation.

The more deeply acquainted the constructor becomes with the nature of cement concrete, and with the manner of stress and strain to which it is liable, the more strongly will he be convinced that it is neither the dead load nor the rolling load; but the force of

expansion initially, and (in certain exceptional cases only) the force of impact eventually, which he has special need to consider and guard against.

We have already seen that the force of expansion can not only be prevented from injuring the slab, but can be utilised in compressing and increasing the density and strength of the slab, simply by securing inflexible centring, and also by keeping that centring at least five weeks, and as much longer as practicable, in position after the slab is cast. We have also seen that the injurious momentum of mass, induced by sudden removal of centring, can be obviated by using wedges, and slowly relieving the centring of pressure.

But, when all has thus been done that can be done to obtain a slab free from expansion-cracks or flaws, another enemy to the endurance of the floor may (?) have to be confronted in the shape of impact.

A rolling load (if not jerkily rolling) is not impactive, but is simply equivalent, in its effect on the floor, to twice the force of the same load statically applied. The force of an impactive load is governed, not only by the weight of the falling body and by its velocity, but also by the degree of yielding of the two surfaces brought into contact.

A universal law, for which no better name can be found than the *Acceleration of Elasticity*, decrees the exact duration of yield of every elastic body under dynamic stress. This duration is determined by the measure of deflection due to the weight in question, acting statically on the body in question. For example, let it be supposed that a weight of, say, 10 tons, resting on the middle of a concrete slab, has caused a static deflection of, say, ½ in., from which, say, the slab will fully recover if that 10 tons weight be taken off.

If now, instead of applying the ten tons statically, we place it on the slab, and suddenly allow the slab to assume its pressure; that is to say, if we apply the ten tons dynamically, without any initial velocity or impact, the slab will, under that dynamic force, deflect ½ in.; it will not, however, remain so deflected, but will oscillate or vibrate up and down at decreasing amplitudes, until, finally, it will come to rest at the static deflection of ½ in.

Now, the time occupied in that first dynamic deflection of ½ in. is determined by the law above referred to, as the *Acceleration of Elasticity*. The time is, in the example before us, the time of one beat of a pendulum ½ in. long; because the law is, that a pendulum whose length equals the static deflection has a beat equal to the period of dynamic deflection. The period of pendulums varies as √length; and, as a pendulum 39 in. (=312 eighths of inches) long beats once every second, the time of ½ in. deflection of the slab under notice will be=

$$\frac{\sqrt{1 \text{ eighth}}}{\sqrt{312 \text{ eighths}}} \text{ second} = 0.0566 \text{ second.}$$

Thus the force of gravity of the 10 tons load will have achieved its maximum result on the slab deflection in 0.0566 second. It does this when the 10 tons weight starts to descend from the normal level of the slab. The same weight of 10 tons will always achieve its maximum result or the full slab deflection in 0.0566 seconds from first moment of contact, no matter what the level from which it starts to descend, and irrespective of the measure of slab-deflection its impact causes.

The accelerative force of the 10 tons in motion is determined by the duration of the accelerative motion. Thus if, instead of starting from normal level of slab, and enjoying 0.0566 second of resisted acceleration, the 10 tons were to start from a height 16 ft. above the normal level of the slab, it would then enjoy one second of free acceleration plus 0.0566 second of resisted acceleration. The accelerated force is measured by its duration solely; and, whether resisted or unresisted, the accelerative force of the 10 tons lasting, or operating, through a period of 1.0566 seconds, is as much in

excess of the same force acting only 0.0566 second as 1.0566 exceeds 0.0566. Thus, in the example before us, the impact of 10 tons, falling 16 ft. on to the slab, would exceed the dynamic stress of 10 tons weight without impact as 1.0566 exceeds 0.0566, i.e., as 18½ exceeds 1. So the impact of 10 tons in the example before us is to the static weight or dead weight of 10 tons as 37½ to 1.

And inasmuch as (within the elastic limits of the slab's endurance) the deflection will vary in simple ratio to the accelerative force, the slab, in the example cited, in order to resist the impact of ten tons falling sixteen feet, would need an elastic endurance permitting of a deflection of 37½ by ½ in., equal to 4½ in., which, of course, no concrete slab of ordinary dimensions could possess.

If, instead of a static deflection of ½ in., the slab showed a greater static deflection, the impact would be less severe. But, on the other hand, if the static deflection were less than ½ in., the impact would be more severe, the measure of severity varying in inverse ratio to the √ deflection.

Thus it will be understood that the virtue of the extreme inflexibility of concrete floors renders the force of impact upon them peculiarly severe.

When all other things are equal, the larger the slab in proportion to its thickness the less severe will be the impact on its centre. In any case the impact will be more severe from a weight falling on or near the solid bearings of the slab than from a weight falling on or near the centre. A pavement slab on *terra-firma*, if bedded on unyielding rock, would be shivered by impact of a falling weight more easily than if bedded on yielding clay or mud.

This question of impact, however (important as it is scientifically, and also practically important in the construction of fortifications), has little, if any, practical importance in floors of dwellings, warehouses, and public buildings. There was a case in which some masons accidentally let a large mass of stones fall upon a concrete floor, near the summit of a building in course of erection; and the impact shattered the upper floor first, and then every lower floor in succession. An accident of this kind does not, however, argue for rendering concrete floors proof against extraordinary impact. Every floor should be designed for the work it has to do; and no architect is reasonably called on to render his concrete floors proof against extraordinary impact, any more than he is called on to render the roof or vaulting of his church-nave proof against the impact of a falling spiral struck down by lightning. So far as the writer is aware, in no case of ordinary roughest warehouse work has impact been known to shatter a well-made concrete slab. And, ordinarily, there is no need to provide against it. The packing-cases generally knock themselves to pieces, and so the floor is saved.

The window-panes of houses, to say nothing of shops, are greatly more liable to be broken by impact than the concrete floors of warehouses. We do not on this account divide the house and shop windows by iron bars into exceedingly small panes; but if we did so, the effect would be, not to prevent impact from shattering the glass, but to localise the injury, and prevent it extending across the entire window. So, undoubtedly, by dividing concrete floors of great area into small squares by means of iron girders, we should not prevent impact, from cracking the floor, but we should confine each crack to its own small square. But seeing that concrete floors never are cracked by impact, it is worth while to incur the great expense of these iron girders, when they are of no use except to localise the effects of impact? It is a practical question, involving economy.

The case of Hayward's, Hyatt's, and other pavement lights may be adduced as practical evidence that there is wisdom in sub-dividing the squares into small areas. But are we then to conclude that, because Hayward's, Hyatt's, and others employ 6 in. by 6 in. lenses ½ in. thick, therefore, we should make our concrete floors in 10 ft. squares 16 in. thick?



The writer knows of a floor 10 ft. square by 4 in. thick, and an ugly hole cut out of one corner to allow of a spiral stairway; also of an extensive series of floors to a warehouse with many slabs 22 ft. by 12½ ft. by 13 in. thick; also of a crowded footpath on a public bridge where the self-sustained slabs are about 6 ft. square by 3 in. thick; and nothing like an impactive crack has manifested itself in either of these cases. Glass is undoubtedly more brittle than cement concrete. That is to say, the deflection of a slab of glass ½ in. thick under its final load within its limit of tenacity would be less (considerably less) than the deflection of a slab of cement of same size and thickness under its final load at point of cracking. Hence impact on glass is more severe than on cement, and the pavement lights are made thick to suit. The briquette of neat cement is again much more brittle than the block of cement concrete. Indeed, the toughness of cement concrete is most remarkable, and involves a measure of comparative flexibility which renders the impactive stress on cement concrete much less severe than on neat cement, and still less than on glass.

To sum up;—the outcome of the foregoing considerations seems to be, that it is an economical mistake to make concrete floors of spans so small as in common use,—for concrete is capable of much higher endurance than it is generally believed to possess; and if a small part of the extravagant sums which are now wasted on iron girders, and on obstructive metal columns, were expended in procuring old, well-seasoned cement, and in erecting and maintaining inflexible centering, the result would be more satisfactory, especially to the proprietor and to the Fire Insurance Companies. For, all other things being equal, it is certain the less of iron used in a "fire-proof" structure, the more really fire-proof it is. If a large quantity of very inflammable stock were stored in a warehouse with roof, walls, and floors of concrete, without any iron anywhere, certainly the heat of the burning stock might cause such expansion of the large slabs and masses of concrete as to crack it in all directions. But even under the most unfavourable conditions it may be taken for granted that, for all practical uses, the warehouse would be as available with its cracks as without; and rarely, if ever, would the building be so injured by the fire as to require reconstructing.

These are some of the conclusions of many years' experience; and it would, perhaps, be well if others would publish their experience of concrete floors, &c.; for the subject has been by no means over discussed, or fully and finally dealt with, by the writers of this or preceding generations.

The question of economy of fireproof construction is a much larger question than at first sight would appear. It is not merely the question whether the wholesale firm of Messrs. Peace & Plenty shall pay for iron girders and not get a fireproof result; it is not merely the greater question of whether fireproof construction generally shall continue to be discredited and placed at a discount by reason of the non-fireproof character of those structures where iron has been so unsparingly and unwisely employed. Wooden houses were thought good enough before the great fire of London. After that fire, wooden roofs and floors were still permitted, though wooden walls were disallowed. This was only a half step in civilisation; and, up to the present time, our improvements stop far short of finality. Is it not true that in 1889 we still regard a fireproof building as a luxury? The great firms and the personal property and archives are to be secured from the devouring flame. But the more sacred and precious lives of the people are still to be risked nightly with nothing but the fire-engine and fire-escape as an alternative. Yet it is a fact that not only walls, but also roofs and floors of the dwellings of the people, can be constructed more strongly and quite as cheaply in fireproof as in a non-fireproof material. Here is the great field for economical and sensible employment of cement concrete. But so long as ignorant mistrust of the strength of concrete

is accompanied by extravagant employment of iron, and by presumptuously soon and sudden removals of centreing carelessly erected, so long will the great and urgently needed improvement be arrested or hindered.

The great advances in the manufacture of Portland cement during the present decade have so cheapened and improved the material as to bring it more and more to the front. And, just as iron and steel have displaced timber from the shipbuilding-yards, so will Portland cement displace it from the building of houses (except as mere centreing) when once the public get to understand that fireproof dwellings can be built as cheaply as the ordinary non-fireproof house or cottage.

F. C.

#### NOTES.

**A**NOTHER association has been formed for the defence of the trading public against the railway companies and their new classification proposals. It is to be hoped that such bodies will not become too numerous, and frustrate the purpose of their existence by clashing with each other, and confusing the Board of Trade with conflicting opinions. Certainly, the new association,—according to the terms of the resolution which created it,—sets out with the best of intentions, viz.:—"For the purpose of furthering concerted common action on such points as are of common interest, together with such other representative bodies and traders as may signify their desire to co-operate." This was the outcome of a large meeting presided over by the Lord Mayor on the 26th ult., and attended by a number of merchants and others, including several M.P.'s. The leading idea seemed to be that traders were wasting energy in carrying out the suggestion of the Board of Trade by attempting to come to agreement with the railway companies, and that the principle of "union is strength" had not been sufficiently recognised. That this principle has guided the Association in the appointment of a committee for the furtherance of its objects may be judged from its composition, for, in addition to numerous representatives of existing bodies, a member of each of the County Councils is to be included. The intention of the association is to urge the Board of Trade "to invite the aid of a commission of experts, with the object of assisting in the preparation of a classification on a fairer basis." If this appeal is successful, of course all the negotiation of the past, based upon the classifications already submitted, has been so much time wasted. Whatever may be effected by the new movement, we can but repeat the hope that it will not result in more unprofitable delay.

**A**S the Post Office Sites Bill has passed a second reading, by a vote (173 to 57) which seems in curious contrast to the strong opposition to it in debate, it may be presumed that the Post Office will now have the site placed at their disposal in some form or other. The Bill is referred to a Select Committee, and we hope the Committee will keep in mind the public interests in regard to light and air and enjoyment, so far at least as to make it a condition that all the ground not absolutely required for Post Office buildings should be kept open and laid out as a public garden or square. There must be plenty of room for that on the site, and if properly done the new buildings required might even be made an addition to the effect of the site—but we fear that is the very last consideration that would enter into the minds of either the Committee, the Office of Works, or the Post Office authorities.

**I**T was officially intimated, at last Tuesday's meeting of the London County Council, that Mr. Gordon, who was lately elected Chief Engineer, will enter upon his duties in London (by the courtesy of the Corporation of Leicester) at the beginning of September. It will be quite evident, from a glance at our report of what was said at the same meeting

of the Council, in the discussion of the Report of the Main Drainage Committee, that Mr. Gordon has very important work before him. According to statements made by more than one speaker, the existing sewage pumping stations are quite inadequate for their work, and the new precipitation works at the Barking Outfall, about to be opened, will produce three times as much sludge as the two sludge-ships can carry away! These are serious statements to be made after the expenditure of millions of money. Of course the County Council is not responsible: these works were bequeathed to it by its predecessor, the Metropolitan Board of Works. We have on several occasions hinted our strong doubts as to the permanent efficacy of the methods adopted by the late Board, at such heavy cost, for the treatment of the London sewage at the outfalls. We notice that Mr. Beal has on the agenda-paper of the Council the following important notice of motion, which is calculated to raise the whole question:—

"That it be an instruction to the Main Drainage Committee, so soon as the Engineer enters upon his duties, to engage an engineer of high eminence (in concert with the Finance Committee) to join with him in an inquiry, and to report on the condition of the Northern and Southern Outfall Sewers, as to the general condition of the Thames at the outfall points, and to confer with the Engineer of the Thames Conservancy, and to report on the necessity (if any) of further extension of outfalls (north and south), as to the best means of dealing with the evidence with the great question of removal of London sewage, and the probable cost of a complete and efficient scheme to purify the river; to remove the sewage and carry out what was designed by the Act of 1855 to meet the needs of London for the next fifty years; the financial operations incident thereto to be extended over eighty years."

Whether this is likely to be carried we do not know, but we see that Mr. Rhodes, the Chairman of the Main Drainage Committee, will attempt to meet it by moving, as an amendment, "the previous question,"—i.e., that the question be not now voted upon. We saw it stated in print the other day by Mr. Rhodes that he intended to take this course because he was quite satisfied, from personal examination, that the new outfall works at Barking would be successful in meeting their intention. We shall see. We do not know what special qualifications Mr. Rhodes has for forming so decided an opinion upon so technical a subject,—nor, we must confess, do we understand why he was appointed Chairman of the Main Drainage Committee,—one of the most important committees of the Council. His reports, and his explanations when he is questioned in the Council, certainly do not convey the impression that he is quite "the right man in the right place."

**T**HE last number of the *Wiener Bauindustrie Zeitung* gives a series of very well-executed illustrations of recent street mansions in Vienna, which we may presume represent the architectural taste and tendency of Vienna at the present moment. One cannot say very much for it, except that the buildings illustrated seem all to be very well-executed and in a handsome and costly manner. Symmetry and a certain dignity they can boast of, but of artistic feeling there seems hardly a trace; all are cold formal *façades* in a commonplace Classic style with the most uninteresting type of *rococo* detail. The House of the "*Gesellschaft Franco-Hongroise*" in the *Rudolfsplatz*, designed by Herr Tietz, deserves the praise of dignity and of apparently a somewhat purer and more refined kind of detail than the other examples. The house built by the architect Herr Otto Wagner for himself, in the *Stadiongasse*, is also free from the reproach of *rococo*; it is a great square block with the lower two stories rusticated, and the next two treated with windows each framed within Roman Doric columns and entablature. In a house, 38 *Heugasse*, designed by Herr Andreas Streit, there is a rich and rather elegant treatment of the segmental projecting bay windows at each end of the *façade*; the bays being flanked by female figures at the re-entering



angle with the main wall at each side, stretching out their arms to hold festoons which are looped across the window heads. The figures are good, and generally it would appear that decorative sculpture introduced in modern Viennese buildings is well executed. But the architecture is of that type which may be called architecture *de luxe*, done to satisfy fashion rather than artistic sentiment. The monument to the poet Grillparzer, illustrated in the same journal, is very good in general conception, and appears to be good in detail also. It represents the statue of the poet seated in a niche under a pediment flanked by two coupled Corinthian columns on each side, the central composition being flanked by two curved wing-walls the height of the impost of the niche, carried round each way from the centre and stopped by square piers, the inner curve of the walls being divided into panels containing bas-reliefs of subjects from the poet's works. The monument is effectively relieved against a group of trees forming the background. The architectural design is by Herr Hasenauer; the figure by Professor Kundmann, and the bas-reliefs by Professor Rudolf Weyer.

**A**LIVELY discussion has been going on in the columns of *L'Architecture* between the advocates and opponents of the Ecole des Beaux-Arts, or of the general idea of a scholastic education in architecture. The defenders of "l'Ecole" affirm that every French architect who has done anything worth speaking of has been educated at the Ecole; the opponents use the argument, *post hoc non propter hoc*, and that it would be just as reasonable to argue that all persons baptised entered into the world perfect Catholics, whatever might be their beliefs or disbeliefs in mature age. It is affirmed by the defenders that the Palace of the Champ de Mars is a "projet de l'Ecole," to which M. Jourdain, the principal "free-lance" in the combat, replies:—

"Est-ce à l'Ecole qu'Hernant a étudié le Louis XV. de son élégant pavillon des pastellistes? Est-ce à l'Ecole que Gauthier a trouvé son exotique porte du quai d'Orsay? Est-ce à l'Ecole que Saurestre a préparé son pittoresque palais des colonies? Est-ce à l'Ecole que Balu, Marquette et Saladin ont documenté leurs pavillons algérien et tunisien? Cette question forcément fastidieuse, je vous la posai à peu près pour toutes les constructions de l'Exposition. Et n'allez pas me répondre que c'est en réfléchissant à côté des abominables villas italiennes, dont la moine horrible ne vaut pas le dernier usoir normand, que nos confrères ont appris ce qu'ils savent, car il n'y a pas le plus éloigné cousinage entre la villa Madama, par exemple, et les adorables intérieurs de Versailles."

This is the old controversy in very full swing indeed, it will be seen. M. Dupuis, who upholds the "Ecole" standard, puts the other side of the question rather well in the following paragraph, urging the importance of systematic training on the basis of the central styles of architecture:—

"Lorsque le novice saura composer, mettre en proportions un plan, coupe, élévation; qu'il connaîtra la décoration en général par l'étude sérieuse, réfléchie des grands maîtres de l'antiquité; qu'il aura jeté son feu, que son imagination aura été modérée, tempérée par les leçons des maîtres; à ce moment seulement il osera de votre trier le double décimètre, le Code, le Manuel des lois du bâtiment et autres étiopiques, et faites comprendre à l'élève le module général. En trois mois le jeune homme sera mis au pas de la vie pratique et ses études classiques, idéales (si vous le voulez), l'auront formé et lui permettront, suivant son tempérament, d'exécuter sinon du grand art, tout au moins de produire des œuvres de goût et de bon arrangement architectural. De grâce, ne proniez pas les petits côtés de l'histoire, ne parlez pas tout de suite dans l'enseignement: du gaz, de l'électricité, du téléphone, du tout à l'égoût et autres engouements modernes qui sont loin d'être poétiques, qui n'éveillent ni l'âme ni le cœur de l'artiste."

The concluding portion of the correspondence is headed "Triomphe de l'Ecole"; so we presume that the director of *L'Architecture*, at all events, thinks that the "Ecolists" have the best of it.

**M**OST people will commend a wish which Lord Rosebery expressed when replying to Mr. Joseph Beck's address upon the

opening, last week, of Clissold Park,—that he trusted the guardians of the park would be wise enough to leave Nature to her own devices there. It is largely due to the exertions of Mr. Beck, the Chairman of the Preservation Committee, that so beautiful an enclosure is secured for public enjoyment. We have already given a brief history of the property\*, which the Ecclesiastical Commissioners offered for sale five years ago. In the interval, the purchase-moneys, amounting to 96,045*l.* 10*s.* 6*d.*, were contributed by various public bodies: 25,000*l.* by St. Mary, Stoke Newington, 6,000*l.* by South Hornsey, 5,000*l.* by St. John, Hackney, 2,500*l.* by St. Mary, Islington, Vestries, and 47,500*l.* by the Charity Commissioners from out of certain funds rendered available by the London Parochial Charities Act, 1883. Though the laying-out of the land is far from completed, we are enabled to say that the principal entrance will be at the old lodge, opposite to the new parish church (the late Sir G. G. Scott, architect), whence a broad path will bend towards the New River, and there be divided into two others. Of these, one passes before the not very imposing house, despite its western colonnade, and so, upon a raised causeway, by the trees along the river's left bank. The other path will lead across a bridge to the portion, being about one-third of the whole 53 acres, known as the "Horse-shoe," which includes some of the best trees. Two other bridges will afford access to within the curve of the river, from the Paradise-row and Highbury New Park gates. The raising of the "Horse-shoe" mound, no longer marked by its oak-tree, will prove an advantage, since the park is generally flat, and much of it lies lower than the river's level. It is proposed to call the new elevation "Fat Turkey-hill," in allusion to the terms of the old lease by the chapter of St. Paul's, whereby the rental was fixed at 109*l.* and a fat turkey yearly. Care will be taken to encourage the settlement and breeding of wild fowl on the lake islands.

**I**N connexion with the Loch Katrine Water-works, the piercing of the first of the new water-tunnels included in Glasgow's water-supply enlargement scheme has just been completed. It is the most southerly of the series, commencing at Strathblane, about ten miles to the north of Glasgow, and ending at the outfall into Mugdock and Craigmaddie service reservoirs (the latter now in course of construction), one mile and three quarters farther to the south, that being the distance to which the new or second Mugdock Tunnel, as it is called, extends. Boring commenced about midsummer, 1886, from either end, and continued steadily by constant relays of shifts up to October of last year, when bad ventilation in the northern drift, and hindrances due to excessive inroads of water there, induced the engineers to confine work to the southern face, and that has been the rule ever since. The junction of the bores in the centre of the hill proved to be most successful, hardly even the smallest fraction of divergence showing itself. Four years was the estimate at the time Messrs. Morrison & Mason entered upon the contract, fully three of these having thus been consumed; but, although the piercing is accomplished, there is still a considerable amount of interior dressing to be overtaken. Much of the drift is through good rock, chiefly whinstone, and requiring no additional support; but there are several insecure intervals of soft, or otherwise unreliable, strata, and these will have to be lined with concrete. The floor also will be bedded throughout with the same material, on a system which will reduce the friction of the current to a minimum, and enable the new tunnel to pass daily, in addition to the increase arising from the larger bore measurements, a much greater proportionate volume of water than is at present within the capacity of the original tunnel. It is expected that the new work will deliver at a rate a good one-third in excess of the present maximum. The esti-

mate for this particular section of the work, which forms a contract by itself, is 40,000*l.* The other contracts to the north, between this point and Loch Katrine, a distance of twenty-four miles in all, are for the most part well under way, the additional tunnelling amounting to about ten miles, and the remainder consisting of level surface aqueduct work and syphoning.

**A**MONG the buildings grouped about the neighbourhood of the Eiffel Tower at the Paris Exhibition are two *façades* in very ancient styles of architecture, but exceedingly modern in their contents. One, in the similitude of an ancient Egyptian temple front, contains the Suez Canal Company's exhibit, which includes a large model of the Canal, a number of photographs, a model of the illuminated buoys that are used to mark the channel in certain places, and a spirited statue of a woman carving the name and date of the enterprise on a rock, for the French have a way of getting sculpture even into practical exhibitions of this kind. The other is the much larger pavilion of the Mexican State, built in the likeness of an ancient Mexican temple, with its immense rusticated basement, and its characteristic steep steps (about 2 of riser to 1 of tread) between the pylons below the central entrance. The public are not invited to enter by these steps (which could only have been used by a bare-footed society), but at lower "practicable" doors at the side. The object of most interest is the admirable model of Captain Eads's ship railway for cutting the Isthmus of Panama knot. The *modus operandi* as illustrated here is as follows: a ship to be transported on to the railway is brought into a large dock the bed of which is laid with a slope upward from deep water to ground-level. Along the margin of the shallow side of this dock is a platform on wheels, and with a number of hydraulic presses working upward through the floor. The rolling cradle which is to carry the ship is wheeled on to the rails laid along this platform and firmly fixed to it, and the whole platform then descends sideways into the dock by gravitation (controlled by hydraulic power), running down on wheels working on rails laid on the sloping bottom of the dock. Arrived into deep water, the ship is floated over and adjusted centrally over the backbone of the cradle, the platform is slowly drawn up, and when the ship begins to bear on the cradle, the hydraulic presses on the floor of the platform are put in action, by one uniform pressure, and as they rise they push upwards a set of corresponding vertical jacks in the bed of the cradle, each of which rises until it clips the portion of the hull immediately over it. The platform then rises to its original position, the jacks are fixed at their respective heights by a simple mechanical means, and the cradle is ready to begin its journey along the railway, the rails of which correspond with the rails of the platform when in its original position by the dock. As the many-wheeled cradle could not turn curves, the line would be laid in perfectly straight sections connected by immense turntables, on which the ship being pulled round on these by two of the locomotives which do the rest of the haulage, and which now shunt on to a circular track laid round the turntable. Mechanically, and apart from special conditions of site, the whole thing seems very practicable, and at all events the model is worth seeing.

**T**HE Brussels architectural journal, *L'Emulation*, devotes an article in its last number to the subject of theatre archaeology, on which there is no doubt much to be said, mostly in the direction of criticism. The Belgian journal is severe on the anachronisms of the Brussels Opera-house, where, we are told, in the last performance of "Romeo and Juliet," decorations from the Villa Medici of 1546, and the Ducal Palace of 1677, were introduced in the first scene of an action supposed to take place at Verona about 1300; while in "Hamlet" the king and nobles in costumes of the thirteenth century walked

\* Vide *The Builder*, February 29, 1887.



in and out of buildings in the style of the seventeenth century. The perception of archaeological correctness of costume generally precedes that of architectural correctness in cases of this kind. In the leading London theatres there is now a laudable attempt at a general indication of architecture of the supposed date of the action; but it is very seldom carried out correctly in regard to minor details.

**I**N *The Antiquary* for August, Mr. E. W. Cox gives an interesting account of the old Ashton Manor House in Lancashire, with one or two sketches. The House is one of great interest and very picturesque character, especially noticeable for the peculiar buttress-like turrets at the angles. It is stated that the Manchester, Sheffield, and Lincolnshire Railway Company, whose line runs a little way from the Manor House, are applying for powers for a compulsory sale in order to build a new warehouse there. It is not very likely that this can be the only available spot for what the company require, and it is to be hoped their demand will not be granted. It is of course useless to make any kind of appeal to a railway company to leave alone an old house which is an interesting relic of the life and history of a once-important medieval family. Managers of railway companies seem to be so constituted intellectually that they would probably rather pull down an ancient house than take an unencumbered site.

**T**HE increasing habit on the part of architects of advertising their names and addresses on notice-boards affixed to buildings which they are superintending is one which all those who care about the honour and dignity of the architectural profession ought to do their best to oppose and put a stop to. Some of those who put out these tradesmen's advertisements, of course, are mere hangers-on at the skirts of the profession; but it is done by others who ought to know better and to have more sense of dignity and professional propriety. Shaftesbury Avenue contains a whole series of these boards giving the name and address of the architect in staring capitals; sometimes, we regret to observe, with the affix "F.R.I.B.A." There is no other liberal profession in which this kind of thing would be done. What would be thought if, when straw laid down in the street gives the outward sign of a serious case of illness, a board were fixed up on the house with the notice—"Case attended by Dr. Forceps, 200, Harley-street?" We venture to think that if any medical man were so regardless of his own dignity as to do this, he would very soon find public opinion within his own profession too strong for him. And why does not public opinion within the architectural profession put down this vulgar and undignified form of toutage? We should like to know what the Council of the Institute of Architects think of members of the Institute who degrade the status of the profession in that way? And if they do think pretty strongly about it (as we should imagine), will they tell these advertising gentlemen what they think?

**The Architectural Association.**—A meeting for the formation of a new class in connexion with the Association, viz., the Class for Sketching and Measuring-up Buildings in London and the neighbourhood, was held at No. 9, Conduit-street, on Monday, July 22, Mr. Leonard Stokes, the President of the Association, presiding. There was a good attendance, and several rules were framed. A very strong list of Visitors was drawn up, which includes the following names:—Messrs. Leonard Stokes, F. B. Farrow, F. T. Baggallay, Millard, W. G. B. Lewis, A. B. Pite, McLaren, Collard, Marvin, Hooper, Cresswell, Horsley, Simpson, A. B. Mitchell, T. G. Hart, and C. H. Lohr, to be submitted with the rules to the Committee of the Association. It is proposed to make fortnightly visits on Saturdays, when vacation visits do not take place. The first visit will probably take place on Saturday, August 10. Mr. A. W. Earle was elected Secretary, to whom all communications should be addressed at 44, Mortimer-street, W.

# LETTER FROM PARIS.

WE gave in our last letter the list of the medals of honour conferred on French and foreign painters by the International Jury of Fine Arts. We now give a list of the first medals adjudged by the same jury to England and France.

**England:**—Sir Frederick Leighton, Messrs. Burne-Jones, Herkomer, Hook, Orchardson, Whistler, Forbes, Leader, Reid, Shannon.

**France:** Messrs. F. Barrias, Benjamin Constant, John Lewis Brown, Jean Béraud, Ferrer, Fourrier, Friant, Humbert, Le Bault, Émile Levy, Luminas, Maignaut, Meron, Montanard, Pélouse, Raffalli, Rajon, Renouf, Rixens, Tony Robert-Fleury, Tattégren, Tissot, Vayson, De Vuillefroy, Wencker, Zuber, Blanc, Glaize, Madame Demont-Breton, Adrian Demont, Bondin, Émile Breton, Santay, Dubufe, Meissonnier *fil.*, Pointelin, Hanoteau, Zucquet, Saintin, Adan, Dantan, Mathey, Danoye, Yon, Gilbert, Binet, Ehrmann, Courtois, Dawaat, Aublet, H. Martin, Luigi Loir, Baudouin, Marec, Barillot, Gœunette, H. Pille, Lépine.

As space fails us for the list of other rewards, we will content ourselves with saying that Messrs. Fildes, A. Gow, F. Gregory, Waterhouse, C. Hunter, S. Knight, James Sant, and Stone have obtained second medals; Messrs. Aumonier, Beadle, Calderon, Fisher, Kennington, Macbeth, Morris, Murray, Stokes, Wyllie, Charlton, Crofts, Goodall, Rivière, Smythe, Starr, and Woods, third medals.

In sculpture, medals of honour have been decreed to Mr. Gilbert and Sir F. Leighton for England; and to M. Mercier, Barrias, Dalou, Ingalbert, Roty, Noël, Turcan, Feinte, Lanson, and Carles, for France.

It must be remembered, however, to avoid misunderstanding, that all the awards by the juries of special groups have to be ratified by the superior jury of twenty-one members.

As usual, there are plenty of malcontents and disappointed people in reference to these awards, and the newspapers have published complaints and protestations, and even refusals to accept the medals on the part of a certain number of artists who have a higher idea of their own talent than that held by the jury. These demonstrations of wounded *amour-propre* are unworthy of art. How many artists of real genius have patiently waited for years for an official recognition of their merit which, after all, could add nothing to their reputation? We need not go further back than the Exhibition of 1867, when M. Pavis de Chavannes accepted graciously the Third-class Medal which had been contemptuously refused by M. Debat Ponsan and Léon Comerre. But these are quarrels which are only interesting to the self-interested, and about which we need say no more here. The only solution of the difficulty would be to suppress altogether these recompenses, which are the objects merely of ambitious vanity to the detriment of the dignity of art.

We may give, however, some of the official honours which have been awarded on the occasion of the National Fête of July 14th, which is always a special opportunity for distributing recognitions of this kind. M. Jules Coutan, designer of the monumental fountain in the central garden of the Champ de Mars, has received the Cross of the Legion of Honour, as also M. Walwein, architect of the Pavillon of the Ministry of War.\* The Cross of Chevalier has been awarded to M. Blavette, architect, principal superintendent of the erection of the Galerie des Machines; to M. Gauthier, architect of the triumphal arch at the Pont d'Alma, and the monumental portal of the Esplanade des Invalides; to M. Saladin, architect of the Tunisian Palace; M. Gaston Hénard, principal superintending architect of the Palais des Arts Libéraux and Beaux Arts; M. Marcel Lambert, architect "des bâtiments civils" and to the works at the Palace of Versailles; and M. Montel, revising architect for the general direction of works of the Exhibition.

We have, at all events, the satisfaction of finding that on this occasion the architects hold a conspicuous place in the honour-list. They are not generally in the way of being too much spoiled in this respect, and the awards have had the effect in this case of giving recognition to able collaborators in subordinate positions, who are too often overlooked and forgotten.

Inaugurations have been going on almost continuously for some time. After that of the

small Bartholdi statue, of which we have already spoken, comes that of the statue of Raspail the chemist, who, as is well known, was a revolutionary *enragé*. This rather ponderous monument is the work of the two brothers Morice, to whom we owe the immense monument on the Place de la République. It has been erected at the angle of the Boulevard Raspail and the Boulevard Edgar Quinet. M. Léopold Morice designed and modelled the statue of Raspail, the two bas-reliefs on the pedestal being the work of M. Charles Morice.

Some days later took place the inauguration of the monument to Admiral Coligny, erected in a small, silent, melancholy square near the chevet of the Temple de l'Oratoire of the Louvre, and a few yards from the spot where Coligny was assassinated by order of Charles IX. This monument, of which we have before had occasion to speak, stands 10.60 mètres high. It was executed after the designs of M. Scellier de Gisors, architect. The surbase, mounted on three steps, is in white marble. On each side of the *fronton* which crowns the surbase, in a tomb form, are seated two figures also in white marble, which as well as the principal statue, are the work of M. Crauk. The figure on the right represents "la Patrie" holding a drawn sword and a crown; that on the right "la Religion" holding a palm. In the middle, on a pedestal of grey granite, is the statue of Coligny, in white marble, of which an illustration has appeared in the *Builder*. An open Bible is placed before the pedestal, which is framed between two columns of pierre de Lorraine supporting an entablature which is decorated with the Coligny coat of arms between two Renaissance vases. The architect and sculptor may be congratulated on having produced a monument of dignified and suitable character and wrought out with much refinement of style.

On the 15th of July there took place also the inauguration of the Bourse de Commerce, built by M. Blondel on the site of the old "Halle aux blés," the cupola of which alone has been utilised. Some days afterwards the opening took place of two charitable establishments founded by foreign benefactors: the "Fondation Rossini" and the "Maison de Retraite" of the brothers Galignani. The first has been built in a corner of the fine park of the "Asile de Ste Perine" at Auteuil; the second on the Boulevard Bineau at Neuilly; and both have been built under the supervision of the architects of the "Administration de l'Assistance Publique."

The latest official ceremony has been the opening of new Zoological Galleries, and the new Conservatory of the Natural History Department, at the Jardin des Plantes. The new Zoological Pavillon is in two sections. On the façade towards the Garden, two galleries run the whole length of the building; behind is a large hall, 55 m. long by 25 m. wide, with aisles 8 mètres wide, repeated on the two upper stories. This building, of a sober decorative effect which offers a certain degree of nobility, is in a good style, is the design of M. André, member of the Institute, and who has just received the cross of the Legion of Honour.

A monument to Condorcet, to be eventually erected on the quay opposite to that on which stands the statue of Voltaire, is at present the object of a public competition; and there will shortly be erected the group intended to commemorate Alfred de Musset, a monument offered to the Municipality by a rich citizen, M. Osiris, who has commissioned MM. Falguère and Mercier to execute the figures. The monument is to be erected in the centre of the "bassin" in front of the Church of St. Augustine, Rue Malesherbes. It should be added, however, that a separate statue to the poet is to be erected by "la Jeunesse Française," which M. Granet has been commissioned to execute.

The scaffolding which long hid the mosaic cupola of the escalier Daru, at the Louvre, has at last been removed. This cupola, elliptical in form, was commenced five years ago from the designs of M. Guillaume. Dedicated to "the Renaissance" it is decorated in the pendentives with four large figures on a blue ground, symbolising Italy, France, Flanders, and Germany. Above, on a large frieze, winged genii, relieved on a gold ground, hold medallions with the portraits in cameo of Raphael, Poussin, Rubens, and Dürer. The principal figures, the winged genii, and the medallions are all executed from the cartoons of M. Lenoire, in the national atelier of mosaic under the direc-

\* Illustrated in our last number.



tion of M. Vannutelli, a distinguished mosaic artist in the service of the Vatican works, whose assistance has been placed at the disposal of the École des Beaux Arts.

The second cupola, situated above the "Victory of Samothrace," and which is to be consecrated to "Antiquity," will include figures of Egypt, Assyria, Greece and Rome. These two latter figures are already partly executed.

At the Panthéon, under the direction of the architect, M. le Deschault, the final preparations have been completed for the translation to that building of the remains of Carnot, Marceau, Latour d'Auvergne, and Baudin; the ceremony of reception being fixed for the 4th of August. On the same day, the President is to lay the first stone of a monument which is to be erected in the Panthéon to the memory of Hoche and Kleber. It is to be placed at the extremity of the right-hand transept, the pictorial decoration of which was long ago assigned to MM. Théodore Mailliot, Joseph Blanc, and Henri Lévy. Advantage is to be taken of the occasion to destroy the immense heap of funeral wreaths which has accumulated in the crypt of the Panthéon since the interment of Victor Hugo.

Though it is unnecessary to speak here of the numerous *fêtes* which have succeeded one another at Paris in honour of the centenary of the Revolution and of the Exhibition, mention may be made of those which took place at the Palais de l'Industrie on the 10th and 13th of July, and which necessitated the luxurious furnishing of the edifice, and its transformation into a gigantic ballroom capable of containing 60,000 visitors. The success of these *fêtes* led the greatest credit, once more, to M. Alphand's genius for scene-setting, and also to M. Thomas, the young architect under whose charge the Palais de l'Industrie is placed, who in this exceptional organisation, carried out in a few weeks and at a cost of 700,000 francs, gave striking proof of his ability and good taste.

At one of its recent sittings the Municipal Council voted funds for the acquisition of a certain number of works in painting and sculpture which were in the *Salon* of 1889. Among the pictures we may mention "L'été" of M. Roll; and among the works of sculpture the fine "Chien Danois" in grey marble exhibited by M. Gardet. We pass over in silence the other purchases, which had little to justify them. But what is open to positive criticism is the choice of a third-rate artist to engrave the commemorative medal which is to be presented to M. Eiffel and all who have worked on his tower. Had they addressed themselves to M. Chaplain, M. Roty, or M. Daniel Dupuy (not to mention other lesser names), they would have had an interesting and well-executed design, as it is, the commonplace figure in contemplation before the tower is marked by neither taste nor originality nor excellence of execution.

We may add that the Municipal Council has recently been occupied in filling up the vacancies caused by death among the artists who are commissioned with the decorations of the Hôtel de Ville. M. Emile Lévy replaces Cabanel in the *Salon* des Caryatides, and the landscape which should have been executed by M. Lavielle has been entrusted to his pupil M. Berthelon.

At the École des Beaux-Arts they have just given the award on the competition for the Prix de Rome in painting. The subject was taken from the New Testament—"The Healing of the Paralytic." The "first grand prize" was accorded to M. Gaston Llys, pupil of Messrs. Bonnat, Gustave Boulanger, and Olivier Merson; M. Ernest Laurent, pupil of Messrs. Lehmann, Hébert, and Merson, has obtained a "second first grand prize"; a "first second grand prize" has been awarded to M. Danguy, pupil of Messrs. Jules Lefebvre, Boulanger, and Gabriel Ferrier; and a "second second grand prize" to M. Charles Lenoir, pupil of Messrs. Bouguereau and Tony Robert-Fleury.

As regards the other competitions of the School, that of the second class, of which the subject was "A Restaurant," has produced the following results:—Out of forty-one designs sent in, the Jury of Architecture has given one first mention to M. Binet, pupil of M. André, and nineteen second mentions. In the competition of analytical elements, the subject for which was "A Chapel," out of eighty-three designs exhibited, the Jury has granted seventy-nine mentions; and finally, for the competition in sketches, for which the subject was "A Country House," out of thirty-one sketches

exhibited, the Jury has given nineteen mentions.

We record with regret the death of two able artists, M. Louis Jules Etex, and M. Otto de Thoren. The former of these was a brother of the celebrated sculptor, who died last year, and a pupil of Lethièvre and Ingres. He began his career at the Salon of 1833, with some portraits which obtained a second medal, and his picture of "Adam and Eve" gained for him the same reward at the Salon of 1838. He painted a St. Philibert for the Church of Our Lady of Loretto, and various portraits for the Museum of Versailles, notably that of the Duke of Montmorency. M. Etex, who died at the age of seventy-nine, was also a Professor at the School of Decorative Arts.

The animal painter Otto von Thoren, who had lived in Paris for many years past, was born at Vienna. He obtained a medal in 1869 for two pictures which were much noticed: "Horse-stealers" and "Cattle-stealers." He obtained a second medal and the Cross of the Legion of Honour at the Salon of 1886, with his "Labour" and "The Refuge." He was a most conscientious artist, indefatigable in work, full of kindness towards young painters, and highly esteemed for the dignity of his character and life. He had exhibited this year two pictures, "In Autumn" and "A Flock of Sheep"—a storm effect. He reckoned none but friends in the world of art, and was a member of the International Jury for Austria and Hungary. He died suddenly, on the day of the National Fête, at the age of 61 years.

P.S.—We may add, as a conclusion to this letter, that M. Charles Yriarte, the well-known art-critic, has just been nominated member of the Superior Council of Fine Arts, in the place of M. Eugène Veron, deceased.

#### ARCHITECTURAL ASSOCIATION VACATION VISITS.

THE fifth of these visits was made on Saturday last to Maidstone and Leeds Castle. As there are several architectural objects of interest in Maidstone itself, a whole day was devoted to the purpose. On arriving at the station, the members were met by Mr. Hurbert Bensted, F.R.I.B.A., who, being the A.A. Sketching-Club Consul for the district, had kindly consented to act as guide to Chillingham Manor-house (now the Museum), the Palace, and the church. The members were particularly fortunate in obtaining Mr. Bensted's services, the restorations and additions to the Museum, as well as the work at the Palace, which has lately been acquired by the town, and utilised as a School of Art &c., having been carried out by him, and he was, therefore, able to point out much that was of interest, and which only one who knew the buildings well would be acquainted with.

The Museum was the first place visited, a few piers and other fragments originally belonging to the Chapel of St. Faith being noticed, also the cloister under the long gallery of the Manor-house.

The nucleus of the present museum is the house built by Nicholas Barham, Sergeant-at-Law to Queen Elizabeth, and Recorder of Maidstone. The house was used as a private dwelling until the death of Mr. Charles, in 1855, when it was purchased by the town, the late owner having bequeathed his pictures and archaeological collection to the town.

In the interior of the house, besides many remains of the original structure, there are several objects of interest to the architectural student, as wood-carving, tiles, &c. In 1874 East Farleigh Court Lodge, being in a ruinous condition, but possessing some fine half-timbered work, was pulled down, and portions of it rebuilt adjoining the museum.

On leaving the Museum the old Palace of the Archbishops of Canterbury was visited. Maidstone was formerly a favourite place of residence of many Archbishops, and in 1348 Archbishop Uford commenced a new palace, which his successor Simon Islip finished. Archbishop Courtenay died here. The building is in very good general preservation, although previous to its recent purchase by the town, it was used as two private houses, during which period much of the old work was hidden. The hall is now a good-sized room with oak panelling, and the old staircase still exists, but with signs of more than one alteration. Throughout the building are traces of alterations made at a comparatively early date, which leads Mr.

Bensted to believe that the front wall, as it now stands, is some feet in advance of its original position. In this he is borne out by the evidence of the mouldings of the door jambs and string-course which appear to be attempts to imitate earlier work, portions of which can be traced, though much weather-worn. In the garden are some vaulted outbuildings which evidently had an upper storey over them, there being traces of the external stair. There is also a doorway from the palace grounds to the adjoining church, which was not visited.

The present Church of All Saints was erected by Archbishop Courtenay, on the site of an earlier one, but the axis of the present church is not parallel to that of the original one, which was probably a smaller building. The Archbishop also gave to the church the college, or hospital for poor travellers, founded by Archbishop Boniface, in 1260, and erected the present college buildings and gateway shortly before his death, which occurred in 1396.

The first Principal of the College, John Wootton, who died in 1471, is buried in the south chancel aisle; his monument still retaining some very considerable remains of colour decoration.

After luncheon the party drove to Leeds Castle, where they were received by Mr. Wickham Martin, the brother of the late owner. The following outline history of the building may be of interest:—

About the year 857, Ethelbert being then King of Kent, a fortified camp was formed, probably on the largest island on which this castle now stands. Most authorities derive the name of Leeds from Ledian (or, as he is sometimes called, Led or Leddan), who was the King's counsellor and general, and is usually credited with the formation of the island stockade. Others, referring to the name "Esleides," by which it is known in the Doomsday survey, derive it from "Slades," meaning an open place in the woods; but it is probably only the two words "es Ledes"—of Led.

Be this as it may, it is certain that the Saxon camp was very shortly afterwards nearly destroyed by the Danes, and apparently was not restored until after the Conquest.

At the time of the Domesday Survey we find Leeds held (like many other places in this county) by Odo, and at his disgrace, shortly afterwards, William granted the manor to the Crevicours of Chatham, near Canterbury (which will be remembered by architects as possessing in its church some fine examples of Kentish window tracery), and referred to now because the chapel in the old castle (on the small island) had somewhat similar tracery placed in the windows in 1314 after the earlier work had been blown in by a hurricane—the old jambs being retained.

The Crevicours apparently kept possession to a certain extent until the time of Edward I., although we find the Earl of Gloucester seizing and attempting to hold it for Maud (or Matilda) against Stephen, by whom, however, it was taken.

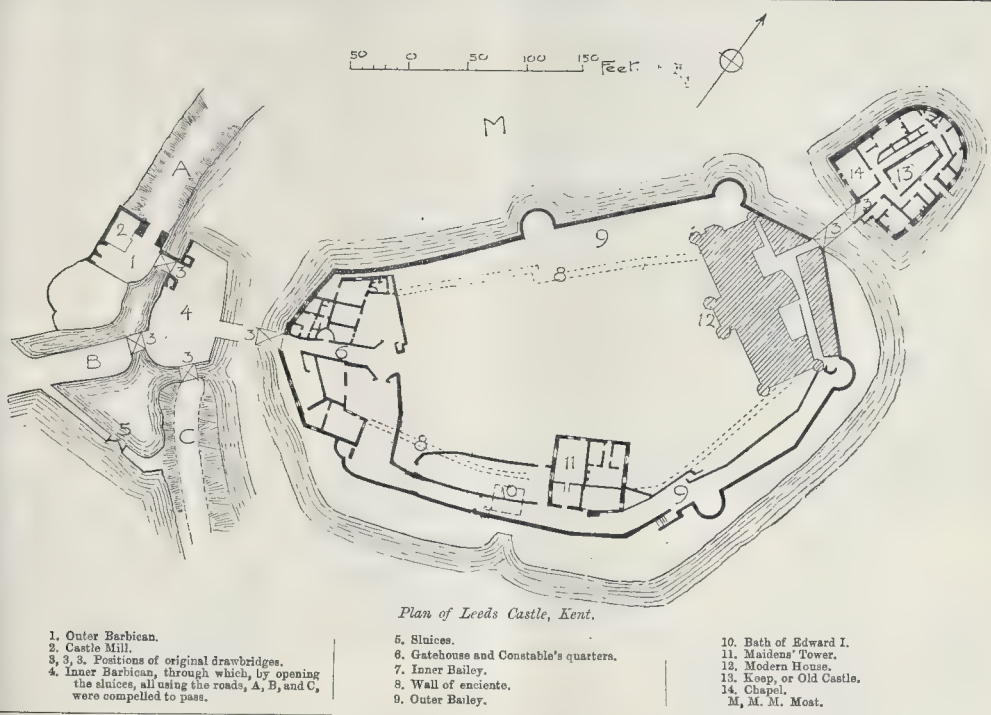
After this we find the Crevicours again in possession, and mentioned in connexion with the Dover Castle guard, Leeds being one of the manors which had to supply a certain number of men for this purpose.

During the Barons' War, in the last years of Henry III., the Crevicour, then holding Leeds, got into disgrace; and we find the castle in the hands of the Leybourns, from whom it passed (probably by compulsory exchange) to King Edward I.; but it is not at all clear how this came about, as we find that King, when he settled the castle on his Queen, Eleanor, and afterwards on his second wife, Margaret, obtained a confirmation from the then living Crevicour. There is some reason to think that Sir Roger Leyborne (to whom it was granted by Henry III.) dying in 1271, his son, another Sir Roger, alienated it to the King on account of troublesome litigation with the contemporary Crevicours.

From the time of Edward I. to Henry VIII. it was a Royal domain, and frequently formed a portion of the dowry of successive queens. Edward gave it to Eleanor of Castile, and afterwards to his second wife.

Edward II. gave the castle to Lord Badlesmere (generally known and referred to as "the rich Lord Badlesmere") in exchange for other property. It is doubtful whether he had the right to do this, as the reversion belonged to his wife Isabella, who in 1321, during the absence of Lord Badlesmere, with the Barons in the north, appeared one evening at Leeds, and,





representing that she was on a pilgrimage to Canterbury, requested shelter for the night, but was refused admittance by the castellan, and on force being resorted to, was obliged to retreat. The Queen, however, complained to Edward, who at once, by a writ dated Oct. 17, 1321, at the Tower of London, summoned the men of Kent, Sussex, Essex, Surrey, and Hampshire to meet him at Leeds. Lord Badlesmere attempted to treat with the King, but finding it useless did not even try to help the inmates of the castle, which was obliged to surrender. The castellan, Walter Colepeper, was hung, and Lady Badlesmere and family sent to the Tower.

In 1395 Richard II. was here, having settled the castle on his queen, Ann of Bohemia. He received Froissart, who in his history tells us that "the King was going to a beautiful palace in the county of Kent, called Leeds Castle." During the same visit the King issued the writs to the Chancellor of Oxford University to expel Lollards and to examine Wickliffe's "Trialogus." Shortly afterwards Richard was imprisoned here by Henry IV., who also settled the castle on his queen, and granted the use of it to Archbishop Arundel.

In 1425 Catharine of Valois was put in possession of Leeds, which she held till 1437. During this time the Curfew Bell was fixed. It is dated 1435, and has in low relief representations of "The Crucifixion," "The Virgin and Child," and "St. George and the Dragon." About the same time the "Old Castle" assumed its present appearance, and possibly the Maidens' Tower was built, though some attribute that to Henry VIII.

Henry VIII. visited Leeds on his way to the Field of the Cloth of Gold, and during his stay in France fat bucks were sent over from the park here for the use of the Court. The castle seems to have been granted to Sir Henry Guildford by Henry, and in 1632 passed by purchase to Lord Colepeper, but there is nothing to show whether he claimed descent from the unfortunate castellan who was hung here more than 300 years before. It next passed by marriage to the Fairfax family, the last direct descendant being General Martin, who inherited it in 1800. On his death he bequeathed it to his cousin Fienes Wykeham, who curiously was a descendant of Sir Roger de Leyborne, who had held it 500 years before. Mr. Fienes Wykeham took the additional name of Martin, and the castle is still owned by the family.

Referring now more particularly to the structure itself.—The earliest part of the present buildings to which any definite date has been assigned is the chapel, which was built in 1280, a considerable amount of other work being carried out at the same time by Edward I. on the castle coming into his hands. It seems most probable that he had noticed how well adapted the place was for making a strong fortified position which should dominate the Weald of Kent, and so assist in protecting London from invaders attempting to gain access by means of the Kentish roads. Although the work of Edward is the earliest to which a date has been assigned, it has been made quite clear by frequent investigations that much of his work is built upon, or added to, work previously existing, and which still remains, although it is uncertain to what period it belongs.

Although Edward, therefore, devoted himself largely to the fortification of the castle, he yet paid some attention to the luxuries of a royal residence, for he constructed here one of the earliest examples of a swimming-bath, an appendage which he added to several of his houses. Probably he brought the idea from the East, or possibly baths were a luxury introduced by his queen, Eleanor of Castile, as we find the bath at Leeds particularly mentioned in the accounts kept by the executors of that queen.

As a specimen of military architecture and engineering it should be noticed that by means of sluices it was possible to flood the ground beyond the causeways on which the roads were formed, so compelling all using them to pass through the castle barbican, while a small watch-room near the guard-rooms was provided with look-out holes commanding each of the approaches.

There also seems some reason to believe that, to avoid the danger of the water of the lake, or moat, being poisoned by the enemy, spring-water was laid on from a spring nearly half-a-mile off, by means of a lead pipe, which is recorded to have needed repair in 1367, so it had evidently been constructed previously.

From a survey made in 1314 we learn that part of the wall of the inner barbican had slipped, and the jury appointed to examine it said they could not estimate the cost of repair without letting off the water from the moat to see the foundations. This would probably have been a difficult matter, as the barbican was purposely placed in the bed of the river Len, in

order to prevent besiegers being able to cut off the water.

The arrangement of an outer and inner barbican is somewhat rare in English castles of this date, though found sometimes in France.

The castle buildings occupy three islands, the first being devoted to the inner barbican; the second to the gate-house, with guard-rooms and Constables' apartments, the inner and the outer bailey, and the lord's residence; while the third was occupied by the keep. All the islands were connected only by drawbridges, so that they could be separately defended.

The gate-house is probably of the time of Henry III. or John, but was raised by Edward I., and the machicolation probably added by Richard II.

The bath already referred to was apparently planned by Edward during a visit here in August, 1289, but it seems doubtful if it was ever used, as the Queen died the following year, and the king is not known to have visited Leeds since, although the work was, perhaps, carried on until 1291, as there is an entry in the account Rolls of a payment to Thomas of Lamberhurst "for paving the bath of the King at Leeds."

The floor measured 22 ft. by 16 ft., and a centena of Reigate stone was purchased for the purpose. This may have been 100 stones 2 ft. square.

Turning now to the Gatehouse, after passing through the gate to the left was a vaulted cell with curious shaft, which seems to have been intended as chimney; or, as some think, a means of ventilation. A bench was also provided for the use of the guard and those waiting to see the Constable. On the upper floor were two guard-rooms, one for the privates and another for a superior rank, while in close proximity was the Constable's room, approached by a narrow passage as an additional means of defence. Communicating with the Constable's room was a "squint" to allow of his giving orders with regard to the drawbridge or portcullis without leaving his room. A small ante-room with look-out holes, commanding the three causeways and their approaches, was also provided.

Having just referred to the portcullis it may be of interest to notice that in January, 1386, we find that "Thomas Bromeligh, the Clerk of Works at Rochester Castle, delivered to William Okangre, Deputy of Sir John Devereux, Constable of Leeds Castle, two new portcullises with all needful ironwork and nails, and a new

iron ring for the barrier near the mill." Some years previous to this, the castle is said to have undergone restoration at the hands of no less a person than William of Wykeham, who in 1359 was appointed surveyor to the Royal castles of Windsor, Leeds, Dover, and Hadlow. But there is no certainty as to what he carried out here.

The original lord's house was pulled down in the reign of Elizabeth, and the new house built by the Smyth family, finished in time of James I.

This was only connected with the "old castle" by a wooden bridge.

In 1760 Lord Fairfax took out the mullions from the Smyth's house and inserted sashes. He also put sham Gothic heads to the windows, so that there was very little of interest left in 1822, when it was pulled down, and the present house built, the oak mantel from the old drawing-room being placed in the dining-room. The cellars under the house are probably twelfth century work.

During the reign of Charles II. some Dutch prisoners confined in the old castle, or "Gloriette," caused a fire, by which the original plan of that portion was lost, although the chapel, as well as Henry VIII.'s banquetting hall and kitchen, have since been identified. Externally the appearance of the castle is probably very little altered since the time of Queen Elizabeth, as the modern house is almost exactly similar to that erected by the Smyths.

### Illustrations.

#### ST. JOHN THE BAPTIST CHURCH, WIMBLEDON.

THE body of the Church of St. John the Baptist at Wimbledon was built from Mr. T. G. Jackson's designs a few years ago, and it is now proposed to complete it by the addition of the tower and spire, which were omitted for want of funds. The church consists of a chancel with an organ-chamber on its north side, and a nave with a north aisle, and provides nearly 800 sittings.

Owing to the fall of the ground, height is obtained under the chancel for the vestry. The material is red brick, with stone dressings sparingly introduced, cut bricks being used for the moulded arches and jambs of doors and windows, both within and without the building. The pulpit and font are of marble; the chancel is paved with marble mosaic, and the chancel seats are of black walnut. The builder was Mr. Townsend, of Wimbledon; the marble work was done and the stalls made by Messrs. Farmer & Brindley, and the heating apparatus is by Messrs. Longden & Co.

#### EXAMPLES OF MEDIEVAL WOOD-CARVING.

THE three examples from Wells Cathedral are probably of the fourteenth century, and are now, with a number of other interesting details, preserved in the Cathedral Library over the east walk of the cloister. The Miserere, from Coventry, is to be found at the back of the present choir stalls on the north side. David with his harp is still fairly perfect, but the majority of the figures have been very much mutilated, and Jesse himself has fared badly. New College Chapel stalls are in good preservation, and the examples given are only a few from a wonderful variety to be found there.

#### ST. PETER'S CHURCH, RUDDINGTON, NEAR NOTTINGHAM.

THE perspective view and small plan given will sufficiently show the design and arrangement of this church. The only part of the old church retained is the tower and spire; the latter was pulled down, a new belfry built upon the old tower, and then re-erected; the total height to the top of the spire is 116 ft. The materials used for the exterior walling is Cox-bench stone; the interior is lined with stone from the Bath quarries. The roofs are covered with slates. An oak dado, 7 ft. high, surrounds the interior of the building. The nave roof is open timber work; that over the aisles and chancel is boarded and ribbed, the latter being decorated in colour with figures, nearly life-size, representing St. George, St. Uriel, St. Michael, and St. Raphael, surrounded by adoring angels and angels throwing incense, executed by Mr. Cantrill, of Manchester, from full-size

cartoons drawn by the architects. The floor of the nave and aisles is of wood blocks, with tile passages; that of the chancel of Hopton-wood stone in 12 in. squares; and the sanctuary of encaustic tiles, all laid by Messrs. Conway, of Manchester. The chancel screen is surmounted by a massive cross, and, together with the side screens, benches, and altar, is of traceried and carved oak; the latter has statuettes in niches, representing St. John, Melchisedek, St. Peter, and Aaron, the work of Mr. Millsom, of Manchester. The altar-top is of Hopton-wood stone. Behind the altar is an embroidered dossal and wings, the work of the Sisters of Bethany. The east window is filled with glass by Messrs. Clayton & Bell, and represents the history of the priesthood from the earliest days of Christianity. This window has been fully and elaborately described in a work written by an American priest, published at the time of the consecration of the church. The glass in the side chancel windows (by Mr. Egan, of London) represents the Sacrifice of Cain and the Sacrifice of Isaac. The eastern window of the north aisle is also filled with stained glass, the gift of Captain Linskill, and represents the Good Shepherd, the work of Messrs. Powell, also of London. The nave and aisles are lit by fourteen brass spider pendants of seven lights each, and the chancel by brackets. These, as well as the other brass and wrought ironwork, were made by Mr. Powers, of Manchester. Messrs. Fish & Sons, of Nottingham, were the contractors, Mr. Henry Brown being responsible for the masonry. Messrs. Williams & Co. of London, supplied the casements and glazing, and Messrs. Stanton, also of London, the heating apparatus. Messrs. MacHamilton & Co., of Manchester, made the chancel screen and pulpit, and Mr. William Arbuckle, also of Manchester, the side screens, stalls, altar and nave panelling. Mr. Millsom executed the whole of the carving. Messrs. Bell & Roper, of Manchester, were the architects.

#### TOWN HALL, HOUNSLOW.

THE illustration shows the interior of the large hall, as proposed after alteration.

In addition to enlarging the hall, a new stage, with performers' retiring and ladies' and gentlemen's dressing-rooms, will be provided on the first floor, a new principal staircase and vestibule to serve the front part of the hall, and two new secondary staircases from the back opening directly to the street. A balcony is provided outside at the back of the stage with an iron step-ladder to garden, to form an emergency exit for the performers, and all the staircases will be fireproof. The stage is so arranged that by removing the partition at the back it can be doubled in size, if required for large theatrical performances.

On the ground-floor will be a new Board-room, 34 ft. by 24 ft., and gentlemen's lavatory and cloak-room, with a ladies' cloak-room in a mezzanine over it. The entrance-hall will be considerably enlarged, and the existing offices rearranged.

In the basement will be store-rooms for coals and other purposes, strong-room, and heating-chamber, with apparatus for warming the large hall.

For the ventilation of the hall, warmed fresh air will be admitted through coils of hot-water pipes placed below the windows, and the foul air will be drawn off at the top by means of sun-burners under the lantern-lights, with double tube extract shafts carried up through roof.

The work is now being carried out by Mr. Thos. Hiscock, of Hounslow. The architect is Mr. H. O. Cresswell.

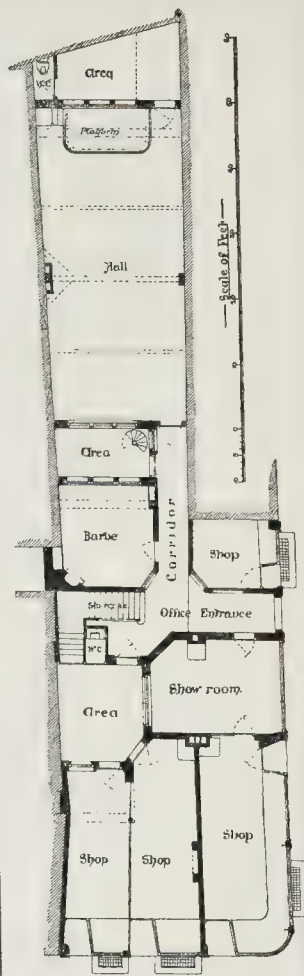
#### BUSINESS PREMISES, CARLISLE.

THE illustration represents a block of buildings in course of erection for Messrs. R. Moss & Co., Scotch-street, Carlisle. The building includes on the ground-floor a group of shops to the principal and side fronts, and a large hall in the rear.

The first and second floors of the front building are devoted to offices, which are arranged in suites, suitable for letting, each with separate lavatory accommodation, &c.

The elevations are being built of the warm red stone for which the quarries in the neighbourhood are famous.

The contracts for the work have been let separately,—all to local tradesmen,—the principal contractors being Mr. James Metcalfe and Mr. W. Batey, for the builder's and carpenter and joiner's work respectively. Mr. Geo. Dale



Oliver, of Carlisle, is the architect under whose supervision the works are being carried into execution.

#### SCULPTURE: "JEANNE D'ARC."

THIS work, as already mentioned in our columns, is a second edition by the sculptor M. Fremiet, of his equestrian statue of Joan d'Arc, in which he has adopted a more robust and vigorous type of physiognomy for his heroine than in the former statue. The group occupied a central position in the great hall of the Salon exhibition of the present year.

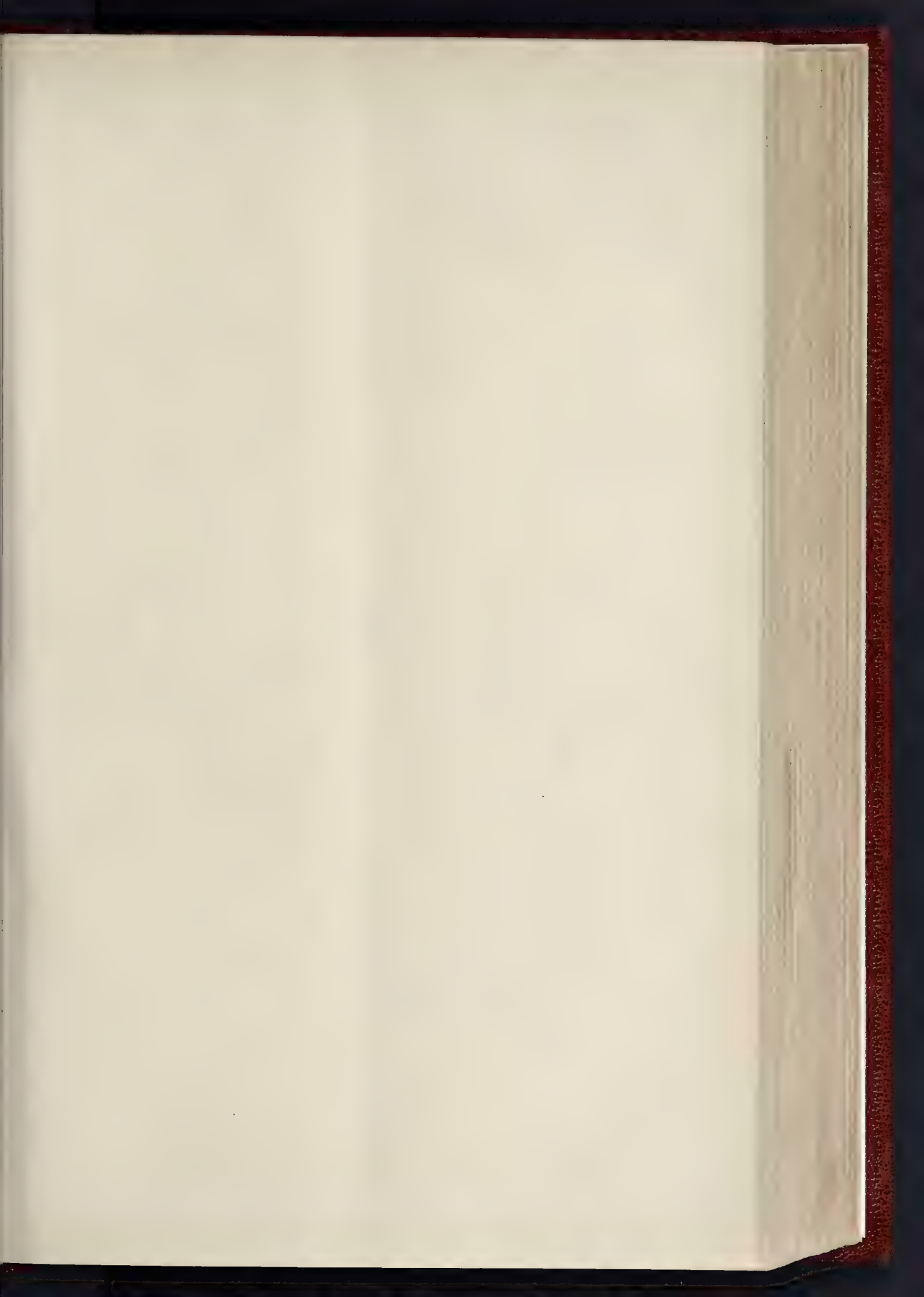
#### SCULPTURE: "EXILÉS."

THIS fine group, by M. Mathurin-Moreau, was one of the most prominent works of sculpture in the Paris Salon of this year, and, as before mentioned, was considered likely to obtain the "Médaille d'Honneur" of the year, though this was not the ultimate decision of the jury.

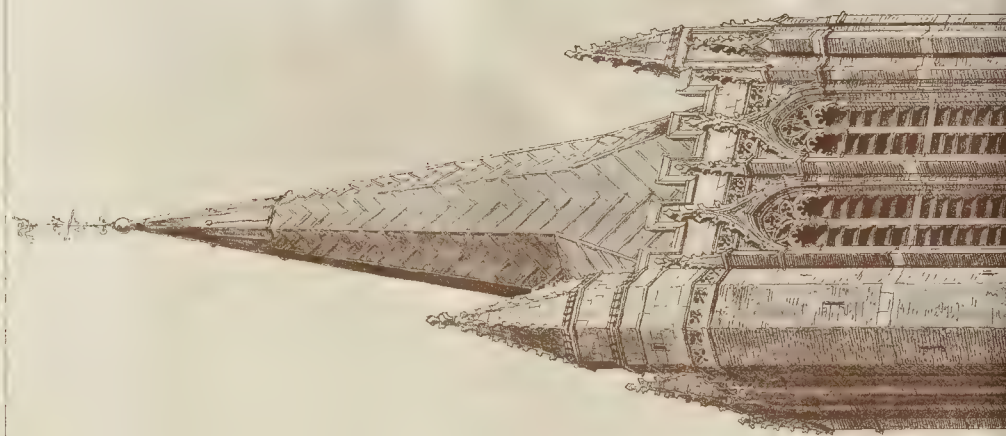
A cast of the group also occupies a central position in the Sculpture Hall of the Paris Exhibition, and was specially referred to in our remarks on French art at the Paris Exhibition.

**The British Archaeological Association at Lincoln.**—The British Archaeological Association commenced its forth-sixth annual congress at Lincoln on Monday last. We have an illustrated report of the first two days' proceedings in type, but are obliged to hold it over until next week for want of space.

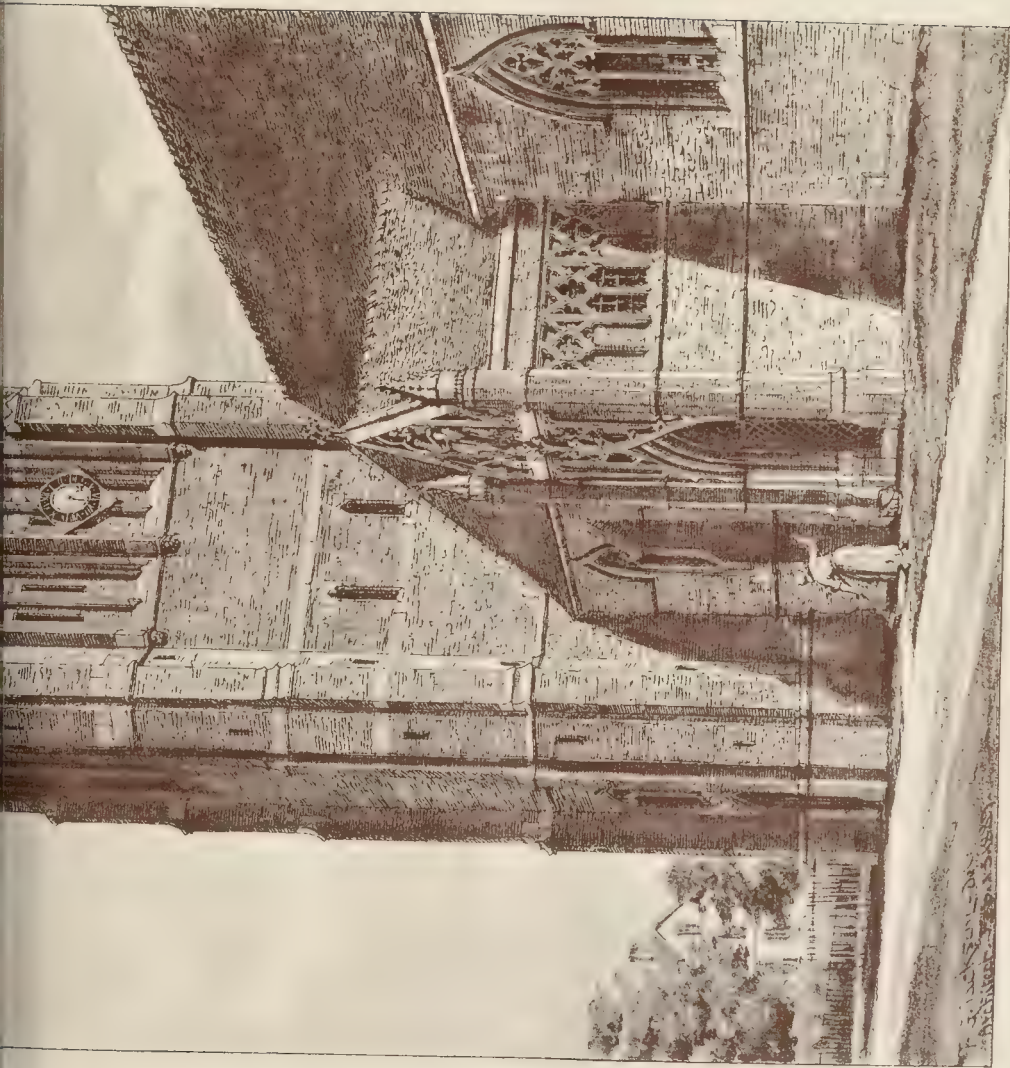




THE BUILDER, AUGUST 3, 1889.



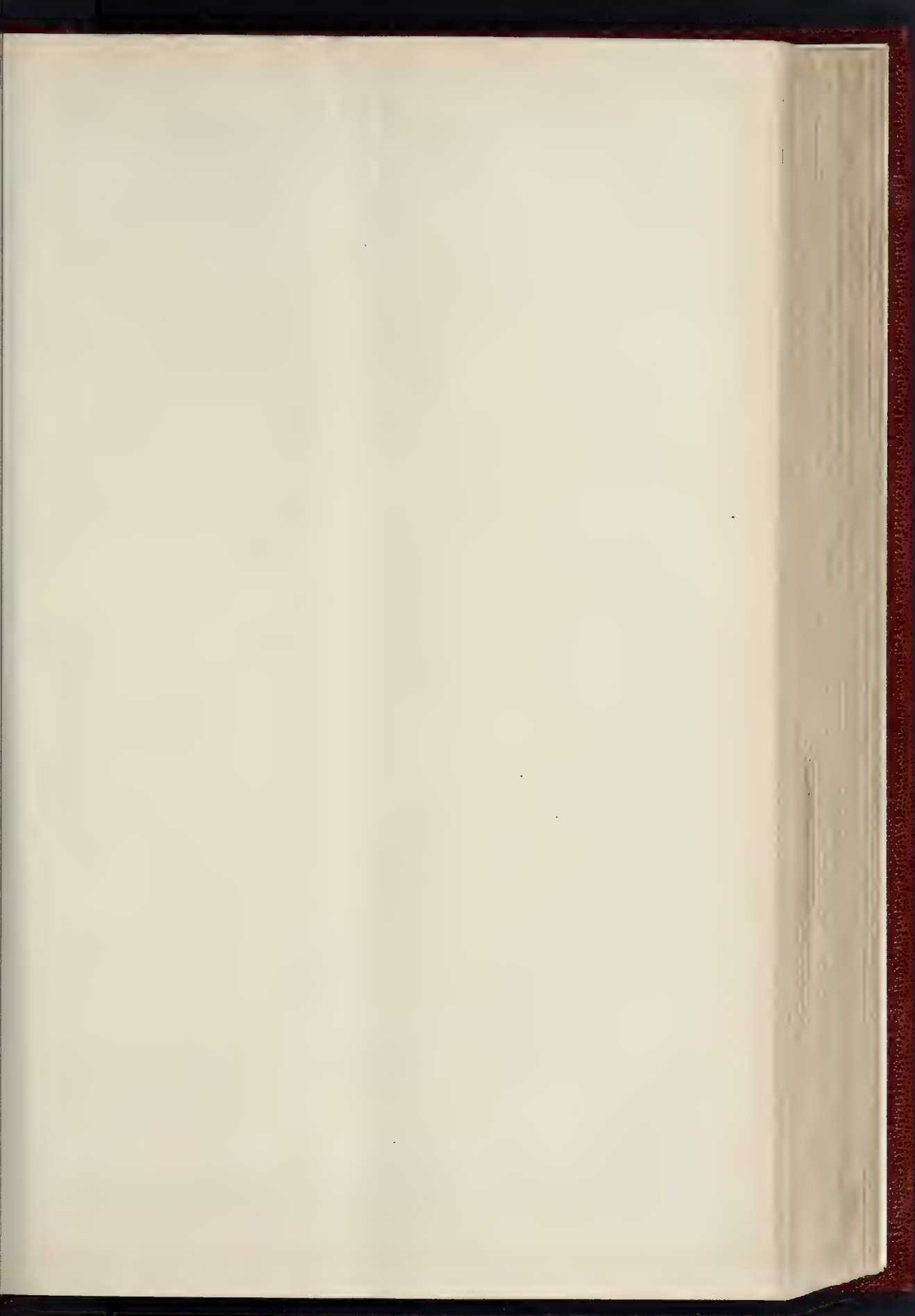




TOWER FOR ST. JOHN THE BAPTIST CHURCH, WIMBLEDON.—MR. T. G. JACKSON, M.A., ARCHITECT.





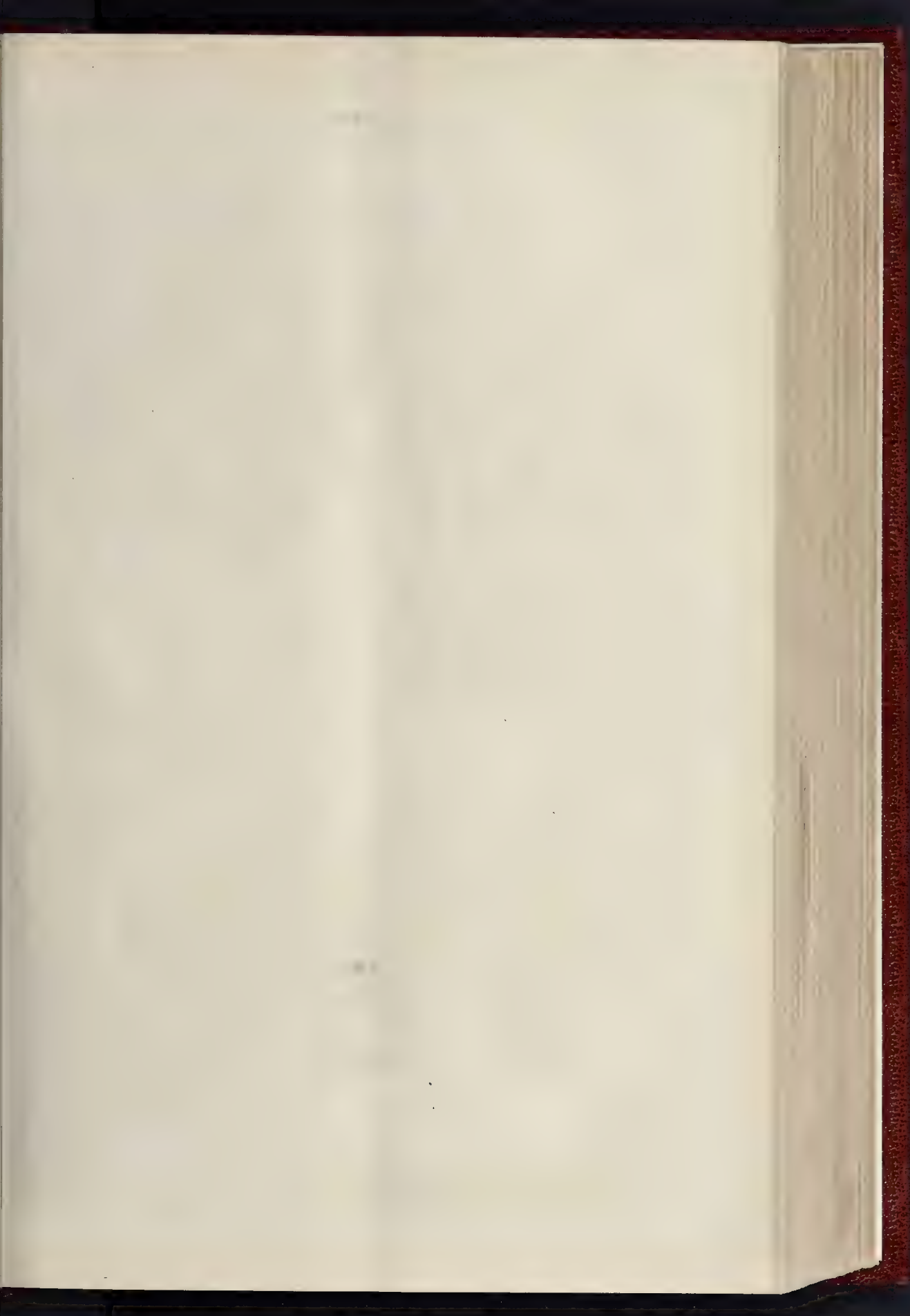




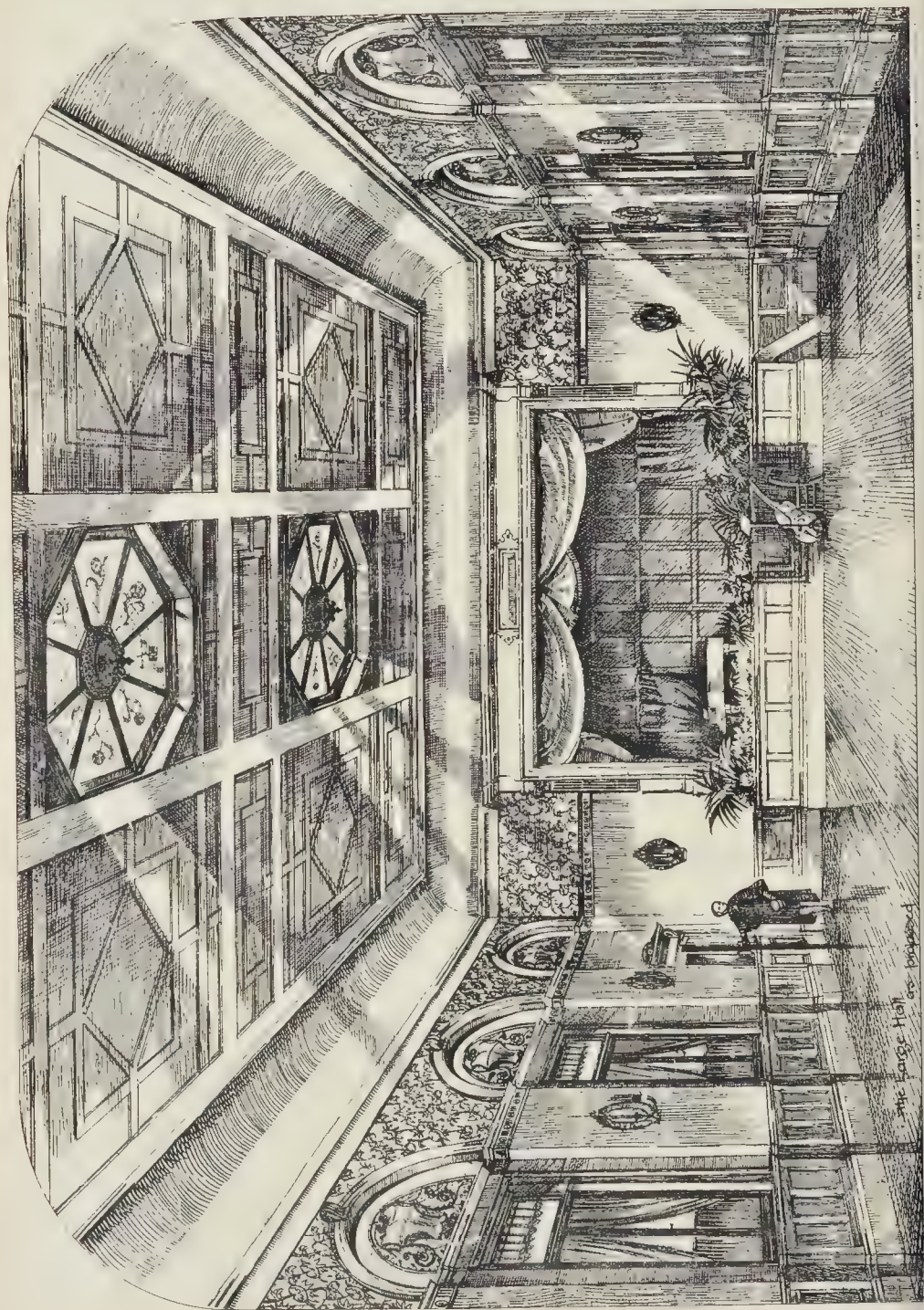
THE PHOTO SPRAGUE & CO., 22, MARTIN LANE, CANNON ST., LONDON, E.C.

SCULPTURE; "JEANNE D'ARC": EXHIBITED IN THE SALON OF 1889.—M. FREMIET, SCULPTOR



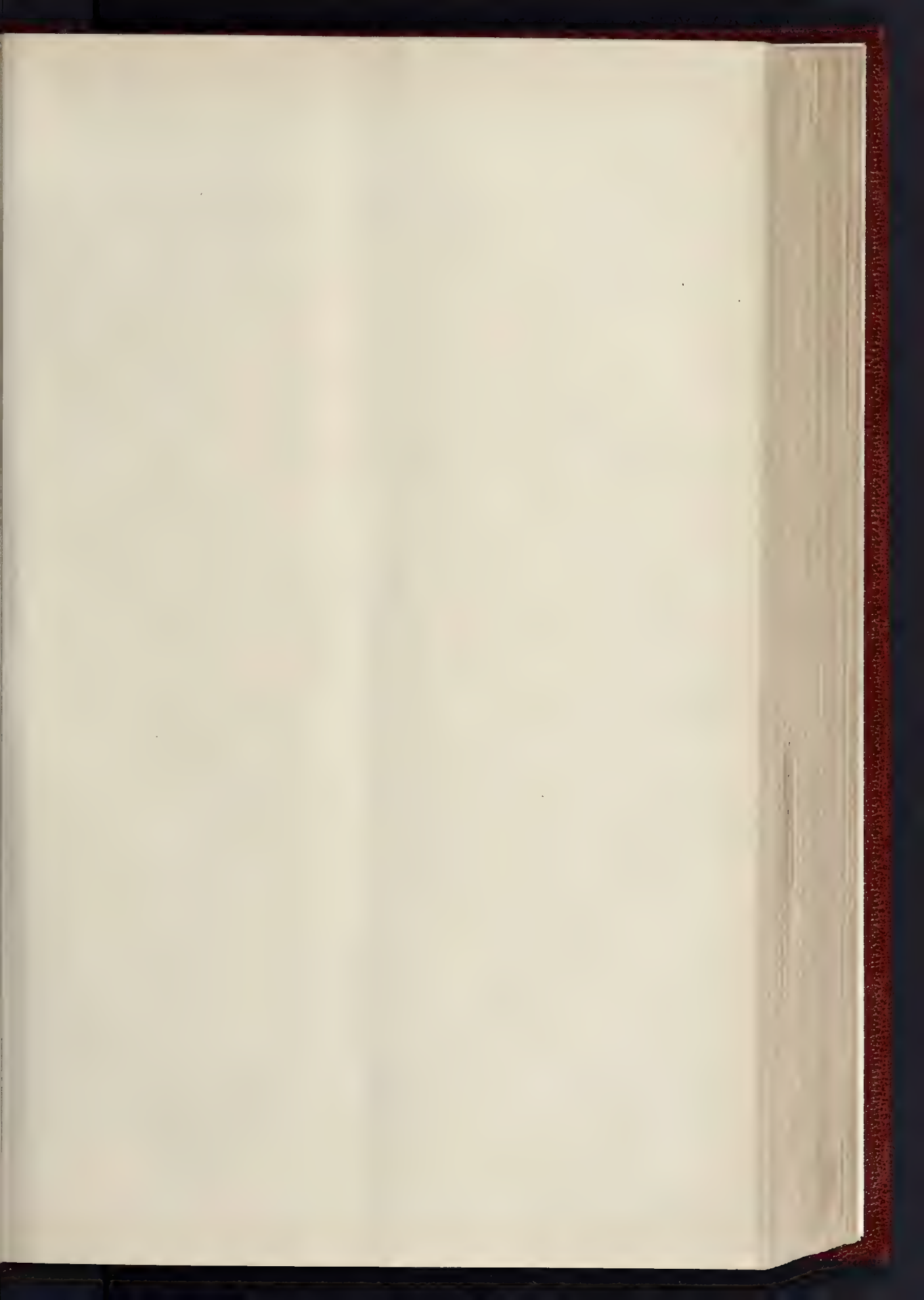


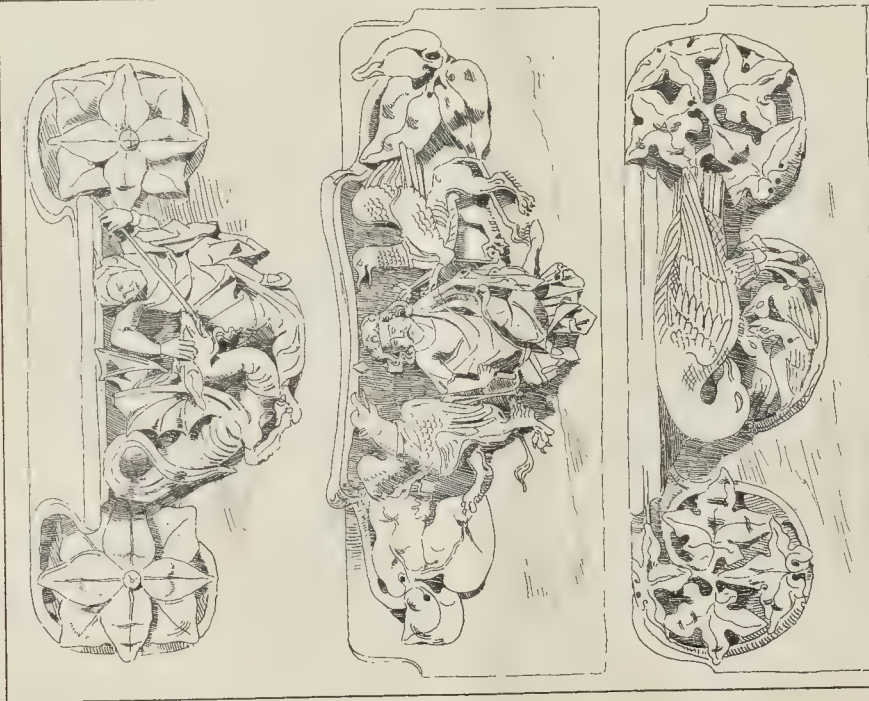
THE BUILDER, AUGUST 3 1889.



The Large Hall as proposed







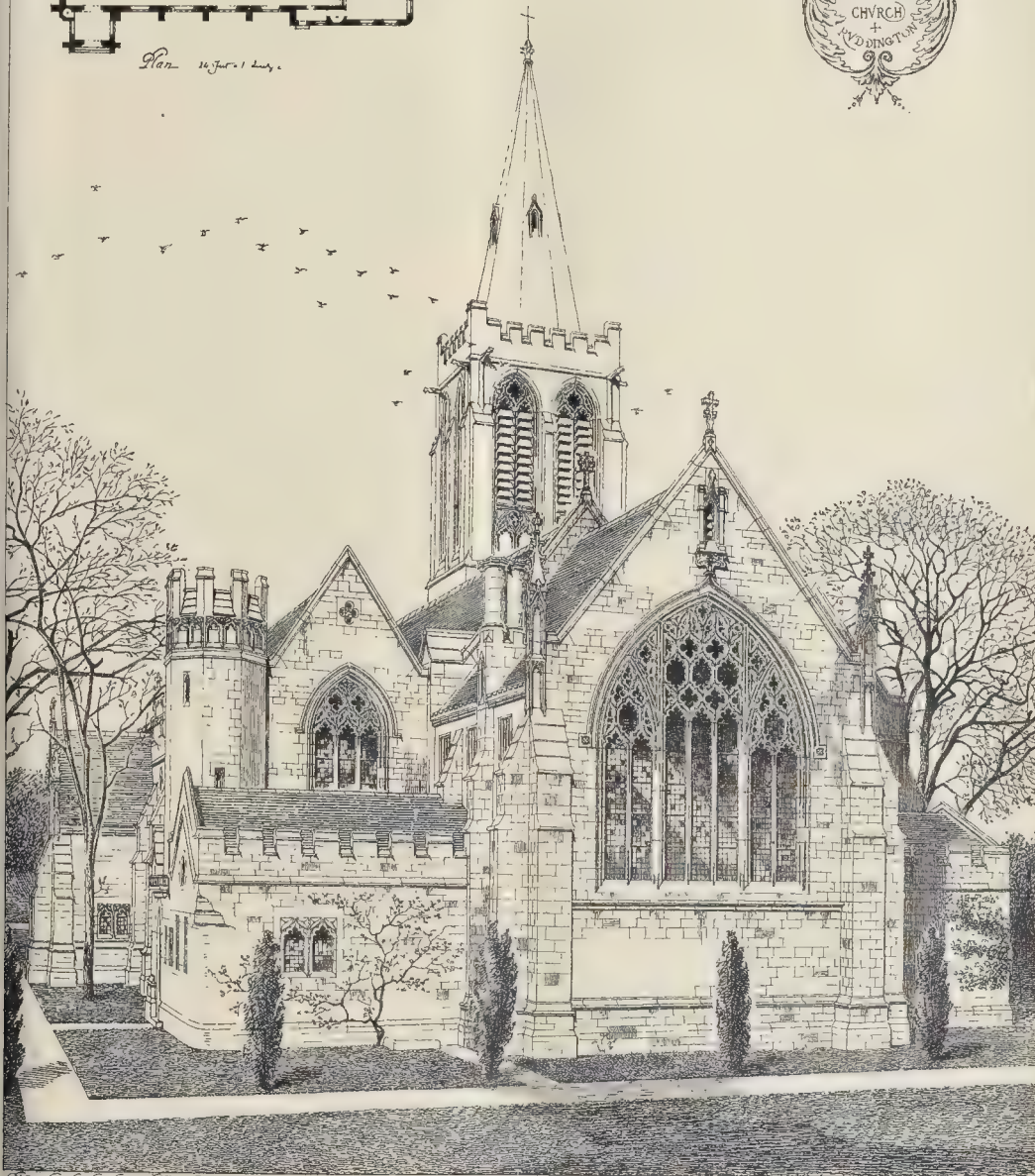
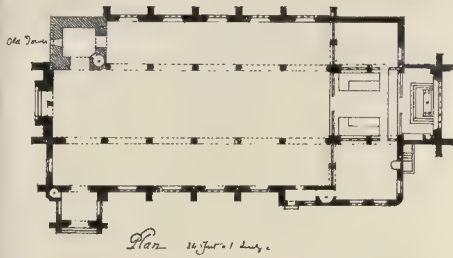
Three Miserere from Wells Cathedral.



Miserere from St. Michael's, Coventry.

Carvings from  
New College Chapel  
Oxford.





Rev. Frank Bayly M.A., Vicar

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ST. PETER'S CHURCH, RUDDINGTON.—MESSRS. BELL & ROPER, ARCHITECTS







BUSINESS PREMISES, CARLISLE -- MR. G. D. OLIVER, A.R.I.B.A., ARCHITECT.







INK PHOTO, SPRAGUE & CO 22, MARTINS LANE, CANNON ST, LONDON.

SCULPTURE; "EXILÉS": EXHIBITED IN THE SALON OF 1889.—M. MATHURIN-MOREAU, SCULPTOR





THE CROSSNESS OUTFALL SEWAGE

WORKS:

VISIT OF THE SOCIETY OF ENGINEERS.

THE new works at Crossness are part of the scheme adopted by the late Metropolitan Board of Works for purifying the sewage of the metropolis by chemical means and discharging the sludge after precipitation by means of steam tank-vessels into the open sea. Whether the plan—particularly the discharge into the sea—will be successful, it is not our present purpose to discuss. The discharge of sewage at other places into the sea has been very objectionable; and the inhabitants of some populous, popular, and healthful watering-places may have reason hereafter to object. In the meantime, however, the new works are going on, and two of the tank-vessels have been built and delivered for service. Last year the Society of Engineers visited the works in progress at Barking, on the north side of the Thames, and on Tuesday last they inspected the similar works which have been begun at Crossness on the southern side of the river. The general project is to use for precipitation the four compartments of the existing reservoir, and to supplement them by additional new precipitation channels. The intention is that the sewage shall be treated first with lime-water and next with iron-water. It is then to remain quiescent for about two hours, during which period most of the solids will be precipitated. The effluent water will be decanted over lowering weirs as quietly as possible, and run to the river when the state of the tide will permit, and at other times temporarily to an effluent store. The sludge remaining behind will be run in its wet condition into a receiving-well with a pump, from which it will be pumped into sludge-settling channels, and in them it will again remain quiescent for about ten hours, during which a further settling will take place. The effluent or "liquor" will then be run off from the settled sludge into a liquor store; after which the settled sludge will be removed from the floor into a sludge-store beneath, whence it will be pumped through pipes carried along a jetty to a pier, from which it will be discharged into one of the sludge-steamers provided for carrying it out to sea. The liquor from the liming station will, by the addition of slaked lime, be made into lime-water, and injected into the line of the outfall sewer at a short distance from the existing sewage-pumps.

For the supply of the new engines, settling-tanks for water admitted from the river will be provided; and the water from these will be used for making lime-water when the liquor is not in quantity sufficient for the demand. Water from this source will also be used for dissolving proto-sulphate of iron to form iron-water. The new reservoir, with its precipitating channels, will occupy an area of about four acres. It will be built in two sets of chambers, one above the other. The foundation-piers have been carried down from 18 ft. to 27 ft. below Ordnance datum, to obtain a basis on the hard gravel. The trenches are filled in with concrete, and arches of the same material are being turned. The flooring will be of bricks on edge set in cement. On this a series of thirteen jack arches will be carried from north to south. On the top of these will be covering arches. Above this again will be a platform of concrete 3 ft. in thickness, upon which the upper tier of arches will be completed, and covered at top to the level of the old reservoir adjoining. The length of these superposed reservoirs is 590 ft., and their breadth 260 ft. Their summit will be brought up to 25 ft. above Trinity datum: the lower set of chambers being 11 ft. 3 in., and the upper tier 15 ft. in internal height. The existing principal and auxiliary main sewage pumping-engines will lift the limed sewage from the lowest level to the existing reservoir and into the precipitating channels. There will be four new pumps for lifting the wet sludge to the settling-tanks, the liquor to the liming station, for delivering the sludge to the ships, and for lifting the overflow of the stored sludge from the lower sludge store into the upper sludge store. There will be also other pumps and machinery for raising the clean river water to the iron-station, to the boilers, and so forth. The estimated cost of the works is over 250,000. Of their gigantic extent and intricate nature some idea may be formed from the following details. The existing reservoir divided into four compartments will have 168 weirs for decanting the effluent. There will be two

effluent discharge culverts carried under the old reservoir. The new precipitating channels will be divided into two compartments of six channels each. These will have forty lowering weirs for decanting the effluent. There will also be eight sludge settling channels and 48 pits and weirs for drawing off the liquor. Beyond all this, there will be various culverts, mixing-houses, engine-houses, and systems of pipes.

The works at Barking (which we fully described last year) are now nearly completed, and will be shortly opened for service. Those at Crossness have not progressed as yet beyond the foundations and the groundwork of the lower tier of settling-chambers, and the work is not being hastened. The engineers' party, with whom was the president (Mr. Jonathan Baillie), Professor Henry Robinson, Mr. Church, Mr. Newton, Mr. Cunningham, and the Secretary, Mr. Pryce Cusson, were brought down by one of the Victoria Steamboat Company's pleasure vessels, and on arrival were entertained at luncheon by Mr. Webster, the contractor for the new works, and the author of the new system of purification of sewage by electrolysis.

After luncheon, the party witnessed the discharge of sludge from the 9,000,000 gallons experimental reservoir into one of the sludge vessels. They then visited the experimental section, where trial is being made of Mr. Webster's electrolytic system of treatment, which excited great interest. This system has already been described in detail by us. The sewage is admitted direct into a series of three wooden tanks of about 18 in. by 18 in. sectional area, and altogether some 400 ft. in total length. There are in these troughs six sections of twenty-two sets of fifteen iron plates, through which a current of 300 amperes at 2.3 volts tension across each of the six sections is passed, which is capable of purifying to the extent of more than 50 per cent. 12,200 gallons per hour. The current is generated by a dynamo of 1,600 amperes capacity. The experiments being still under operation, it would be premature to give results; but the electrical engineer in charge seemed to think that a million gallons of the London sewage could by this means be purified to the extent of 50 per cent. organic matter in solution, at a cost of 15s. The use of iron for electrodes has, no doubt, a great chemical advantage, for the iron will be given off in a condition to exert a primary powerful action, and afterwards in its changes to facilitate oxidation of the organic matters. Mr. Webster's theory of the electrical action is that water is decomposed when the current of electricity is of such density that it can overcome the resistance. The decomposing effects are precisely in accordance with the chemical equivalents of substances electrolysed. Thus, the same amount of electricity that would reduce fifty-six parts of iron from its solution would reduce 207 parts of lead, or sixteen parts of oxygen. Therefore the chemical changes which take place in the electrolysis of sewage are the splitting up of water, sodium, magnesium, and other chlorides, into their constituent parts. Chlorine and oxygen gases are set free at the positive pole, in a nascent condition, and consequently intensely active, so that the organic matter in the sewage is rapidly oxidised and burnt up into innocuous compounds. Hypochlorous acid and other oxides of chlorine are formed at first. The former unites with the iron, which is again precipitated, probably by the ammonia in the sewage and the oxides of chlorine destroying the organic matter.

The use of sulphate of iron for the treatment of sewage has been objected to as liable to give rise to afterchanges of a disagreeable nature, namely, the formation of sulphides whereby, through the loss of oxygen, a residue of sulphuretted hydrogen would be given off into the atmosphere. This result could not follow on the disintegration of the chlorine from the iron, whilst the residual oxide of iron would still have its utility manifested by its further action on the remaining organic matters.

The party was conducted over the original outfall works by Mr. Houghton, and were shown the fine pumps in their handsome house, and the treatment of the sewage by the permanganate of potash process in operation. The new works were also inspected under the guidance of the contractor.

The new works are calculated to provide for the treatment of the sewage of 2,400,000 persons within the area of the metropolis south of the Thames. The sewage as it ordinarily arrives, independent of rainfall, is very much

diluted, the total volume very closely approximating the quantity of water supplied by the London Water Companies,—namely, an average of thirty gallons for each inhabitant. Indeed, the amount of water remaining in the sludge put into the tank vessel,—namely, 90 per cent.,—excited much comment. In this view, the small quantities of lime, 3.7 grains; and iron, 1.0 grain per gallon, advocated by the Official Chemist, Mr. Dibdin, become intelligible, and, although we do not here take sides in the controversies which are raging, it is only fair to observe that the official plan regards the influence of the small quantities of precipitants as curdling and throwing down a certain portion of the organic materials without rendering the alkalinity of the sewage-water sufficient to re-dissolve those organic materials.

Whatever may be the ultimate settlement of the sewage question for the metropolis, the method now adopted will soon have a practical trial at Barking on ten times the scale of the present experience, and this will, therefore, if it prove no more than a temporary expedient, help very materially towards a really final decision. The electrical system may, however, possibly prove to be a much less expensive means of high purification than the use of chemical salts.

COMPETITIONS.

*Richmond Municipal Vestries.*—At the meeting of the Richmond Vestry on Tuesday evening, the works Committee presented a report stating that eight sets of plans had been received in this competition. The Committee concurred in the opinion of Mr. James Edmeston, F.R.I.B.A., who acted as professional assessor, that the design bearing the motto "Q.E.D." was the best, and that with the motto "Westward Ho!" the second best, and they accordingly recommended that the first premium of £100 be awarded to "Q.E.D." and the second premium of £50 to "Westward Ho!" This having been agreed to, it was found that the design "Q.E.D." was by Messrs. George Elkington and Son, and "Westward Ho!" by Mr. Thomas Verity.

*Police Stations, Newcastle-on-Tyne.*—At a special meeting of the Newcastle Watch Committee, to consider the report of Mr. Murgatroyd, assessor of the plans of the proposed new police stations to be erected at Elswick-lane and Arthur's-hill, Mr. Murgatroyd presented the following plans, which he had selected out of a large number sent for his examination.—For Elswick-lane Station, "Custos," 1; "G. C. D.," 2; and "Truth," 3. For Arthur's-hill Station, "Truth," 1; "Adrian," 2; and "G. C. D.," 3. In accordance with the recommendations of the assessor, the committee selected the plan of Mr. J. S. Quilter, London, who had signed himself "Custos," for Elswick-lane Station; and the plan of Mr. Alfred Houston, whose *nom de plume* was "Truth," was chosen for Arthur's-hill Station. It was agreed to divide 50l. between the second and third competitors for the two buildings. "Adrian" (Messrs. Clark & Moscrop, of Darlington) received 12l. 10s.; G. C. D. (Mr. A. D. Gibson, of Newcastle), who was second in one and third in the other, to receive 25l.; and "Truth," who was third for Elwick's-lane building, to receive 12l. 10s.

STAINED GLASS.

*Bristol.*—The Church of St. Stephen, Bristol, has just received a three-light window representing the Resurrection, in memory of the late Mr. George Macready Chute. The tracery above contains figures of SS. Paul and Cecilia, and Masonic emblems. The work has been designed and executed by Messrs. Mayer & Co., of Munich and London.

*Brookley (Kent).*—Messrs. Pepper & Boyes, of Euston-road, have lately placed a three-light window, representing "Our Saviour among the Doctors," in St. Peter's Church, Brookley, Kent.

*Newington (Kent).*—A stained-glass window representing Our Lord blessing little children, has just been placed in Newington Church, Kent. The window was designed and executed by Messrs. Warrington & Co., of London.

*Presbury.*—The old parish church here has lately received an addition in the shape of a stained-glass window, from the studio of Messrs. Mayer & Co. It consists of three lights, with tracery above, and is filled with the subject of "The Baptism of Christ." The window has been erected in memory of Mr. Thos. Goodier Richmond, who is the donor of several other windows in the church executed by the same firm.



# NATIONAL ASSOCIATION OF MASTER BUILDERS OF GREAT BRITAIN.

This Association held its twenty-third half-yearly meeting on Tuesday, July 23, at the Cross Keys Hotel, Hull, Mr. J. H. Colls, the President, in the chair, and representatives from London, Liverpool, Manchester, Birmingham, Bristol, Bradford, Nottingham, and Hull, were present.

The report and accounts for the past half-year were adopted.

The Employers' Liability Amendment Bill has not again been introduced to the House of Commons, and the Home Secretary has intimated that it is not intended to bring it forward until the next Session.

The question of the trades unionists' eight-hour movement was discussed.

The question of railway rates and terminal charges were discussed at very great length. The London, Birmingham, and Bolton Associations have drawn up valuable tables showing the great increase in the charges on many of the roads, but it is considered probable that the Board of Trade will object to the demand of the railway companies.

The Bill brought into the House of Commons, backed by Mr. Provand and other members, to provide for the compulsory examinations of boilers and fuses, was fully discussed, and it was recommended by the Council to the members of this Association who use machinery to give it their hearty support.

The Council also urged the members to insure their risks in the Builders' Accident Insurance, Limited, which was established for their protection by this Association; the Board of Directors consists of thoroughly practical Master Builders who are connected with this Association.

The question of the Form of Contract was also fully discussed.

It was decided to hold the next half-yearly meeting in London.

In the evening, the members at the meeting were entertained at a banquet given by the members of the Hull Association. (*Continued*).

# BUILDERS' BENEVOLENT INSTITUTION: ANNUAL MEETING.

The forty-second annual meeting of this Institution took place on Thursday, the 25th ult., at Willis's Rooms, St. James's. Mr. J. Howard Colls (President) occupied the chair, supported by Messrs. Thomas Stirling, Charles Russell, Robert Perkins, T. Hall, and other friends of the charity.

Major Bruton (secretary) read the report, which stated that during the past year six pensioners had died. In two cases the wives had taken the place of the deceased, while one male and one female pensioner had been elected. Happily the income for the past year from all sources, had been sufficient to cover the necessary expenditure, and this was greatly to be ascribed to the exertions of the President in obtaining donations at the annual dinner, and to the continued generosity of the subscribers. The annual dinner will take place, with the consent of the Worshipful Company of Carpenters, at their hall, on Thursday, Nov. 7 next, when Mr. J. W. Hobbs, who has kindly accepted the position of President of the Institution for the ensuing year, will preside.

The Chairman, in moving the adoption of the report and balance-sheet, congratulated the meeting on the fact that the Institution was going on prosperously.

Mr. Thomas Stirling seconded the resolution, which was unanimously agreed to.

Cordial votes of thanks were passed to the President, the Vice-Presidents, Trustees, Treasurer, Committee, and Auditors.

The Chairman next proposed that Mr. J. W. Hobbs (Mayor of Croydon) be the President for the ensuing year. He had not the slightest doubt that Mr. Hobbs would, during his term of office, use his utmost endeavours to further the interests of the Institution (applause).

Mr. Russell moved a hearty vote of thanks to the Chairman for presiding, which was duly seconded and agreed to, and the proceedings terminated.

**"The Kilm." Beasted, Kent.**—In reference to our notice of this house in our issue of the 20th ult., we are asked to mention that the floors have been laid with Lowe's patent wood block flooring in redwood, pitchpine, and light and dark oak.

**Savoy Hotel.**—We are asked to mention that the lifts in this hotel, of which we published a description the other day, are all fitted with the "Bostwick folding gates."

# THE LONDON COUNTY COUNCIL.

The ordinary weekly meeting of the London County Council was held on Tuesday afternoon at the offices, Spring-gardens, Lord Rosebery in the chair.

**Tenders.**—The first business was to receive tenders for the alteration and enlargement of the Council Chamber at Spring-gardens. That of Messrs. J. Allen & Son, amounting to £8,600, was accepted. The tender of Messrs. J. & T. Greenwood for the cleaning of the offices at Spring-gardens was accepted at £294. Tenders were also received for the construction of a viaduct, carriage-way, footways, sewers, &c., between Clerkenwell-road, and Farringdon-road (forming part of the new street between Holborn and Islington). These tenders were referred to the Improvements Committee for consideration and report. (The lists will be found in this week's *Builder* under the heading "Tenders.")

**The Fire Brigade.**—On the recommendation of the Finance Committee, sanction was given to the expenditure of £3,650, for increasing the efficiency of the Fire Brigade by establishing new stations in localities as yet inadequately provided with protection against fire.

**Brockwell Park.**—The Finance Committee also reported that, having further considered the resolution of the Council of the 9th inst. (No. 21), agreeing to contribute one-half of the cost, not exceeding £1,000, towards the sum required for the purchase of Brockwell Park, "your Committee have received from the Parks and Open Spaces Committee a statement as to the value of Brockwell Park and its probable value as a building site, as made by well-known experts, also the value of land recently sold or let for building purposes in that locality, and have arrived at the conclusion that the estimate of 1,500, per acre as the value may be accepted, and, as directed by the Council, provision has been made in the Money Bill for a sum not exceeding £1,000, as a contribution towards acquiring this property, and your Committee recommended—

"That the estimate of £91,000 towards the purchase of Brockwell Park be approved, subject to the removal of the existing statutory liability to contribute £12,500 in aid of Hale Park."

This, with a verbal amendment, was agreed to after considerable discussion, and after two or three amendments to reduce the amount had been made; but a resolution was subsequently agreed to to the effect that the contribution in this case of one half the purchase was not to be regarded as a precedent.

**The Main Drainage Committee.**—This Committee presented a report in fulfilment of an authorisation to them to obtain and open tenders for the supply of about 40,000 tons of coal required by the Council for its pumping stations and for other purposes. But only two firms tendered, and their prices being regarded as abnormally high, and it being suggested that the paucity of tenders was due to the manner in which the form of contract had been drawn up, the matter was referred back for further consideration, the Committee being empowered to obtain a temporary supply of coal during the recess. In the course of the discussion which ensued as to the qualities of steam-coal required, Councillor Aneas Smith remarked that it was necessary to provide the various sewage pumping-stations, and especially the Abbey Mills Pumping-Station, with the best possible fuel, in order to get the most efficient work out of them. The engines at those pumping-stations were utterly inadequate to the work they had to do, and especially was that the case at the Abbey Mills Station, which was barely able to cope with the dry-weather flow of sewage on a summer's day. It was no wonder, under these circumstances, that in times of rain various parts of the metropolis were subject to flooding by sewage. Councillor Westcott asked when the Council might expect the report of the Committee on the subject of the alleged breach of contract by Mr. Webster at the Crossness Outfall Works? Councillor Rhodes, who is the Chairman of the Committee, replied that the matter was one of such extreme importance that it needed very careful weighing by the Committee. Councillor Marsland asked for what period did the Acting-Engineer recommend that Mr. Webster should have an extension of time for the completion of his contract at Crossness, as stated in one paragraph of the Committee's report? Councillor Rhodes replied that nine months was the period asked for. Councillors Westcott and Samuel urged that the alleged breach of contract, which had been referred to them several months ago. Councillor Samuel went so far as to suggest that the Committee were desirous of screening the contractor, a suggestion which Councillor Rhodes warmly repudiated. Councillors How, Williams, Osborne, Haggie, and others took part in the discussion, in the course of which it was urged that no harm would or could be done by giving Mr. Webster the required extension of time, on the ground that while the new precipitation works at the Barking outfall were now practically ready, and would be making sludge enough to require five or six sludge-slips to convey

it away, they had only two ships built! What was to be done with the rest of the sludge? The completion of Crossness works would largely add to the quantity of sludge; therefore, it was argued, delay in the completion of those works would be an advantage rather than otherwise. Councillor Aeworth suggested that the new Chief Engineer, Mr. Gordon, should be instructed to make it his first duty after entering upon his duties to examine into and report upon the whole question of the sewage outfalls. In reply to this it was intimated by the Deputy-Chairman that Mr. Gordon, by the courtesy of the Corporation of Leicester, would be released from his present duties at the end of August, and would take up his position as Chief Engineer of the Council on Sept. 1. The month that would intervene between that date and the re-assembling of the Council after the recess Mr. Gordon would devote to making himself acquainted with the outfall works and the staff.

The same Committee also reported, "for the information of the Council," that "an exhaustive series of experiments, extending over nearly a month, has been carried out at Crossness. The tank used was cylindrical, 6 ft. in diameter and 30 ft. high (an old disused boiler), to which such fittings were adapted as were necessary. The conclusions reached are best conveyed in an extract from the report of the Chemist who, with the superintendent at Crossness, had charge of the experiments:—

"These experiments have had a valuable result in that they have established the fact that the average quantity of water (effluent) present in the settled sludge is equal to about 90 per cent., such a conclusion being satisfactorily established by reason of facilities afforded of obtaining a large sample, and a large number of results obtained some time back in connection with the special series of experiments on the rate of flow of the sludge as an inland trough. It is thus shown that settled sludge cannot be, with any regard to economy, reduced in bulk. The proposal of pressing it into cakes is one which has already been shown to be far more costly than the method of disposal by carrying it out to sea."

After the transaction of other business, the Council adjourned until Friday, August 2, at 3 p.m.

# CASES UNDER THE METROPOLIS MANAGEMENT ACTS.

At the Hammersmith Police Court, Messrs. Batey & Co., Limited, Soda Water and Ginger Beer Manufacturers, were summoned by the London County Council for not setting back the fence in front of their premises in Munster-road, Fulham, to the extent of 20 ft. from the centre of the road, as required by the 41 & 42 Vic., c. 32, sec. 6. Mr. Thomas Burton, solicitor, appeared in support of the summons, and Mr. Webb for the defendants. Mr. Alfred Millwood, surveyor to the London County Council, said the fence was 16 ft. from the centre of the way; 25 ft. had been set back, there remaining 100 ft. In answer to Mr. Webb the witness said this was to the extent of the length of the building. The notice of the County Council had been complied with. A plan was submitted showing the block of buildings fronting the road and the length of the fence which had been set back. Mr. Webb said the land adjoining the building was intended to be let for building purposes, and, supposing it was separated by a wall it could not be contended that the defendants were liable to put back the fence. Mr. Burton said the land adjoining the land belonged to the premises in the same way as the yard did to a brewery or a forecourt to a house. The defendant used the whole of the land for the storage of empty cases and bottles. Mr. Newton thought the Act did not apply to a field in which rubbish was deposited, and dismissed the summons.

At the Southwark Police Court on the 25th ult., Messrs. Dover, Wood, & Co., of Cornwall House, Stamford Hill, contractors, were summoned by the London County Council for having erected at No. 53, Blackfriars-road, Southwark, a wooden structure, or erection of a durable or temporary character, without the consent of the Council. Mr. J. Chivers, from the Solicitor's Department, supported the summons, and stated that defendants, on or about March 21 last, erected the structure complained of, which, since that time, had been used as an advertising hoarding; the structure was 30 ft. in height, and projected about 5 ft. in front of the adjoining buildings, and as no building operations had been going on since the above date, the defendants had rendered themselves liable to penalties. Mr. Millwood, a surveyor in the office of the London County Council, was called, and produced a plan of the structure, and proved that no building operations had been going on since March 21 last, and that no consent had been given for the erection of the structure. For the defence, Mr. Slater, solicitor, Bromley, contended that the structure was exempt under the provisions of the section, it having been erected for the purpose of pulling down an old music-hall, which formerly stood on the site, and that the defendants intended rebuilding, but had met with some difficulty in getting their plans passed, which was the cause of the delay. Mr. Slade, in giving his decision, stated it was clear from the evidence that no building operations had been going on since March 21, and he must convict the defendants, and fine them 5l. and 10s. costs.



## TOWN CLERKS AND TOWN SURVEYORS.

SIR,—A vulgar prejudice exists that "there is one law for the rich and another for the poor." Educated people, of course, know that the law is no respecter of persons; nevertheless, two recent decisions in the Courts show that there is one law for Town Clerks and another for Town Surveyors, and that lawyers know how to take care of themselves and of one another. The Town Surveyor of Ramsgate was employed at a moderate fixed salary to discharge the ordinary routine work of the borough. Subsequently, by resolution, he was "appointed Engineer to the Corporation for carrying out the scheme for completing the drainage," with certain agreed "allowances" for such extra services, in pursuance of which resolutions he undertook the work. Section 193 of the Public Health Act enacts that if "any officer accepts any fee or reward whatsoever other than his proper salary, wages, and allowances," he is liable to penalties and costs, and is "incapable of employment under the Act." A common informer sued under this clause, and the Court, reluctantly, gave judgment against the Town Surveyor, admitting that the offence (?) was purely technical, involving no moral wrong-doing. On appeal the decision was reluctantly affirmed, with the result that the Surveyor was financially and officially ruined. So much for the Town Surveyor. The Town Clerk of Bury was also appointed at a fixed salary, but a drainage scheme being proposed, the Town Clerk was also paid for his extra work therein. Encouraged by the Ramsgate case, a common informer sued the Town Clerk, but was defeated. On appeal the Court denounced the action as "frivolous and vexatious," expressing an exuberance of disdain against the common informer, but no such exuberance was manifested by the Court in the case of the Town Surveyor. Now, to an ordinary practical mind the two cases are absolutely analogous, but the Courts have said that "any officer" does not mean a Clerk, but a Surveyor, although both are engaged under the same Act, appointed at a fixed salary, each paid by resolution for extra services, yet the lawyer's payment is legal and the Surveyor's illegal!

It is obvious that section 193 was directed only against dishonesty on the part of officers. The ordinary official salary is often small, and not intended to cover large special works. As the Lord Chancellor said in the case of the Town Clerk (*Times* report, July 25, 1889), "The facts here were that the defendant's salary was fixed by resolution. Then work was undertaken by the Town Council, which threw an unexpected amount of labour upon the Town Clerk. By a resolution of the proper authority, an extra sum was regularly and properly voted to him for this extra work." Identically the case of the Town Surveyor; but the Town Clerk retains his fees and office, and the Town Surveyor is dismissed and ruined. The hardness and injustice of the case was brought by the Council of the Association of Municipal Engineers before the Local Government Board, to whom we look as our natural protectors, asking that sec. 193 might be so amended as to avoid any such scandal, but our memorial had no result.

LEWIS ANGELL, M. Inst. C.E.,  
late President of the Association of  
Municipal Engineers and Surveyors.  
Town-hall, West Ham, July 31.

## THE CHANNEL DRAIN-PIPE:

R. NORMAN SHAW'S AND T. L. WATSON'S  
PATENTS.

SIR,—The note in your issue of the 20th of July on the above subject is fair in tone, and of the class of criticism to be welcomed as helpful in arriving at just conclusions. In the same spirit, may I be allowed a few words in reply. You say, "with care, it is possible to leave circular drains smooth inside." That is a matter, perhaps, open to question, and, in fact, it has been questioned by practical and experienced sanitarians; but it is not necessary for my present purpose to do so. Assuming that ordinary drain-joints can be made perfectly smooth inside, how are we to insure that they are made so? When a drain has been laid, how are we to know that the joints have been smoothly finished? And even if they have been so, how are we to tell whether they have escaped dislocation or injury on settlement or accident during the progress of a building?

With the channel drains, the pipes may be left on for examination for a month, or for six months, if the building is unfinished so long, after a drain has been laid.

At any time before the covers are cemented down,

we may satisfy ourselves as to the smoothness and regularity of the flow. The drains are in actual use all this time, and they are not finally closed in till all risk of injury is at an end.

Remembering that one imperfectly-finished joint is enough to impede the action of a drain, and may be enough to cause it to choke periodically, it is something to be able to provide with certainty that there shall not be even one such joint. As to the other claims made for the Channel pipes, your readers will form their own judgment. Referring to the statement that the joints can be more solidly and more tightly made than with round pipes, you say, "In view of some of the recent improvements in jointing round pipes the statement is absurd." The comparison is intended to be with ordinary pipes jointed in the usual way and, so far as they are concerned, the validity of the claim will not be disputed. It is not for a moment meant to imply that it is impossible, by means of jointing of any kind, to make round pipes tight. Such a claim, if it had been put forth, would have deserved to be called absurd.

So far, however, as I have been able to form an opinion regarding the various "improved" methods of jointing for round drain-pipes, they are all open to other and serious objections, which detract from their value, and, in fact, have prevented their general use. The Channel drains, so far as I am aware, are free from such objections, and their tightness is one only among several advantages. Probably nothing but experience can finally decide as regards some points, but the claim as to tightness may be explained in a very few words. The drain consists of two parts, the channels and the covers. Let us take the channels first. Whether the joints of a drain can or cannot be well enough made and finished from the outside of the pipe, it is transparently obvious that they can be much better done, more closely packed with cement, and more smoothly finished on the inside, when, instead of a round-closed pipe, you have an open channel, and can get at the inside as well as the outside of the joint. Now, take the

## CARTMEL CHURCH.

SIR,—In answer to a query in the *Builder* of March 16 by "A. R." respecting the stone of Cartmel church, I enclose the following extract:—"The stone of the . . . ashlar walls of the older part of Cartmel Priory Church, which dates from 1188, is a fine hard drab or light yellow-coloured sandstone. . . . Now, there is, about three miles distant from Cartmel Priory, by a flat road, a moderate-sized point on the shore-side of the park at Holker Hall, where there is a quarry of sandstone. . . . There are beds of fine sandstone still there some feet thick, and enough to build several more Cartmel churches. The formation is coloured in the recent one-inch Ordnance geological maps as the "Yoredale Rocks," and consists of beds of shales, sandstone, and micaceous limestones" ("The Harrington Tomb in Cartmel Priory Church: Cumberland and Westmoreland Antiquarian and Archaeological Society Transactions," vol. 5). HENRY LITTLEHALES.

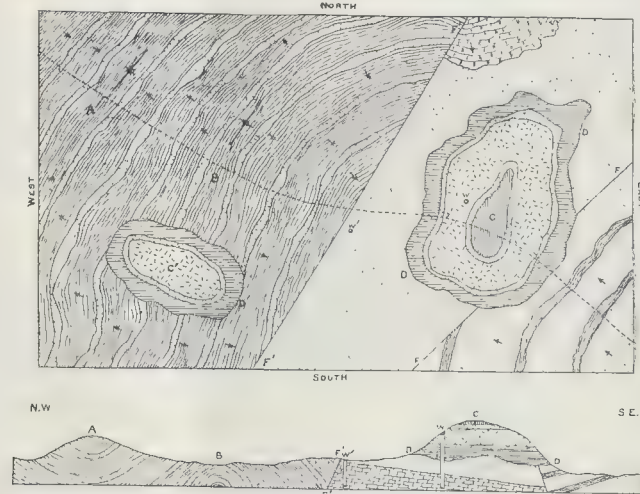
## The Student's Column.

## WATER-SUPPLY.—V.

## DISPOSITION OF STRATA.

WE will now describe some of the principal phenomena of stratification.

A very small proportion of the original deposits of any geological epoch are left to us. After having been laid down, these missing portions were wasted away, both immediately subsequent to their deposition and up to the present time, by the action of denudation. Given plenty of time, denudation is a very powerful destroyer; the unceasing action of rivers and brooks in wearing away their channels, the solvent agency of rain and the acids usually accompanying it, frost, ice, sea-waves, winds and currents, all conspire to wear away



Geological Map and Section.

covers. Evidently they cannot be finished off from the inside, and evidently they involve additional jointing to begin with as compared with ordinary pipes. On the other hand the jointing, being on the top, can be more easily and more safely done than with a round pipe. But that is not all, and it is, perhaps, not enough. There is a further security to be taken which, in effect, makes the covers altogether jointless. Having first jointed them with cement and made the drain as tight as any round drain can be made, the further precaution is taken of coating the whole surface of the covers with cement. This improvement was suggested by Mr. R. Norman Shaw, R.A., and, while the covers can be made perfectly tight by jointing alone, it offers, in the simplest possible way, a guarantee of absolute tightness and the most perfect security against the escape of impure gases. It seems to be a sufficiently modest claim to say that "the smoke-test is less necessary than with ordinary pipes." You say "the whole top is a cement-joint," but would it not be more correct to say that the top is jointless from end to end? Is it conceivable or possible that they could leak with the covers first bedded and jointed with cement and afterwards coated with the same material? I do not think so. After five or six years' of experience of the channel-pipes I have never found one joint defective.

Glasgow, July 24, 1889.

T. L. WATSON.

the land, and modify the extension, thickness, and character of geological formations.

The connexion between denudation and water-supply will be apparent to the most casual observer. It serves to show us why deposits occur in such a broken and uneven manner, which continually assist to augment, lessen, or cut off supplies. The wearing away of the present surface of the ground in carving out the various physical features, permits the escape of water from one aquiferous bed to another, by removing a non-water-bearing stratum that originally intervened. Or, it allows water to issue forth as springs by cutting down through a non-water-bearing bed, and tapping the supply contained in a lower deposit. Thus, the geologist finds how very capriciously rain is disposed of after having soaked into the ground, and it demands the closest study on his part to foretell where it goes to, and, consequently, where it can be got at.

The disposition of strata, in regard to their curvature, dislocation, &c., may be conveniently illustrated by the annexed sketch of an ideal geological map and section, the position of the latter being shown on the map by a curved, dotted line. The map may be presumed to represent a tract of country about















LINCOLN.—For the ventilation, by power, of the whole of the central stores of the Lincoln Equitable Industrial Co-operative Society, Limited. Mr. Frederic Smith, 29, Bridgewater-chambers, 6, Brown-street, Manchester, architect.

Blackman Ventilating Co. (accepted) £151 10 0

For Power Loists to above.

H. Wren & Co. £245 0 0  
Higginbottom & Mannock (accepted) 198 0 0

LONDON.—For the construction of a viaduct carriage-way, footways, sewers, &c., between Clerkenwell and Farringdon-road (to form part of the new street between Holborn and King's Cross) for the London County Council.

T. Gibson & Co., No. 2, Westminster-chambers, £23,883 15 4

J. W. & J. Neave, Marlborough-road, Leytonstone, £2,586 0 0

E. H. Oliverhouse & Co., Pratt's Wharf, King's-cross Bridge, Camden Town, £3,075 8 6

C. Killingsback, Ice Well Wharf, James-street, Camden Town, £2,490 0 0

Nowell & Holton, Watwick-road, Kensington, £2,300 0 0

G. Double, Kirby Lodge, St. John's, £2,851 15 4

J. Howland & Co., Grosvenor Wharf, Westminster, £2,477 0 0

Brass & Son, No. 47, Old-street, £2,475 0 0

Holden & King, No. 198, Stanhope-street, Euston-road, £2,436 0 0

T. Down & Son, Ball's-pond, N., £2,436 0 0

Biggs, Farm-street, Birmingham, £2,383 0 0

Stoke Newington, £2,383 0 0

W. Griffiths, No. 283, Kingsland-road, £2,280 0 0

T. Adams, No. 28, Cannon-street, Kingsland, £2,367 17 0

J. Dickson Townsend, St. Alban's, £2,395 15 0

LONDON.—For cleaning, painting, &c., of the offices of the London County Council, Spring-garden.

John Grover & Son, £274 0 0

John Clemence, £485 0 0

David E. Laing & Co., £329 0 0

Patman & Fotheringham, £353 0 0

Stimpson & Co., £313 0 0

J. & J. Greenwood (accepted), £299 0 0

LONDON.—For alterations of Council Chamber and offices at Spring Gardens, for the London County Council. Mr. Thomas Bashill, Architect.

Brass & Son, £2,970 0 0

J. Mowbray & Co., £2,762 0 0

Garlick & Horton, Limited, £3,300 0 0

Kirk & Randall, £2,816 0 0

G. Macdonald & Sons, £2,833 0 0

Stimpson & Co., £2,460 0 0

T. Elkington, £7,350 0 0

D. Charteris, £2,324 0 0

J. & J. Greenwood, £7,091 0 0

J. Allen & Son (accepted), £6,900 0 0

LONDON.—For alterations to dispensary, medical officer &c., for the Guardians of the White-chapel Union. Mr. J. Capel, architect, 70, Whitechapel-road.

Lobb & Oliver,\* New Southgate, N., £1,764 0 0

[Full list appeared last week, p. 71.]

LONDON.—For new front to No 22, Aldgate, E.C., for J. P. Kelly. Mr. John Hudson, architect, 50, Leman-street.

Gladding, Mile-end (accepted), £210

LONDON.—For the enlargement of the Rotherhithe New-road School, South-east, 428 places, for the School-board for London. Mr. T. J. Bailey, architect.

J. Tyerman, £15,749 0 0

No additional, £12,353 0 0

A. & W. G., £12,063 0 0

J. Longley & Co., £11,611 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For repairs and alterations at the Jessep-road School, Here-hill, for the School Board for London. Mr. T. J. Bailey, architect.

J. Derry, £1,594 0 0

H. Walkley, £1,340 0 0

H. G. Heywood (accepted), £1,235 0 0

LONDON.—For the erection of a new house for the school-keeper, together with the cockery centre, in one block, on the Ricardo-street site, Poplar, for the School Board for London. Mr. T. J. Bailey, architect.

J. Webb, £2,225 0 0

T. Lifford, £1,992 0 0

J. Edmunds, £1,984 0 0

H. Bacon, £1,679 4 6

Norris & Lake, £1,634 0 0

Barrett & Power (accepted), £1,655 0 0

LONDON.—For overhauling and improving the Rotherhithe School, 428 places, for the School Board for London. Mr. T. J. Bailey, architect.

T. W. Haylock, £21,842 0 0

H. Walkley, £1,708 0 0

J. W. Sawyer (accepted), £1,789 0 0

LONDON.—For the enlargement of the St. Andrew's-street School, Battersea, by 400 places, for the School Board for London. Mr. T. J. Bailey, architect.

J. Tyerman, £4,507 0 0

J. Holloway, £4,171 0 0

Holloway Bros., £3,977 0 0

H. Knight, £3,965 19 8

J. Longley & Co., £3,917 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For providing new windows for the boys' department and improving the lighting of the girls' department at St. Northey-street School, for the School Board for London. Mr. T. J. Bailey, architect.

Holloway Bros., £230 0 0

J. Holloway, £209 0 0

J. Derry (accepted), £190 0 0

LONDON.—For erecting three new iron buildings on the Honeywell-road site, Wandsworth, for the School Board for London. Mr. T. J. Bailey, architect.

W. Jones, £1,632 15 0

M. Harrison, £1,617 7 6

J. J. Richards, £1,475 0 0

North & Son, £1,400 0 0

J. W. Smalls, £1,275 0 0

A. W. Pocock, £1,255 0 0

J. C. Humphreys, £850 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For extending heating apparatus on the low-pressure hot-water system, and providing a new boiler at the Schools in New-road, Wandsworth-road, for the School Board for London. Mr. T. J. Bailey, architect.

Clements, Joakes, & Co., £295 15 0

T. Wood & Co., £84 0 0

Hayward Bros. & Eckstein, £58 0 0

Ridale & Co., £54 0 0

W. G. Cannon, £51 0 0

T. Green & Son (Limited), £47 2 2

Purcell & Nobbs, £42 0 0

J. F. Clarke, £48 17 2

J. & E. May (accepted), £47 5 6

LONDON.—For extending the heating apparatus on the low pressure steam system, and providing new boiler and additional coils at the Old-street schools, for the School Board for London. Mr. T. J. Bailey, architect.

T. Wood & Co., £295 0 0

J. & F. May, £485 11 9

T. F. Clarke, £407 12 7

Ridale & Co., £352 16 0

T. Green & Son, Limited, £349 17 2

W. G. Cannon (accepted), £310 10 0

LONDON.—For the enlargement of the Princess-road School, Regent's Park, by 230 places, for the School Board for London. Mr. T. J. Bailey, architect.

W. Goodman, £2,689 0 0

W. L. Kellaway, £2,658 0 0

J. Derry, £2,590 0 0

J. Longley & Co., £2,479 0 0

W. M. Dabbs, £2,447 0 0

\* Recommended by the Works Committee for acceptance.

LONDON.—For extending heating apparatus on the low-pressure hot water system, and providing a new boiler at the Monteith-road School, for the School Board for London. Mr. T. J. Bailey, architect.

T. Wood & Co., £220 0 0

Ridale & Co., £167 18 6

J. & F. May, £149 12 0

J. F. Clarke, £148 14 0

W. G. Cannon, £141 0 0

J. Wontner Smith, Gray & Co., £137 15 0

T. Green & Son, Limited (accepted), £132 0 0

Purcell & Nobbs, £98 0 0

LONDON.—For extending the heating apparatus on the low-pressure hot-water system and providing a new boiler at the Bell-street School, for the School Board for London. Mr. T. J. Bailey, architect.

T. Wood & Co., £270 0 0

Ridale & Co., £397 4 0

W. G. Cannon, £285 19 0

J. & F. May, £282 14 0

T. Green & Son, £256 3 5

J. W. Smith, Gray & Co., £253 0 0

J. F. Clarke, £252 7 8

Purcell & Nobbs (accepted), £227 0 0

LONDON.—For cleaning and painting the interior and exterior of the Saffron-hill School, and for providing additional lighting, &c., for the School Board for London. Mr. T. J. Bailey, architect.

J. W. Sawyer, £249 0 0

J. Holloway, £426 0 0

G. Parker, £399 0 0

Holloway Bros. (accepted), £327 0 0

LONDON.—For providing additional lighting, stepped floor, and kindergarten gallery, for the Infants' Department of the Queker-alley Schools, for the School Board for London. Mr. T. J. Bailey, architect.

Holloway Bros., £437 0 0

J. Holloway, £420 0 0

G. Parker, £360 0 0

J. Derry (accepted), £310 0 0

LONDON.—For providing an iron communication staircase for the Boys' Department at the Baltic-street School, for the School Board for London. Mr. T. J. Bailey, architect.

R. Knight, £2193 10 0

J. Stone, £158 10 0

G. Smith & Co., £156 0 0

W. Jones, £155 0 0

L. Faulkner & Sons, £128 0 0

St. Pancras Iron Works Co., £122 0 0

\* Accepted.

LONDON.—For the construction of a wharf upon the site of the Old Toll House, Putney Bridge. Mr. James P. Norington, Surveyor to the Vestry.

Downs, £2,953 0 0

Neave & Son, £2,511 0 0

Nowell & Robson, £2,774 0 0

Marriott, £2,713 0 0

Tomes & Wimpey, £2,413 0 0

Ball, £2,352 0 0

R. Mayo, £2,200 0 0

LONDON.—For addition to the Summer Printing Works, Summer-street, Southwark, S.E., for Messrs. Riddle & Co. Messrs. Romaine-Walker & Tanner, architects. Quantities supplied by Mr. Fryce Caxson, surveyor.

Patman & Fotheringham, £20,873 0 0

J. & J. Greenwood, £6,983 0 0

Grover & Son, £6,784 0 0

Hy. Hart, £6,720 0 0

Rider & Son, £6,638 0 0

Wm. Downs, £6,572 0 0

Holloway Bros., £6,474 0 0

Higgs & Hill (accepted), £6,368 0 0

LONDON.—For the erection of Public Library, &c., at Lower-road, Rotherhithe. Messrs. Stock, Page, & Stock, architects. Quantities by Messrs. Lindell & Giffard.

If Bath stone be used.

Rider & Son, £23,318 Deduct £33 ... £23,285

J. & J. Greenwood, £3,160 " 30 ... £3,130

J. Downs, £3,160 " 85 ... £3,075

Holland & Hansen, £3,146 " 80 ... £3,066

Chappell, £3,099 " 50 ... £3,049

Nightingale, £3,064 " 89 ... £3,014

Pritchard, £3,051 " 81 ... £2,970

Marland, £3,035 " 140 ... £2,895

White & Co., £3,025 " 150 ... £2,875

B. Wells, £2,727 " 60 ... £2,667

LONDON.—For alterations and repairs to dwellings, Nos. 7 and 8, Beaumont-street, Marylebone, W., for Mr. Joseph Chaplin. Mr. Thomas Durran, architect.

Upper Baker-street, N.W.:

White, £2,195 0 0

Stokes and Pinder, £2,164 12 0

Stevenson, £2,061 0 0

Foxley & Co., £2,012 0 0

Birch, £1,877 0 0

Falkner & Co., £1,675 0 0

Oldrey & Co., £1,640 0 0

Mankin, £1,525 0 0

Higgs, £1,443 0 0

Turtle & Appleton (accepted), £1,265 0 0

LONDON.—For the rebuilding of warehouse premises, 16 and 18, Brunhild-street, Bishopsgate, E.C., for Messrs. S. & L. Beck. Mr. J. W. Brooker, architect, 13, Railway-approach, London-bridge, S.E.:

Jackson & Todd, £1,639 0 0

W. Downs, £1,645 0 0

W. & F. Croaker, £1,594 0 0

Kelland, £1,550 0 0

Burns & Sons, £1,545 0 0

Reynolds, £1,454 0 0

Rick, £1,325 0 0

Battley (accepted), £1,287 0 0

LONDON.—For erecting new coachhouse at Dorset Works, East-road, City-road, N., for Messrs. Dottridge Bros. Mr. A. G. Collins, architect, 30, Finsbury-pavement, E.C.:

T. Nixon, £2365 0 0

H. J. Williams,\* Bernouddsey-street, £187 10 0

\* Accepted.

LONDON.—For erecting new stables at Dorset Works, East-road, N., for Messrs. Dottridge Bros. Mr. A. G. Collins, architect, 30, Finsbury-pavement, E.C.:

Chesnum & Sons, £2302 0 0

T. Nixon, £199 0 0

J. Godfrey & Son, Clapton (accepted), £193 0 0

(Exclusive of stable-fittings, drainage, and paving.)

LONDON.—For alterations, additions, and sanitary works, 11, Ladbrooke-terrace, W. Mr. Lewis Solomon, architect, 55, New Broad-street, E.C.:

Foxley, £21,408 0 0

Sayer, £1,385 0 0

Vernal & Griffiths, £1,559 0 0

Kellaway (accepted), £1,224 0 0

LONDON.—For repairs and sanitary works, at 24, Pembroke-villas, W. Mr. Lewis Solomon, architect.

Watts, £485 0 0

Bishop, £491 0 0

Roberts (accepted), £37 0 0

Pike, £427 0 0

LONDON.—For cleaning, distemping, painting, and general repairs internally and externally, at the Blackheath Literary and Scientific Institution, Chancery-lane, E.C. Mr. Henry Hoshell, F.A.S.I., surveyor, 1, Finsbury-circus, E.C.:

B. Nightingale, £431 6 0

Dove Bros., £301 5 0

L. Lundy, Shepherd's-bush, £233 14

**MANCHESTER.**—For new stabling, shed, and additional lairs, at the abattoirs of the Pendleton Co-operative Industrial Society, Limited, and in Cheltenham-street, Pendleton. Mr. Frederic Smith, architect, Manchester. Quantities by the architect:—

Jones .....	£2,300 0 0
W. Southern & Sons .....	2,270 0 0
J. Lindsey & Son .....	2,284 0 0
Statham & Sons .....	2,249 0 0
J. Ramsbottom .....	2,218 0 0
R. Neill & Sons (accepted) .....	2,171 0 0

**MANCHESTER.**—For new engineering workshop, in Green-lane, Old Garratt, for Mr. Hans Rosold. Mr. Frederic Smith, 29, Bridge-water-chambers, 4, Brown-street, Manchester. Quantities by the architect:—

W. Harrison .....	£308 0 0
Burgess & Galt .....	890 0 0
J. Hibbert .....	845 0 0
W. Southern & Sons (accepted) .....	807 0 0
J. Robinson .....	798 0 0

**MANCHESTER.**—For two shops and ware-rooms, &c., on Edgode-green, Pendleton, for the Pendleton Co-operative Industrial Society, Limited. Mr. Frederic Smith, architect. Quantities by the architect:—

Jones .....	£2,300 0 0
W. Southern & Sons .....	1,885 0 0
Statham & Sons .....	1,937 0 0
R. Neill & Son .....	1,910 0 0
J. Ramsbottom (accepted) .....	1,849 0 0

**MANCHESTER.**—For new creamery, &c., at Fallowfield, for the executors of the late Sir Joseph Whitworth, Bart. Mr. Frederic Smith, architect. Quantities by the architect:—

W. Southern & Sons, Salford* .....	£255 0 0
------------------------------------	----------

\* Accepted.

**MANCHESTER.**—For new warehouse and shed in Phillips Park-road, Bewick, at the chemical works of Messrs. Thomas Hyland & Co. Mr. Frederic Smith, architect, Manchester. Quantities by the architect:—

J. Robinson .....	£244 8 0
W. Harrison .....	450 0 0
W. Southern & Sons .....	453 0 0
Burgess & Galt .....	435 10 0
J. Hibbert .....	417 0 0
E. and C. Jackson (accepted) .....	419 0 0

For Ironwork to Above.

Taylor .....	£426 0 0
Carter Bros. (accepted) .....	386 3 5

For Concrete Work to Above.

Hindley & Co. ....	£62 0 0
Ham-r Lockwood .....	45 17 0
Brunswick Rock Asphalt Co. (accepted) .....	40 15 0

**RICKMANSWORTH.**—For the erection of a private residence and stabling situate at Long-lane, Mill End, Rickmansworth, Hertfordshire, for Mr. Thomas Wilks. Mr. William M. Yetts, architect, 44, Finsbury-pavement, E.C. 4.—

J. Bass .....	£4,476 0 0
Faulkner .....	3,869 0 0
Woodward & Co. ....	3,787 0 0
Downs .....	3,787 0 0
Fastag .....	3,685 0 0
T. Turner, Limited .....	3,638 0 0
Waterman .....	3,337 0 0
Brown .....	3,310 0 0
W. Gladding (accepted) .....	3,263 0 0

**ST. MARY CRAY (Kent).**—For additions and alterations to premises at St. Mary Cray, Kent, for the Cray's Co-operative Society, Limited. Mr. St. Pierre Harris, architect, 1, Basinghall-street, E.C., and Orpington:—

Otway .....	£1,063 0 0
Hart Bros. ....	1,035 0 0
Wood .....	997 0 0
Knight .....	850 0 0
Low (accepted) .....	789 0 0
W. R. Taylor (withdrawn) .....	677 0 0

**SWANLEY.**—For additions and alterations to a house near Swanley, Kent. Mr. St. Pierre Harris, architect and surveyor, 1, Basinghall-street, E.C., and Orpington:—

Harvey .....	£893 0 0
Low .....	827 0 0
Payne .....	733 0 0
Knight .....	729 0 0

**SYDENHAM.**—For new stables at Horner Grange, for Mr. W. Knight. Mr. J. Fogarty, 21, Suffolk House, architect:—

Lascelles & Co. (accepted) .....	£2,381 0 0
----------------------------------	------------

**SYDENHAM.**—For range of vinerie and plant-houses, for Mr. W. Knight. Mr. J. Fogarty, architect:—

Lascelles & Co. (accepted) .....	£1,760 0 0
----------------------------------	------------

**SYDENHAM.**—For new billiard and ball-room, for Mr. W. Knight. Mr. J. Fogarty, architect:—

Lascelles & Co. (accepted) .....	£1,560 0 0
----------------------------------	------------

**WEST COWES.**—For sinking new well and boring, for the West Cowes Local Board. Mr. W. Brown, engineer, High-road, Totterham:—

Tucker & Co., London .....	£3,350 0 0
Hill & Co., Gosport (accepted) .....	3,084 0 0

**Rebuilding No. 29, Hereford-street, Mayfair.**—The amount extra for Portland stone in Messrs. Higgs & Hill's tender was not £1,500, as stated in our last, but £16 only. The error was that of a copyist, and it inadvertently escaped notice.

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# The Builder.

VOL. LVII. No. 257.

SATURDAY, AUGUST 10, 1889

## ILLUSTRATIONS.

Church of St. John, Stanstead Montfichet, Essex.—Mr. W. D. Cardie, Architect	Double-Page Photo-Litho.
Design for Decoration of a Billiard-Room.—By Mr. G. Aitchison, A.R.A.	Double-Page Ink-Photo.
Sketches from the Marshland Churches of Norfolk.—By Mr. Arnold B. Mitchell	Two Single-Page Ink-Photos.
Heaubeis Hall, Norfolk.—From a Drawing by Mr. G. J. Skipper, F.R.I.B.A.	Single-Page Photo-Litho.
Sketches illustrating the Norwich Meeting of the Royal Archaeological Institute	Single-Page Photo-Litho.

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### In the Trocadéro Galleries.



WE have before remarked in passing that the collection in the West Gallery or quadrant of the Trocadéro, little talked of and much neglected by visitors, is in reality one of the most interesting sections of the Paris Exhibition. The whole range of these two galleries, the east and west quadrant of the Trocadéro, is indeed, to those interested in architecture and the arts necessary to it, well worth a leisurely visit, containing matter of much higher interest than the majority of the Champ de Mars pavilions can show.

The west wing of the Trocadéro contains the valuable loan collection of objects of French mediæval and Renaissance art, constituting the "Exposition Retrospective" of French art. This retrospective idea has been carried out in a double sense in the Exhibition; there is the retrospective exhibition of painting for the last hundred years, collected in part of the upper galleries of the Palais des Beaux Arts; and there is this retrospective exhibition in the Trocadéro, which goes back to early days of French history, and consists of miscellaneous examples of artistic work. This is a temporary collection for the period of the great Exhibition only. The east gallery contains the permanent collection of casts of architectural detail, and of sculpture mostly architectural in its position or relation; this can be seen at any time, but as we doubt whether many visitors to Paris have seen it, or have any idea of the value and interest of the collection, it is worth while to bestow a few words on it here.

It is probably intended that both galleries of the building should eventually be occupied by a permanent architectural exhibition, as both have been treated in the same way, being divided into bays at intervals by large built-up casts of ancient portals, Gothic and Renaissance, stretching across the gallery and leaving passage-way through the centre. These seem to have been erected before the general chronological arrangement of the museum was planned, as they do not go systematically with the chronological arrangement of the minor objects on the walls and about the floor of each room. The east end of the east gallery is closed by a cast of the

portal of the church of Ste. Marie des Dames Saintes at Charenton, about the twelfth century. The two walls of this compartment are occupied by a contrasted exhibition of Gothic and Classic detail: on the right, starting with one's back to the end wall and going westward, is a very fine collection of Gothic carving, capitals and scroll-work, including scrolls from some of the French transitional cathedrals which partake of the character of both schools; Gothic in force of design and boldness of execution, Classic in purity of line and in the details of the conventional leaves. A fine collection of photographs of Gothic carving supplements the casts. On the left wall are casts of detail chiefly Renaissance, the central feature being the *cheminée* from the château d'Ecouen, with a beautifully executed bas-relief figure in the centre panel, and detail which is an odd mixture of Classic and *rococo*, with a special treatment of the Greek key pattern with a delicately designed flower ornament winding through it. In the midst of these Renaissance details a cast of one mighty crocket from Troyes has been placed either by design or by happy accident; a mass of carved stone standing up nearly 3 ft. above the main line of the gable capping which it decorated, and looking as if giants had cut it out; compared with the Renaissance detail, it might be a bit of architecture from another planet.

The next compartment, guarded by casts of Desrier's "Diana" and Leconte's "Hercules," leads to a collection of casts of Versailles detail, a large space being occupied by the bas-reliefs from Girardon's fountain, which is the most refined work in a section the interest of which is not of the highest. The apartment includes, however, a cast from Puget's portal of the old Hôtel de Ville, a fine bold piece of work, with a projecting canopy carried by powerfully-designed Telamones with sad and agonised faces, and decorated with a grinning Satyr's head over the coat of arms in the centre. This is another of the examples which seems to combine Gothic force with Classic general form. A cast of Houdon's pretty nude "Diana" forms the centre object of the compartment, the exit from which is flanked by two of Magnier's very well-nourished reclining nymphs, between which we have access to a cast of the sixteenth-century tomb of St. Just at Narbonne, which is odd in another way, presenting in its subbase a Classical pilaster ornament of orthodox type, with small niches

between filled with figures distinctly mediæval in feeling and disproportion, while the pilasters themselves are worked with a truly Gothic indifference to finish or perpendicularly. This strange mingling of Gothic and Classic types and feeling, in which late Mediæval and early Renaissance architecture in France abounds, is one of the things most prominently illustrated in this collection of casts mostly from French work. We come next, for instance, on an extended piece of shrine work from Limoges Cathedral, which is an extraordinary mixture of detail: its general appearance at a casual glance is that of florid Gothic with large pendants and canopies which in general outline are completely Gothic in effect, but which are all made up of small Classic detail, the spirelets and pendants alike consisting of little circular shrines with classic colonnades, set one upon the other in diminishing stages; the intrados of the arches have a curious nondescript carved fringing hung on to them, in obvious imitation of foliated cusping. One of the portals of Beauvais, in this compartment, of course entirely Gothic in its architecture, exhibits in the doors somewhat the same peculiarity of Classic detail arranged so as to present a generally Mediæval aspect, appearing thus quite in harmony with its Mediæval masonic setting. One may surely get some lessons in design from this successful combination of what at first sight would seem incongruous elements.

The cast of the Tomb of the Duc de Brabant and Margaret de Foix, from the Cathedral of Nantes, which is in this compartment, affords a fine example of what might be termed the bedstead type of tomb of the Classic style, with the monumental effigies reclining on the top, and with allegorical figures mounting guard at the angles. These figures are of considerable interest; three of them apparently symbolise Temperance, Faith, and Justice: the fourth is rather a puzzle; it holds pincers in one hand and a cup in the other, perhaps intended as instruments of the Passion, but the head is double-faced, a female face looking outward, the back showing the face of an aged man. Although the whole details of the actual work are Classic, it is noticeable that the reliquary, or *ostensoir*, held in the hand of one of the angle figures, is pure Gothic, thus indicating that the idea of a relic of special sanctity was still connected with that of its original Mediæval shrine.

The Brézé tomb from Rouen is reproduced



here, reminding one, in spite of its generally sumptuous effect, how bad the detail is; a criticism which may be repeated with more emphasis in regard to some Della Robbia reproductions opposite. Robbia's figures and heads are fine, of course, but, in spite of the fuss made about his name, his decorative detail may be said to be about the worst that has ever been produced by an artist of genius; it is not decorative design at all, but a mere realistic modelling of fruit and leaves stuck on in lumps, and rendered still worse, in the original examples, by coarse attempt at realistic colouring. It does not matter that the world has gone on admiring this kind of work for a good many generations; the world has been in the wrong; it is bad art.

The compartment closes with the portal of the Ducal palace of Nancy, again a piece of Gothic work with a quasi-Classical *fronton* as a termination, the two elements appearing to be contemporaneous. A more regular example of Gothic work is shown in the portal of transept of Bordeaux Cathedral, a cast which somehow irresistibly reminds one of Prout. A good deal of interesting Gothic sculpture is collected in this compartment, among others the extraordinary alto-relief of the "Last Judgment" from Bourges, though perhaps the finest object in the room is the cast of a great capital of a clustered pier from Rheims. The foliage is grand, as well as the way in which it is designed to form a suitable termination to the collection of shafts; the only criticism that could be passed on it (for even Mediæval work should not be blindly admired) is that the purely architectural character of the foliage is a little adulterated here and there by a *souçon* of realism, which just mars what would otherwise be a perfect piece of work.

A good deal of illustration of Mediæval sculpture of the figure is continued in the next compartment, where however we find also a cast of one of the Erechtheion figures. Was it by design that this was placed in the same compartment with the figures from one of the piers of Strasburg? If so, or whether so or not, it is a happy and suggestive collocation. The general similarity in the style of treatment of the drapery on the Erechtheion and Strasburg figures is very remarkable, nor is the Mediæval example much inferior to the Greek one in refinement and effectiveness in the design of the drapery. It is a curious instance of how the same object, the desire to produce a piece of sculpture harmonising with and forming part of the architecture, could lead to such similar artistic results in places so widely separated ethnographically, geographically, and chronologically. After this the most interesting exhibit in the same room is the reproduction of a considerable portion of the plinth from Amiens Cathedral, with its curious panel carvings representing the signs of the zodiac as well as other symbols, and including, in one panel, a geometrical elevation of a castle in low relief, with doors and windows, and the grated window of a dungeon shown beneath the ground line. The defect in this interesting piece of architectural reproduction is that the jointings of the stones are not indicated, a defect the more important as the portion modelled runs partially into the plinth of an obliquely placed buttress, and the method of making the angle between the buttress face and the main wall is a matter of some interest as a point in ancient building practice.

The last compartment of the permanent exhibition of casts is one of the most interesting of all in character, including several models from important buildings of the French Romanesque type. We enter the room under the narthex portal of Vézelay, with its twisted columns and curious corrupt Classic just turning to Gothic, and its mass of archaic figures in relief, in stiff sculpture-like drapery. There was an immediate recurrence in our mind to Branchidæ and other sites whence Greek archaic art had been turned up, on looking at this cast; and on turning round we catch sight of a cast of an archaic Athene from Ægina, with the same kind of stiff drapery scored with nearly

parallel folds or flutings. This can hardly have been done indiscriminately or by chance, and the presence of this Athene cast is in itself an admirable bit of critical comment on artistic history. Then we have a reproduction of the strange gateway from Notre Dame at Clermont (Puy de Dôme), with its circular-headed *tympa*n and odd suggestion or reminiscence of a Classic pediment under it with a pyramidal sculpture composition. Opposite this is the still circular-headed twelfth-century doorway from Chartres, with its twisted columns and extraordinary mingling of Byzantine and Classic reminiscences with Gothic feeling and execution in the carved work. The scroll work round the archivolt, and facing the spectator, is distinctly Byzantine in character; but look round the angle on to the door jamb, and what do we find there? The Greek fret, carved in a kind of perspective, exactly like a copy in relief of the favourite Roman mosaic border representing the Greek fret as if in high relief; and such in fact there can be little doubt it is. This is about as curious a little paragraph in the history of architectural ornament as could well be found.

This interesting room concludes the series of the permanent exhibition of architectural sculpture casts in the east quadrant of the Trocadéro. Though, as we have implied, it might be susceptible of more systematic arrangement, it is even as it stands a splendid collection of comparative illustration of architectural sculpture. We have nothing so good in England: South Kensington has a number of very fine reproductions of this class, but they are not so varied in style or so representative, nor by any means so numerous; and the Renaissance element greatly preponderates. The architectural museum of casts at Westminster is too exclusively Gothic, too poor and ineffective in arrangement, and too entirely deficient in examples of a larger type, such as whole portals and other features, to compare in the least with the Trocadéro collection, which is arranged in a fine gallery and kept in first-rate order, and when the space is clear in the west gallery, now occupied by the loan exhibition of which we are about to speak, there will be ample room to extend the collection further, the outlines for it being already marked out. France has started this architectural museum in thoroughly good style, and it is much to be wished that we could see anything done equal to it in London.

Passing round the semi-circular corridor skirting the exterior of the centre building, we come to the loan exhibition in the west quadrant. The first room at once gives indication of the value and interest of the collection. On the left, one of the first objects is a portion of a metal candelabrum foot from Rheims, of the twelfth century, with which Burges must have been familiar, and which is unsurpassable in its way in the boldness and grandeur of design and execution displayed in its scroll open work. A case on the same side is full of reliquaries, adorned with champlevé enamel, and croziers of various designs, many of them showing in the crook the sculpture of the defeat of the dragon, an apparently favourite subject, in which the dragon takes the form of a lizard, and suggests the idea of having been studied from one. A saucer-shaped bell from the museum of Melun is an item of some interest, as showing that form of bell as in use in the fifteenth century; it is dated 1498. On the right of the room are cases containing the same class of objects but with more of repoussé work and less enamel. The "Croix du Paraclet" from Amiens, of the eleventh century, is a splendid piece of work of its kind. It shows the figure of the Saviour engraved on the flat metal of the centre of the cross, which is completely lined up with precious stones, and the quatrefoils at the ends of the arms of the cross similarly ornamented. The "Croix de St. Robert" from the Dijon Museum is another splendid piece of work, the surface entirely fretted over with minute tracery in gold work; in the middle of the crook is fixed a star with a large ruby centre.

The same kind of minute network of detail covers the reliquary cross from the Musée de la Seine Inférieure, which is powdered all over with jewels on the gold tracery work. A noteworthy feature in this part of the exhibition is the frequent recurrence of reliquaries in the form of a hand and arm, which seems to have been a favourite form at one period. In a case in the middle of the room is a well-preserved collection of arms and ornaments discovered on a skeleton found at Pouan in the Aube district about forty-five years ago, and attributed to the fifth century.

As in the other gallery, the compartments are divided off by reproductions of ancient buildings, and the first compartment here ends with that extraordinary piece of semi-barbarous architecture the portal of St. Pierre at Moissac, with foiled cusping up the jambs of each doorway, and a centre pillar formed of a series of griffins carved in bas-relief and interlacing. The heading of the doorway is an architrave covered with carved ornament confined within a series of circular saucer-shaped panels; while in the tympanum above is seen a wonderfully powerful piece of decorative sculpture representing the winged symbols of the Evangelists grouped round a central figure of Christ, so that the lines of the wing form a *vesica* shape. A more extraordinary and eccentric piece of work than the whole lot would be difficult to find; barbarous enough in general appearance, no doubt; but the forgotten artist who sculptured that group in the tympanum was a genius, whoever he was, who might claim kinship with some of the greatest of the known sculptors of later times. Before passing beneath this remarkable portal let us pause to notice a fine collection of ivory carving in a case in the centre of the floor, including a coffer from Lyons Cathedral, attributed to the ninth or tenth century, with small figures in the panels having a remarkable resemblance, in feeling and treatment, to archaic Greek work.

The second compartment contains some Mediæval ironwork, including a splendid wrought-iron grille of thirteenth-century date, with the scrolls welded into and apparently growing out of the centre piece, without signs of attachment by rivets or rings, as if a giant hand had peeled off and curled up the various sprays one by one from the centre stem. There is a certain amount of ivory carving again in this compartment, among which the ivory statuettes look, some of them, exceedingly German in type and style of execution. The prominent attractions of this second court, however, are the reliquaries of ostensorios, of which a magnificent one is lent by M. Spitzer, a very valiant contributor to the Exhibition, and whose collection of Mediæval work, to judge from the examples of it here, must be pretty nearly unique. This is a large piece of gilt metal work with a spreading base, supporting on the stem a locked casket of some considerable size; over this is a glazed ostensorio of Gothic tabernacle work, and below the casket the stem branches each way to carry two other ostensorios, one on each side of the casket. The centre stem below is further enriched with a tabernacle carrying little shrines all round it. This is one of the finest pieces of church furniture of the kind in existence, probably, not to be forgotten when once seen. The same collection lends two cases of fine Mediæval embroidery. From the Church of St. Trawig, Evreux, comes another splendid shrine of the thirteenth century, of another type; a long gabled coffer about 3 ft. in length, with a central *flèche*, and three gables at each side adorned with bold metal gilt crests; figure subjects are under each arch and the decoration is picked out with enamel. The base, with a large cavetto moulding, is ornamented with beautifully delicate repoussé scroll-work. An interesting case of iron door furniture is exhibited, showing remarkably variety in the design of key handles. The designs of the wards of the keys, too, strike one as very intricate in comparison with the modern types of key which are supposed to be most invulnerable to unauthorised attacks.

At the end of this compartment is the re-



production of another extraordinary bit of early French architecture, the door of the abbey of Charlieu. The doorway is round-arched, and the nook shafts in the jambs, though occupying the common position of the Gothic upright shaft, are all tapered from bottom to top so that the top diameter is only half that of the bottom, and the shafts are divided off in their height by projecting rings making them look somewhat like drop spouts with wall-fastenings; the rings are enlivened with a cresting all round on the upper side. A more odd piece of detail it would be hard to find. The sculptured Greek fret is found again here, this time decorated with continuous surface ornaments of repeated circles or discs.

In the third room there is a very mixed collection of work, none of it without value, but oddly assorted. Specimens of Palissy ware are mixed with Medieval work of a very different type: there is a beautiful silver processional cross from Quimper Cathedral, and a sixteenth-century processional cross from the church at Guingal, with decanter-topper finials like those put in England to curtain rods; a decided and rather painful descent in taste from the Quimper cross. In the same room is a curious collection of French clocks lent by M. Leroux, some of them of peculiar design; in the form of vases or caskets, for instance, with the dial or figures belt-wise round the periphery, and a pointing hand travelling round to give the time. Needless to say that these fancies belong to the Renaissance period. A reliquary of Ste. Ursule from Rheims is curious, in the form of a ship, with virgins in costumes coloured with enamel standing on the deck—not "eleven thousand" of them, certainly; a smaller group had to suffice the artist. Among the other attractions of this third compartment is another display of keys, this time Renaissance, and also with very curious and varied devices in handles; more of M. Spitzer's embroideries; a good deal of Palissy and Limoges ware; a number of fine panels of Renaissance wood-carving, and a Renaissance carved wooden coffer lent by M. Chabrières; some fragments from the carved stalls at Gaillon and elsewhere, again showing the most curious mixture of Renaissance and Gothic work; some of these may be, and in fact appear to be, patchwork of different dates; but in one case there is a Renaissance pilaster decorated with the usual style of symmetrical scrolls and vases, and a Gothic gablet capping, all out of the same piece of stuff. In the middle of the floor in this compartment is a small case by no means to be passed over, of watches, lent by M. Paul Garnier. How these old French Renaissance watches behaved as time-keepers we have no means of knowing, but in design they are exquisite; more like jewels than watches; flowers of watches, in various graceful and unexpected shapes, and with the most delicate decoration. Nothing could give a more vivid idea of the exquisite and refined luxury, in regard to the adornments of life, which characterised the eighteenth century in France; and one asks on seeing them, why are all modern watches nothing but a dull uniform circular disk; why can we not have, along with improved mechanism, some of the grace and fancy which sported in the designs of these watches of the *perruque* period?

We pass into the next room under the portal of the church of St. Gilles: another piece of extraordinary architectural anomaly. Coupled Corinthian columns, almost pure Classic, resting on pedestals carved with Byzantine-looking animals in low flat relief; the subbase moulding with a Greek fret worked along the upper fillet in relief. The soffit of the entablature is ornamented with coffers with a large rosette in the middle of each in the Roman manner, while along the lower part of the frieze odd Byzantine-looking animals crawl along within a few inches of the Roman rosettes; and below the architrave, between the projecting coupled columns, are niches with stiff flat-looking semi-Medieval figures, divided from one another by clumsy fluted pilasters, just

recalling the Classic pilaster. Certainly the incidents of transitional architecture are curiously illustrated in this series of architectural productions. A first glance at this, at a distance, would suggest the idea that it was a bit of Renaissance work; on the contrary, it is the Classic element preserved longer than usual, and reluctantly invaded by the Gothic.

In the next compartment we come into the region of later Renaissance and modern work, of better known and more ordinary types, including however some fine work in Sèvres and other ceramic productions, and a large exhibit of snuff-boxes, some of them showing beautiful examples of miniature painting. There are some interesting examples of snuff-boxes in decorative metal-work of considerable delicacy of design, and some silver work of good design. M. Spitzer is again benevolent in his loans of embroidery. The next compartment is reached under a reproduction of the arch of the Grosse Horloge at Rouen, with its Classic details of mouldings and ornament, and carving on the soffit of its elliptical arch which is Gothic in force and character. These give access to a fine collection of drawings of ancient buildings made for the Commission des Monuments Historiques; the apartment being terminated at the further end by a reproduction of the arcade from the Hôtel de Berry at Toulouse, with its curiously corrupt Classic detail and columns encrusted with ornament not in the best taste. In a case near this is some fine jewellery of the seventeenth and eighteenth centuries; much of the gold work here is worthy of high admiration, and in its thin texture and minute and delicate design recalls some of the qualities of Greek gold work; it is certainly far superior in artistic style to most of what the French have to show in this class of work at the present day.

We have omitted so far to notice that the upper portions of the walls of all the compartments in this gallery are hung with tapestries of various dates, many of them very fine. Those of the later dates, seventeenth century, are mostly Classic subjects of a very florid character. As we go back to the sixteenth century we find broader and fuller draperies and the compositions more broadly massed and more decorative in style. In the earlier sixteenth century work especially there is something of the flat decorative style and abundance of minute detail characteristic of Medieval art, some of the special qualities of which seem to have survived in tapestry after the Medieval spirit had become extinct in most other forms of work. Going back again to the first room we find two curiously contrasted tapestry exhibits. One of these is from the Parc aux Cerfs at Versailles, and is a highly conventional representation of a palisaded enclosure and trees, and animals scattered about; there is no attempt at perspective, and if this is of the date of the Parc aux Cerfs, it is a curiously naïve piece of work for its time. On the opposite wall, in startling contrast with this, are two tapestries from the Hospice de Chalais, representing the Prodigal Son, and "Les Bucherons," a group of woodcutters. These, the latter especially, are as realistic as the artist could make them, and in reality quite out of keeping with the true conditions of tapestry art; their precise date is not given.

The retrospective exhibition does not fill the whole of the western gallery, the end portion being devoted to the permanent collection of casts from Cambodian architecture and sculpture, which may be regarded as part of the general collection of comparative casts of architectural sculpture. The vestibule at the bottom of the end staircase, at the extreme western end of the gallery, is occupied by a cast of the end portion of the great sculptured balustrade, known to those who have studied the French discoveries and illustrations of Cambodian architecture; a balustrade on an immense scale which consists of an enormous serpent supported horizontally by a succession of kneeling figures, considerably over life-size, and which turns up as a ramp at the end with

a portentous and many-headed finial, as of serpent heads radiating round a centre. After looking at the Classic and Mediaeval sculpture in the eastern gallery, it is strange to end one's walk with the sight of this monstrous and barbaric production, which seems as if it belonged to an earlier age of the earth's history altogether—yet, uncouth as this is, there is a wonderful power about it, which sends one into speculation as to the character and life and associations of the people who could have produced it. They were artists in their way; they could not model the figure, certainly, and the kneeling figures seem rather blocked out in the rough than carved; the thing is so weird, so completely out of touch with all our associations and tastes, that it looks as if it might have been one of the sculptural decorations of De Quincey's opium dreams. One feels, certainly, a kind of loathing of the people who could do such a thing; but there is far too much power of conception about it to pass it by indifferently, and it is certainly a most strange and bewildering addition to a museum of architectural sculpture.

#### NOTES.



THE case of Whitmore v. Crabb, Veley, & Co., tried in the *Nisi Prius* Court at the Essex Assizes, on the 29th ult., afforded another instance of the extraordinary misapprehensions under which learned Judges seem to lie as to the architectural profession. The plaintiff in the case was an architect who sued for professional charges, and got a verdict. On the statement of the plaintiff's counsel that "the charge of five per cent. on the actual outlay amounted to 33½," the Lord Chief Justice is reported as having observed that he would not accept the dictum of the Royal Institute of British Architects in the matter of charges. This or that percentage could not be allowed as customary. "The principle he should go upon would be that of *quantum meruit*,"—architects should be paid like other people." And how are "other people" paid? We have most of us heard of fixed and recognised charges in the legal profession. But the fact is that the Institute scale of charges is precisely an endeavour to define *quantum meruit* in a convenient manner for general working. The Institute does not endeavour to impose anything. It has merely stated an average fair charge as a means of avoiding dispute, and as a guide to architects and their clients as to what is reasonably fair to both sides. The Institute did not invent the percentage system of payment; they have only advised upon it. We think it a bad system; so do some of the profession; but it has become generally accepted by custom, and the fact is that in many cases it is in favour of the public and bears hardly on the architects; and many eminent architects, whose designs are much sought after, could make a great deal more by naming fees *ad libitum*. According to another report the Lord Chief Justice added that an eminent architect, whose name he would not mention, had claimed 5,000*l.* thirteen years after the plans had been prepared for a castle which had never been built. Lord Coleridge is probably not aware that when the plans and designs of a building have been prepared, half, according to a fair estimate, of the architect's work in connection with it is done. Is he to have no recompense for that because the client changes his mind and does not build? And apparently, in Lord Coleridge's mind, the fact that the unfortunate architect has been kept thirteen years out of his money is an aggravation of his offence in asking for it! If any member of the legal profession brought a claim for fees that had been owing to him for thirteen years, we should probably find that the delay in paying him would be adduced as an additional grievance. But according to Lord Coleridge, we presume, if an architect is kept out of his rightful earnings for thirteen years his claim ought to lapse. Then a



muddle-headed local newspaper says this is just as bad as the Institute's other attempt to impose professional referees on competition committees. As this wisecrack has already been told, the architects in their corporate capacity never made any such attempt; they simply said that, for reasons they thought sufficient, they would not compete except under certain conditions. This is surely a free country, even for architects. If people do not like those conditions, they need not have architectural competitions,—that is all. No one obliges them to put buildings up to competition.

WE are glad to see that the Master of the Rolls, on appeal, has declined to set aside Sir F. Bramwell's arbitration in the case of Messrs. Kirk & Randall and the East and West India Dock Company. It will be remembered that the contractors claimed a large extra payment beyond their contract, on account of the very different nature of the excavation from what they had been led to expect, the ground being soft and incapable of being retained at the prescribed slope ( $1\frac{1}{2}$  to 1) without a great deal of expensive shoring. Sir F. Bramwell, who was called in as arbitrator, ruled that the work as it had to be executed did not come under the head of the character of work for which they contracted at the scheduled prices. The Master of the Rolls said that,—

"Whether certain work was within the schedule and addenda of prices seemed to him to be a question of facts, though it might perhaps turn upon the true construction of the schedule. In the schedule the work was described. The work was to be done in a soil described by the engineer. The arbitrator decided that the work was described to be done in a soil where sufficient ballast would be found for the concrete, and where the soil would stand at a slope of  $1\frac{1}{2}$  to 1. The arbitrator decided that that was the description of the work to be done for which prices were fixed in the schedule, and that work to be done in another kind of soil would be work of another description. That was a matter for a scientific man to decide. The arbitrator had, in effect, said that a statement made by an engineer to a contractor that the soil would stand at  $1\frac{1}{2}$  to 1 amounted to a description of the soil, and that if the soil would not stand at that slope it made the work of a different character, and the description in the schedule of prices did not apply. No price, therefore, being named in the schedule, the arbitrator had to fix it. For these reasons he was of opinion that there was nothing appearing upon the face of the award which showed error in point of law. Whether the arbitrator was right in his findings of fact it was not for them to say."

The case does not in our opinion reflect creditably on the East and West India Docks Co. They or their practical advisers must have known well enough that the contractor was doing extra work and was put to great extra cost beyond what he had estimated for; the work was done and the value of the money claimed had been given, and they endeavoured to withhold it from the contractors on a question of technical interpretation of words, and they endeavoured (unsuccessfully) to prohibit the arbitrator from admitting evidence as to the nature of the soil. The moral excuse, we presume, is that the managers of the Company were bound to save their shareholders' money by any means in their power. It might be said that the contractors should have acquainted themselves with the nature of the soil; but the obvious retort is, that so should the Company's engineer who drew up the specification. The unquestionable fact remained that the unexpected nature of the soil led to difficulties and expense for which neither the Company nor the contractor were prepared, and the Company made use of technicalities to endeavour to throw the extra cost on the unfortunate contractors. That would be considered a very mean policy on the part of an individual; it is a thing no high-minded man would condescend to; and we are quite unable to see why there should be one code of honour for individuals and another for Companies.

THE first number of the second volume of the *Technology Architectural Review*, the illustrations in which consist mostly of ideal designs for types of buildings, contains two sets of designs for a Billiard Hall and Exedra;

which latter word appears to be used for an open gallery or colonnade in connexion with the Hall. The plates are, like all the *Technology* illustrations, beautifully executed, but both the designers appear to have forgotten that top-light is an essential characteristic of a billiard-room where it can be obtained; and this should certainly have been remembered in an ideal design unhampered by considerations of site. The number includes a photograph from a finely-executed elevation of the Library of St. Mark, by Mr. S. W. Mead, labelled "Rotch Scholarship envoi." There is a kind of "École des Beaux-Arts" air about these American drawings, and the frank adoption of the word "envoi" seems to further indicate the original inspiration of the *Technology Review*. The number contains some good literary matter, about which we may have more to say.

IN the current number of *L'Architecture* M. Jourdain, replying once more to M. Dupuis, the upholder of "L'École" in architecture, and referring to the claim advanced by the latter that the Exhibition buildings were designed on the principles taught in the École des Beaux-Arts, asks rather pertinently if his opponent can tell him where are the traditions of "L'École" in the "Galerie des Machines," and what are the Classic formule of entablature, columns, pilasters &c. observed in that building, and where among the Five Orders M. Dutert found his curious capitals, and what affinity of any kind the structure in question has with the Greek and Roman temples and Italian Renaissance villas, the study of which forms the basis of the teaching of the École des Beaux-Arts? M. Dupuis will find that rather a difficult question to answer. M. Jourdain further avers that his object (though he regards this as a "véritable rêve de fumeur d'opium") is not to narrow but to extend the field of architectural studies at the École. He says:—

"Je voudrais qu'on fit aux élèves des cours sur l'architecture comparée du monde entier; qu'on allât fouiller le passé pour en chercher les chefs-d'œuvre; qu'on dressât une sorte de catalogue raisonné des manifestations artistiques vraiment grandes de l'humanité; qu'on tentât l'analyse et la synthèse de chaque style, sans parti pris, sans mesquin esprit de dénigrement; qu'on ouvrit les portes à toutes les tendances, à tout les essais, à toutes les évolutions; qu'on ne pressurât pas les cerveaux dans le même moule à gaufres; qu'il n'y eût ni élus ni damnés; qu'enfin on démolît la cage oh,—comme récompense suprême,—on oblige de sauter diables dont le casier judiciaire est vierge à relever pendant quatre ans des ruines romaines que tout le monde connaît et qui n'intéressent personne,—pas même les membres de l'Institut."

This programme seems very much in accord with that which M. César Daly demands under the title of "Hautes Études"; studies directed to find a reasonable basis of architectural style in general, independent of the reproduction of special styles. In regard to practical education, M. Jourdain continues:—

"Ce serait plus simple. Je ne demanderais pas qu'on apprit aux étudiants la section réglementaire d'un ventilateur de fosse ni la façon dont fonctionne une lampe Siemens. Non, certes; mais je voudrais qu'on leur fit comprendre que tout a sa raison d'être en architecture; qu'un artiste—pas plus qu'un honnête homme—ne doit mentir, et que c'est cruellement, malheureusement trahir la vérité que composer, entre autres, une fenêtre par un plancher, donner à une baie de cabinet de toilette la même importance que celle d'une salle de fêtes, dissimuler un linteau sous de la pierre, enduire de plâtre une voûte en fer, dresser une colonne qui ne supporte rien, et mettre des pilastres pour 'faire bien.' Il y en aurait à citer un volume d'exemples de cette force-là."

So the French also are beginning to find that out!

A SPANISH correspondent informs us that the Cathedral of Seville, which last year was supposed to be hopelessly defective, as instanced by the fall of one of the piers in the nave, may yet possibly be put into such a state of repair as to give the structure some chance of holding together for another spell of years. The report of the Government Committee as to the condition of the building is sad enough, but an attempt

at restoration is about to be made, and Congress has voted 400,000 pesetas (equal to about 13,500*l.*) for the purpose, as a first instalment, pending the result of the attempt. The examination of experts has proved that last year's catastrophe was due to disgraceful carelessness on the part of the clerical authorities for many years past. The Cathedral has not been watertight for a long period, and the rain has filtered through and disintegrated the mortar of piers and arches from plate to footings; but, although the wet came through everywhere, and the fact was patent to every superficial tourist, no steps whatever were ever taken to mend the roofs,—at a cost of a few thousand francs. Several hundreds of thousands pesetas have already been expended in shoring up the dangerous portions, and some 8 or 12 millions will be required to put this interesting old Cathedral into a state of tolerable repair. The last extensive restoration was by Ferdinand Ruiz, in the sixteenth century.

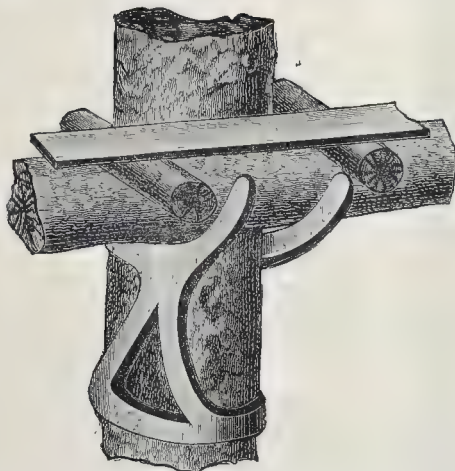
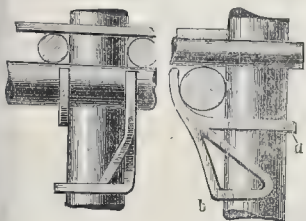
THE Advocates' Library in Edinburgh is, like the British Museum, possessed of a collection which is enriched by a copy of every book issued in the United Kingdom. Possessed of this privilege, the Faculty of Advocates have, with great liberality and public spirit, thrown open the treasures in their possession to the inspection of literary and other men who desire to inspect or make use of them. The Library was thus of the nature of a national institution for the use of the country at large, and is for Scotland what the British Museum is for England. The expenses, however, of housing and maintaining the collection have not, as in the case of the British Museum, been paid from the public purse, but have been sustained by the Faculty of Advocates. The existing accommodation is now altogether insufficient, and the Faculty, from their limited means, are unable to provide the additional buildings required for the proper custody and inspection of the continually increasing publications entrusted to their care. In these circumstances, the matter has been taken up by the Town Council, and a motion has been unanimously passed that it be remitted to the Lord Provost's Committee to consider as to the advisableness of nationalising the Advocates' Library, and to report. The Library is at present an appendage to the Courts of Law, and occupies a site to the west of the Parliament House, and presents an unfinished jumble of buildings approaching within about 40 ft. of the thoroughfare of George IV. Bridge, and having a breadth of about 60 ft. along that thoroughfare. Upon this site there is ample space for the erection of a suitable building, and the position is appropriate, being opposite to the new Free Public Library, provided by the munificence of Mr. Andrew Carnegie. Upwards of half a century ago the late Mr. Playfair, architect, prepared a plan for the completion of the Library, showing a stately colonnade of Doric columns, a design not likely at the present time to meet with approval. Since then various unsuccessful efforts have been made to get the building completed, and the site is enclosed by a wall of rough rubble indicative of its temporary nature. This wall extends along the west side of the County Buildings (which adjoin the Library), the architectural back elevation of which was exposed when the bridge was opened up; the late Mr. David Bryce, architect, prepared a new elevation for this building towards the bridge, but it, too, is still in *rubibus*. Should the library be completed, the county authorities can hardly refrain from making a new frontage, and then the whole length of George IV. Bridge would present an architectural and finished aspect.

WITHIN the bounds of the seaboard parish of Irvine, Ayrshire, a deep trench, dating back to before the opening of the eighteenth century, has gone continuously by the name of the "Minister's Cast," although, popularly, the origin of that title had long been forgotten or overlooked.



Operations now being carried on by the Lanarkshire and Ayrshire Railway Company have been interfering with the old work, leading to some temporary flooding which a few days ago formed the ground of a trifling action for damages in one of the local courts. It appears that during the religious troubles, culminating in the rout of the Covenanters at the battle of Bothwell Bridge, June 22, 1679, among the many Scotsmen who fled to the Low Countries for safety, and were for a while exiled there, was one Patrick Warner, a probationer. Warner utilised the period of his banishment by a close observation of the drainage methods affected in Holland, and when, in 1688, the troubles being over at home, he was appointed to the parish church of Irvine, he managed to turn his recently-attained civil engineering knowledge to profit. He acquired from the burgh authorities, on very easy terms, a piece of low-lying morass ground of some considerable extent, and cutting the trench above referred to, succeeded in clearing the area of its excessive moisture, thereby transforming a waste place into property of value. The reclaimed ground took the name of the Meadow Park, which it retains still; and the reclaiming ditch that of the "Minister's Cast." It is of some interest to note that the Meadow Park still remains in the possession of the descendants of the original reclainer, the Rev. Patrick Warner, the present possessor being Mr. Patrick Warner, of Ardeer. These particulars were elicited through inquiry set on foot by the County Sheriff presiding over the court, who felt interested in the old work thus oddly titled.

THE contrivance illustrated in the accompanying cuts is, we are informed, in considerable use in Germany for fixing the



cross-poles to the uprights in scaffold-building. According to the patentee's description:—

"The holder is made of one piece of iron, and consists of a saddle-arm, clamp provided with spur, and counter-arm provided with spur. It is fixed to the vertical pole by pushing it on sideways and turning it with a jerk, the arms pointing in an

upward direction. This can be done with one hand and in a few seconds. The holder fixes itself automatically, so that it is even superfluous to drive in the spur with the hammer.

The holder thus fixed to the post permits the horizontal beam to be placed on the projecting saddle-arm, and its weight will tend to press the holder against the vertical post in such a manner that the spur on one side and the counter-spur on the other side will both enter the wood and prevent the holder from sliding off.

The holder is now made in two sizes, viz., 4½ in. and 6½ in., and it may be pointed out that they can be used with equal security to posts of half their thickness."

We should hardly agree to the statement that the holder can be used with equal security on posts half the thickness of that which would fit the curve; it would have a grip, no doubt, but hardly such a good one. We have examined a specimen of the holder, which is of ample strength for its purpose, and the principle of the grip is of course much the same as that of the "Lewis," applied in another form. The only question is whether the sudden lifting of a heavy weight off the scaffold might not give a shake to the supports at the same moment that it loosened the grip, with the result of a slip. It could not slip far on rough scaffold timber, but it might slip sufficiently to cause an accident, if the spike did not suffice to hold it. We do not think it very likely it would fail in that way; but we should recommend a severe test before adopting it on large work. Its advantages, if proved to be secure, are obvious. The patentee is Mr. Ottoman Erfurth, "Master Mason," of Teuchern, Germany.

WE are indebted to Mr. Robert Boyle for a note as to what is apparently a rather remarkable building in its way, the new Mormon Temple at Salt Lake City, Utah, which Mr. Boyle has been surveying for a scheme of ventilation. He says:—"This building, when finished, will be one of the most remarkable of modern buildings, not only on account of its size and the purpose for which it will be used, but for the immense thickness and strength of its walls, which are built throughout of solid blocks of dressed granite, the basement walls being 20 ft. thick, tapering gradually to the top of the building to a thickness of 6 ft. The tabernacle, which is estimated to accommodate fourteen thousand people, besides having the largest unsupported ceiling of any building in the world, is perfect in its acoustics, a pin

dropped at one end of the building being distinctly heard at the opposite end or any other part of the building." This experiment, however, does not prove that a building is "perfect in its acoustics" for speaking and hearing purposes. There is such a thing as a building being too sonorous.

AT the annual meeting of the Institute of Architects of New South Wales, on June 19, the President, Mr. J. Horbury Hunt, towards the close of a clever and spirited address (reported at length in the columns of the *Sydney Building and Engineering Journal*), made some remarks on the Press in regard to architecture, some of which might be read and noted with advantage over here. He said:—

"I venture and with due respect beg to point out to the Press that it does the architectural profession very serious harm, perhaps unknowingly and unintentionally, by giving exceedingly laudable descriptions of proposed buildings based on an opinion formed after inspecting somewhat craftily-prepared drawings got up for the occasion of a festival, or for the ceremony of setting or placing the chief stone, generally termed by the public 'laying the stone.' All competent judges are agreed that our present Town-hall is a piece of building composition highly discredit to our colony and age, and such as no city like Sydney ought to have tolerated. From my scrap-book I cull this description, inspired by a few lines on a sheet of Whatman:—'The design unites to chaste and elegant appearance a degree of solidity and grandeur which will make it one of the ornaments of the city.' Now this is so much unearned, undeserved credit to the designer (a house-painter from a neighbouring colony) now dead; pity for art's sake he ever lived. . . . It is evident some architectural descriptions of buildings go direct to the Press from the architect, for the sole object of advancing his position at the expense of the whole profession, while also inflicting an irremediable injury upon the art of architecture. In this I think we have the right to beg protection of the Press, whose editors, when they have pointed out to them the mischief and injustice wrought by this class of public announcement, depend upon it, will take steps to stop it and cause a more healthy tone to be given to architectural descriptions of works in progress or completed, than has hitherto existed. . . . There are cases where it is necessary to give to the public some idea of the proposed building; then let the report read: 'We are supplied by the architect' (or other equally responsible person) 'with the following, &c.'"

That seems a very simple recommendation, but it is one which daily newspapers in this country as well as in New South Wales much neglect. The public would be astonished if they knew how many complimentary criticisms on buildings, stained-glass windows, monuments &c., which appear in daily papers, are "got in" by the designers or makers themselves; printed as they are sent just to save trouble, and because they make convenient paragraphs to fill up the corners of a paper. We get similar self-laudatory paragraphs not infrequently, but then we know what to do with them, as their modest and ingenuous authors probably discover when they see them in print.

#### THE RICHMOND MUNICIPAL BUILDINGS COMPETITION.

EIGHT architects have, upon the invitation of the committee, submitted designs for this building, and those of Messrs. Elkington & Son and of Mr. T. Verity have been recommended as worthy of the first and second premiums, respectively, in accordance with the unusually clear and concise report of Mr. James Edmeston, the assessor. All the drawings have been exhibited for a week in a room in George-street, Richmond, where we have taken the opportunity of examining them.

There is little doubt that, judged from most points of view, the award is an extremely fair one. The most important of the conditions appears to have been that the building should cost not more than 10,000*l.*, or within ten per cent. of that sum. None of the competitors, have produced a design which is likely to cost so little, but Messrs. Elkington & Son's is certainly the most economical, at any rate of those that are at all suitable in other ways; their plans are excellent, and their elevations are not so very much worse than some of the others. In this respect none of the competitors are to be congratulated greatly. As in the designs for the Gloucester Municipal Buildings, which we lately described, there is a dead level of common-place, broken only by something worse, which is really quite depressing. Seeing how many of our architects are now doing work which is of undoubted artistic excellence, one cannot but ask why important buildings like municipal offices are, as a rule, so ill-designed



externally. Many answers might be given to the question, but whatever is the real reason, the fact that, as a rule, second-rate designs are chosen for such buildings is deplorable. In competitions especially, plan and cost alone seem to be considered, and so well do competitors know this that even those who can, and who every one knows can, produce an architecturally fine building, hardly exert themselves at all to do it.

To return to the designs for the Richmond Municipal Buildings. The site is a rectangular one of (roughly) about 150 ft. by 50 ft., occupying a portion of the site of the old Castle Hotel, a strip having been taken on the north-west side for a new street, which the long side of the buildings will face. One end of them looks into Hill-street, and the other over some gardens to the river. On the south-east side is a block of shops of considerable depth, which seem to have given some of the competitors a little trouble in the matter of lighting their front block, and nearer the river are some other buildings with rights of light that had to be considered.

Messrs. Elkington & Son ("Q.E.D.") have placed their main entrance in the middle of the Hill-street front, opposite the end of a corridor, running, about the middle of the site, from it to the entrance of the council-chamber, which is on the same floor on the river frontage. This corridor is lighted near the entrance by a large well staircase, and further on by windows looking into an open area. On the right of the entrance are the vestry clerk's offices, and on the left the rate collector's room. Beyond the staircase are a public waiting-room, offices for the medical officer and inspector of nuisances, a committee room and a chairman's private room and members' cloak-room, &c., attached to the council-chamber. The council-chamber is well arranged, with a small ante-room at one end and a space for the public screened off at the other, and near the latter a secondary entrance for the public, the caretaker, &c. The rear portion of the building consists practically of one floor only, a well-arranged caretaker's residence occupying but a small part of the upper floor. The main front block contains, however, two stories of offices over the ground floor, giving accommodation for another committee room and the surveyor's and accountant's offices.

In the basement is accommodation for heating and electric lighting, and a kitchen communicating by a lift with the ante-room of the Council Chamber, which will make a convenient serving-room when the latter is used for banquets. Every part of the building is well lighted, and all the requisite accommodation is arranged in a compact and convenient manner, with the one exception that the larger committee-room is a long way from the Council Chamber. The elevations show a red-brick building with what we presume are terra-cotta dressings, and high roofs, above which rises an octagonal angle pavilion, surmounted by an open turret. The main entrance is flanked by columns, and surmounted by sculptured figures upon a sort of pediment. But for this imposing feature the building might look rather unfortunately like an ambitious and overgrown villa.

Mr. Verity ("Westward, Ho!") has been somewhat more lavish than "Q.E.D." with his accommodation; he has succeeded in finding a use for the whole of two floors, covering practically the whole area, as well as a spacious second floor. He has thus been able to produce, externally, a much more imposing edifice; and, internally, a more spacious and dignified, though hardly a more convenient one. On the ground floor, a similar corridor to that of "Q.E.D." unites two spacious halls in the middle of the front and rear blocks, respectively. The main entrance is in the new thoroughfare just out of Hill-street. It opens into a wide lobby in communication with the hall in the front block in which the main staircase is also situated. There are besides two other entrances on this floor, one for the councillors, to be used also by the house-keeper, and one for the public to the council chamber. The whole of the floor is occupied by offices and one committee-room. On the first floor the council chamber, with its ante-room, retiring room, &c., occupy the end of the building nearest the river, the surveyor's offices are on the Hill-street front, and between the two are the public waiting-room, the larger committee-room, and the chairman's private room. The size of the caretaker's apartments, which are on the second floor, seems in



this design to be rather excessive, and the lavatories occupy valuable space. The strong-rooms in the basement are well planned. The elevations show a heavy but suitable-looking building in red brick and stone or terra-cotta. There is a good deep cornice, broken only by the high council chamber windows, and a tall and slender turret surmounting the roof over the main entrance and looking excessively light by contrast.

"Bon Espoir" and "Concilium," whose designs are commended by the assessor, have placed their main entrances some distance down the new street, and opposite to monumental-looking staircases, built out into large court-yards, taken out of the south-east side of the site. This looks as if it would be a very good and effective arrangement, but the other parts of the plans are by no means equal to the two sets already described. "Bon Espoir's" plans, especially, are terribly cut up, and wanting in architectural simplicity and directness. His elevations, on the other hand, have some good architectural character, and if he could have been satisfied to do without a rather obtrusive angle-turret and so many large dormers, it would have been easier to detect some excellent detail, which they now throw into the background.

Among the other designs, "Syenes" shows a set of plans that would work fairly well, and a rather effective little perspective sketch of his building from the river, showing the gardens and flights of steps. "Rules" exhibits a sepia perspective showing a well-grouped building with a handsome but expensive clock tower. Some skilful and effective pen-and-ink drawing has been expended upon the almost too plain and unambitious design of "Nota Bene," who is, perhaps, to some extent a victim to a conscientious attempt to keep within the specified cost. It is certainly very much to be regretted that competition promoters so frequently set up an impossible limit of cost, which has in the end to be abandoned. It is terribly unfair to those competitors who do observe the rules of the game, and, in fact, often reduces the whole affair to a question of making the best guess or getting the best information as to which of the incompatible requirements of the promoters may be disregarded with least danger.

**The Scandinavian Wooden Villa Export Trade.**—Of late years the export to warmer climates of wooden villas from Norway and Sweden has greatly increased, and a further impetus has been given by the handsome show of villas and Norwegian native habitations in the Norwegian section of the Paris Exhibition, which has resulted in orders for these structures from various quarters. An agency has also been established in Paris for the sale of Norwegian villas. The Ekman Planing Factory of Stockholm has just executed an order for the wood-work of a new hotel in the Canary Islands.

#### THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT LINCOLN.

The forty-sixth congress of the British Archaeological Association commenced on Monday, the 29th of July, in the ancient city of Lincoln, a centre from which visits were made to various points of interest around it; but there is, indeed, so much to be seen of antiquarian interest and artistic beauty in the city itself, that it is not surprising to find that the two first days were devoted exclusively to the examination of some of the objects which it contains. The Council of the Society may be congratulated on having selected Lincoln as its meeting place, and at having secured the hearty co-operation of the Earl of Winchilsea and Nottingham as President for the meeting, and for the following year, as well as in having the active help of the Bishop of Nottingham, and Precentor Venables.

The meeting was announced to begin at two o'clock on Monday, but long before that hour an active party of the members might be seen threading some of the narrow passages of the city in pursuit of some of the less known of its many antiquities, in one place coming upon a charming relic of old timber, fifteenth century work; in another, the remains of an ancient mansion, or the stonework of some of the very many demolished churches. The party was under the guidance of the Rev. Canon Barrett, and much interesting work was done.

The sun shone magnificently, showing the grand old cathedral, built on the highest ground in the city, as the members and their friends assembled in the County Rooms in the high town. The spacious Hall was filled by the party, and here the noble President was formally introduced to the Mayor and Corporation of Lincoln, and a beautifully illuminated address of welcome from the civic body was read. These ancient mace and other objects were inspected, after which the party proceeded to partake of luncheon on the invitation of the Mayor and Corporation. After the luncheon, the Earl of Winchilsea proceeded to deliver the inaugural address, in the course of which he remarked that the people of Lincoln had many things to be proud of, but there was nothing which they ought to be more proud of than the antiquities which had been committed to their care. The natural advantages of their place could not escape any Government or people, and it was, therefore, not surprising to find that even in the early British times a city was founded here which took its name from the river Lindum. Passing on to Roman times, he called attention to the Newport arch in Lincoln, one of the most interesting—if not the most interesting of Roman relics in Britain. In that arch they would see simplicity, strength, and durability, and would recognise in it one of the works which were worthy of the nation that became the masters of the world. Not only in this city were the Romans pioneers and engineers, as they had always proved themselves to be



at in other parts of the country their work remained. In the great road which led north and south of Lincoln, and was still the main thoroughfare, Ermine-street, they traced the long hand of the Romans, and in the bank that still protected the farmers of the East Fens from the incursions of the sea, and which for 500 years had successfully resisted the rising-de, they recognised their far-sighted policy. These were some of the interesting relics by which they were surrounded. There was something particularly interesting to Englishmen in seeing these rude but solid mementoes which that great nation had left in our land, because all the empires that had borne sway in the world, he knew of none which was so nearly approximated to our own as the Roman empire in the spirit in which it was conducted, in the justice of its laws, in the great engineering works by which it covered the surface of the globe, in that high intelligence and that lofty common sense which animated it in its best days. Then, coming to later times, the resident observed that the history of Lincoln as the history of England, reminding his ears of the important part played by Lincoln in the contests between the Saxons and the Danes, and of the fact that almost every king who reigned from the time of the Conquest down to the time of Henry VII. was attracted within the sphere of the city's influence. After reference to the gradual growth of the beautiful cathedral, he said that not only would Lincoln itself command the admiration of the members of the Association, but they would find that Lincolnshire would make good its principal claim to being eminently a county of parish churches. Proceeding to consider the utility of archaeological research, his lordship said it must be limited that if they compared this century with the century that preceded it there had been an enormous revival among public bodies and by private individuals who were custodians of many valuable treasures, in regard to the interest they bestowed on objects of this class. People might ask of what practical use these things could be. He protested against the idea which would for a moment limit a great nation to any small view of what was necessary to its existence. The treasures of art and of science, the memories of our ancestors in a bygone generation, were just as much a necessity to our existence as the air we breathed. In the mighty cathedral one generation after another had laid its dust within those walls, but before it passed away each age made its contribution to the fabric, a contribution lighted by genius and warmed by faithful and true devotion, so that when all those ages had passed away we had in that cathedral a great treasure-house, not only of wood and stone, but of the spirit and devotion of our ancestors (applause). It was a precious heritage and a very practical advantage, and it ought to constitute an education to the young men of this city.

The address was delivered without notes, and was listened to with all the attention that it merited. Very hearty applause followed, and after the Mayor and Corporation had been warmly thanked, a considerable number of the party proceeded to the extreme south end of the city to begin the survey of some of the buildings of the city. Under the guidance of the Bishop of Nottingham the Church of St. Peter at Gowts was inspected, the party paying tribute of admiration in passing the pretty spire and church of St. Mark's, which was rebuilt not many years since from the designs of the present Mayor, whose architectural taste is shown by several of the other buildings at Lincoln. St. Peter's at Gowts, the well-known early church, with respect to the history of which so much has been written, and upon which there has already been much controversy, is likely, with its sister-church, St. Mary-le-Wigford, to afford no little work to the antiquaries present, and it is to be hoped that some new light will be thrown during the Congress upon the subject of the date of its erection. The Bishop also described St. Mary's Church, and pointed out many of its peculiarities. Both churches have been restored creditably, but an ominous-looking crack in the tower of St. Mary-le-Wigford will soon require special attention, for the tower will be in danger. John-of-Gaunt's tables, as the group of late Norman buildings are popularly called, and the old timber houses in the old Norman bridge beneath High-street were also visited and described, and the first day's work was brought to a close.

The archaeologists were up betimes on Tuesday, the 30th, to be present at the ancient Guildhall, in the Stonebow, as the picturesque arch over the High-street is designated. Here the party was received by the Mayor (Mr. W. Watkins), supported by several members of the Corporation. The regalia of the city were laid out for inspection, and Major Lambert, F.S.A., gave a lucid description of each of the articles, concluding his remarks by an offer to have certain repairs that were needed effected at his own cost—an offer that was at once cordially accepted by the Mayor. The various charters of the city and their seals were described by Mr. de Gray Birch, F.S.A., and Mr. Loftus Brock, F.S.A., brought to the notice of the party some remarkable terra-cotta water-pipes of Roman construction, which had been discovered during the recent deep drainage works carried out in the city. These are now without a permanent place of keeping, and they justify Mr. Brock's plea for the establishment of a local museum, there being no such institution as yet at Lincoln. The Mayor, in response, said that the drainage works alone had produced relics almost sufficient to stock a museum, but that these had been scattered, owing to there being no fitting receptacle for them. The Guildhall has a good fifteenth-century roof, and the members heard with great satisfaction of the restoration of the building and the ancient gateway below it. It had been seriously proposed, only a few years ago, to demolish both gate and hall, a proposal that was happily frustrated. Emerging from the quaint hall, progress was made to the beautiful church of St. Swithin, recently erected by Mr. Fowler, of Louth, a building well known to many of our readers. In it is preserved a remarkably fine Roman altar, which was found during the building of the spire, fortunately, with its face downwards, in a bed of sand. The preservation of the inscription is, in consequence, perfect, and the lettering is as fresh and sharp as if only out in recent years.

The Entrance Gateway  
Lincoln Castle



The Old Grammar School, formerly the Grey Friars', on the north side of the church, was then inspected, the undercroft being vaulted from end to end, and having a range of pillars down the centre. The work is of the middle of the fourteenth century.

After passing that beautiful fragment of late Norman architecture, the Jews' House, and another example of similar date, discovered and restored in recent years, the grand old Cathedral was reached punctually at eleven o'clock. Here the party was met in the Consistory Court by the Rev. Precentor Venables, who gratified his audience by a lucid lecture upon the architecture and history of the Cathedral, fully one hour in length. The lecture was illustrated by Professor Willis's plans, and by elaborate diagrams of no little interest to the members, since they were the work of the late Edmund Sharpe. At the conclusion of the lecture, Mr. Loftus Brock, by aid of the drawing of the west elevation, called attention to the simple rule of proportion, which has often been

mentioned in these pages, namely, that all the composition falls within the enclosing lines of an acute triangle. It was pointed out that the apex of this triangle was now wanting, owing to the absence of the ancient spire, but that the rule of proportion of which this Cathedral is a remarkable example, gave the height for the central spire and that for the two western spires.

Under Precentor Venables' guidance, a perambulation of the Minster was made, commencing at the west end, proceeding to the transepts, and to the work of St. Hugh within and beyond them. A detour was then made to the private garden of the deanery, in order to inspect the beautiful view of the Cathedral seen from the north-west, which was seen to great advantage under a magnificently blue sky and brilliant sunshine. Progress was then made to the cloisters, which may be considered the present museum of Lincoln, in the absence of any other. Among Roman moulded work, small decorated columns, pottery and pavements of many colours, are examples of Saxon slabs with interlaced patterns, found during excavations, and, alas! of much carving which should never have been removed from the Cathedral. Here are the originals of the elaborately-carved shafts of the western doors (Bishop Alexander's work, most probably), which were restored some years ago by the substitution of modern copies for the originals. Fortunately, the originals are preserved here.

The Precentor called attention to what is being done at the cloisters, which may be of service to be repeated here. The decayed nature of much of the work requires attention to be directed to it, and the old work is being taken down stone by stone. Every portion fit for re-use is replaced in its exact position.

Two sides of the cloister, the south and the west, have been thus treated, and it was gratifying to see what a great mass of ancient work has been replaced uninjured by the process. This is a different course to the entire renewing

of the work, and it is worthy of careful imitation on the part of the custodians of our ancient buildings, whenever repair may be an absolute necessity.

Certain of the party inspected the contents of the Library, under the guidance of the Rev. A. R. Maddison, Succentor and Priest Vicar, when the most ancient of the contents were pointed out, and the fabric itself was examined. Part of the building is of 15th century date, and the remainder is the work of Sir Christopher Wren. On returning to the Cathedral, the Angel Choir, the eastern transepts, and the sites of the shrines of St. Hugh, and of the boy wrongfully said to have been murdered by the Jews, were inspected, and at the Gallies porch, on leaving, a hearty vote of thanks was tendered to Precentor Venables by Mr. W. H. Cope, F.S.A. After luncheon, the Castle of Lincoln was inspected, under the guidance of Mr. Geo. Patrick, who read an interesting paper on the history of the fabric. The salient features of the structure, the two mounds, the



keep, Cobb's Hall, which consists of two stories of vaulted dungeons, in which the rings for prisoners still remain, and the herringbone masonry of the curtain walls, were all pointed out. Past the Church of St. Paul, a modern structure, which is supposed to mark the site of the primitive Church of St. Paulinus, in the centre of the old Roman city, the party proceeded, under the guidance of Mr. Roach Smith, F.S.A., to survey the relics of Roman times. The remarkable portico of massive columns, 2 ft. 9 in. in diameter, discovered a few years ago, and happily preserved, thanks to Mr. Allis's care, was minutely inspected. These remains consist of the moulded bases, and about 5 ft. in height of five out of six columns, buried beneath the modern houses of Bailgate. Mr. Allis, builder, however, on discovering the remains, ingeniously contrived to support his new work on piers and girders, and it is possible to inspect in comfort these massive works of a long past people. Mr. Roach Smith readily showed that the portico, the angle-columns of which are double, in one case at least, is at right angles with the mass of Roman walling known erroneously as the Mint Wall. The building may have been the Basilica of Roman Lindum, but it is equally likely that the portico, at least, was that of a temple. Not far off, in the exact centre of the original city, was found a Roman milestone, now safely deposited in the Cathedral cloisters, where it had been inspected earlier in the day. The well-known Newport gate was then visited, which appears to be put together without mortar, although pointed in later times.

The deep and wide fosse around the northern and eastern sides of the city was inspected, where occasionally a fragment of the actual city wall was met with, built of rubble, laid here and there herringbone wise, with no layers of tile as at the Mint Wall, and no pounded brick in the mortar. A pleasant halt was made in the grounds of Mr. and Mrs. Melville's house, after which the party continued the examination of the wealth of ancient work of this part of the city, occasionally inspecting an ivy-covered tower, or a Roman tomb, or a timber-framed house. The long day's work was brought to a close by a visit to the ruins of the ancient palace of the Bishops of Lincoln, now in part restored, again under the guidance of Precentor Venables.

In the evening the members assembled in goodly numbers in the Theatre of the School of Art, the President, the Earl of Winchilsea and Nottingham, being in the chair. Papers were read as follow: "On a Visitation of Lincoln Cathedral in 1486-7," by the Rev. A. R. Maddison. This interesting paper referred to a very loose state of things at the time named, the canons quarrelling with themselves and with the Dean, part of the cloisters pulled down to build a stable, two of the parish churches demolished to sell the stones, charges of immorality, and such like. "On a Roman Lanx, or Charger, of Pewter, found at Lackenham Fens," by Mr. Hy. Prigg; "Somerton, and its Royal Prisoner: King John of France," by the Bishop of Nottingham; and on "Medieval Walling," by Mr. Chas. Lynam.

On Wednesday, the 5th, a visit was paid to Haverholme Priory, the residence of the President of the Association. This is a well-built, modern Gothic house, in the style of thirty or forty years ago; and it can justly be termed a modern antique, although the good taste of the present owner has converted it into a pretty home. The party reached the mansion by way of Raskington, from Lincoln.

On assembling on the lawn, which extends along the entire length of the garden front, the history of the site was told by the Bishop of Nottingham. Here, in early Norman times, was founded a Cistercian Monastery, by Bishop Alexander, of Lincoln, who tenanted the building with twelve monks from Fountains Abbey. For a couple of years they endured theague and other discomforts arising from the wet, dreary nature of the site, and at the end of that time they could endure it no longer, but petitioned to be removed. They obtained their release, and after returning to Fountains for a time, they finally settled at Louth Park. The lands at Haverholme were afterwards granted to the then new English order of Gilbertines, founded by St. Gilbert of Sempringham, who settled here in 1139, and who do not appear to have suffered as did their predecessors, for they remained here till the suppression in 1538. The two establishments were

stated to have been separate buildings on different sites, but nothing that was shown to the visitors supported this supposition, which, however, is likely enough, since the requirements of the two orders were somewhat diverse, the Gilbertine establishment consisting of canons and nuns, of which there were once as many as fifty canons and one hundred nuns—a number that had sadly dwindled away at the time of the Dissolution, when a prior and six canons were the only occupants. St. Thomas à Becket, of Canterbury, found a refuge in the Priory when a fugitive from the south of England. After the Bishop had narrated the somewhat slender history of the site, the party made the tour of the pleasure-grounds around the house. Here, amid flower-beds and lawns, is the site of the ancient cemetery, covered with ancient stone coffins, while close at hand is the solid base of a pier with engaged shafts of early English date, which plainly shows that the site of the church is close to the cemetery. None of the walls have yet been found. Returning to the house, various interesting antiquarian objects were shown by the President to his numerous guests. A fine collection of miniatures was inspected in the library, where also was the celebrated Dugdale manuscript.

This is a remarkable collection of drawings of various monuments and brasses, with descriptions, once within the churches of Peterborough, Ely, Lincoln, Newark, &c., and drawn to preserve a memorial of them prior to the times of trouble which the author foresaw to be approaching. Many of them are now destroyed. The well-preserved book was attentively examined, as were also several other manuscripts, transcripts of pedigrees, title-deeds, &c., all of which were explained by Mr. W. de Gray Birch, F.S.A.

After thanks had been expressed by the Mayor of Lincoln on the part of the members, a visit was paid to the beautiful Church of Ewerby, at no great distance from the grounds



Ewerby Church.

of Haverholme. Assembled within the building, the Bishop of Nottingham again described the fabric, which was seen to great advantage, and its simple, but remarkably effective, architectural members examined in detail. The Earl of Winchilsea has taken great personal interest in the work of repair, which is being slowly carried out. The solid broach spire at the west end, and also many other parts of the church, are built of stone as perfect now as when first erected, and the surface tool marks of the masons are distinctly visible. As is so well known to our readers, the fabric dates from the middle of the thirteenth century, but the visitors had no difficulty in finding traces of earlier and later work. Part of the existing foot is of early date, while in the floor of the north aisle lies a fine incised slab of Saxon knot-work, which, according to a suggestion made to the President, who accompanied the party,

will shortly be raised, and placed for safety upright in the wall. A good chancel screen, of fifteenth century oak work, in somewhat dilapidated condition, still exists.

Passing the little church of St. Oswald at Howell, the party proceeded direct to the famous church of St. Andrew, Heckington, still under the guidance of the Bishop of Nottingham. The contrast between these two buildings is very great, one being designed pure but late Early English, the other in the early flowing style of sixty or seventy years later, and now seen to great advantage since the roofs have been raised in recent years to their original pitch, the chancel having received its arched and boarded ceiling only within the last few months, the latter from the designs of Mr. Fowler, of Louth. Taking up his stand beneath the chancel arch the Bishop rendered historical evidence for assigning the rebuilding of the church, as it is now seen, to Richard de Pottegrave, Chaplain to Edward II., and whose tomb was pointed out on the north side of the chancel. The effect is a very beautiful one, showing all the details of an elaborate ecclesiastical costume. The fine lofty sedilia, and the richly-carved Easter Sepulchre,\* opposite to it, were attentively examined. These are covered with minute carvings still in perfect condition. Carriages being resumed, the party proceeded through five country covered with happy signs of an abundant harvest, likely to be gathered in a few days, with frequent glimpses of lofty spire and large churches at no great distance. Stowford was reached in time for luncheon, at which the Bishop conducted the members to the curious church of the town,—a fabric remarkable not alone for elaborate work, but for great irregularity of plan. It is a large structure, with the west fronts of its wide flowing Decorated aisles coming up flush to the western face of a singular tower and spire of very early thirteenth century work. The foundations of the tower had been sinking for many years when, not long since, a flash of lightning struck the spire during divine service, to the great consternation of the congregation. This catastrophe has occasioned the entire rebuilding of tower and spire, on new foundations, the old stones to a great extent being re-used. Entering the restored fabric, the Bishop pointed out the many and varied objects of interest which it contains, the principal of which is a very fine and elaborate rood screen of the fifteenth century, except the parapet, in perfect condition, and having a curious projection in the centre, which, the Bishop said, had existed for many years, and was original. His Lordship then guided the party to the site of the once celebrated castle, now an open space cut up with traces of foundations and the remains of ditches. A small portion of masonry overturned alone remains above ground. It was erected by Bishi Alexander in the early part of the twelfth century.

At the evening meeting papers were read by various authors. These were as follow:—"The Churches of Lincoln City," by Mr. E. P. Loft Brock, F.S.A.; and on "Joan Beaufort," by J. P. Pritchett. A third paper by Mr. Romie Allen, F.S.A. (Scot.), on "The Early Norman Sculptures at Lincoln and Southwell," had to be deferred for want of time. The scope of the first paper was to draw attention to the remarkable group of churches, fifty-two in number, which formerly existed at Lincoln, and it suggested that the great bulk of these dated from Saxon times, judging by the evidence of the dedications, which were to saints of Saxon name, or who were popular in Saxon times, also by the existence of workmanship of the early date. A parallel was then drawn between the work of the two towers of St. Mary, Wigford and St. Peter at Gwtd, and corresponding details in the Church of Stow, to support the statement that these three buildings were of moderately early Saxon date. The evidence adduced was curious enough, since it showed that saw-cut joints and fine bedded masonry existed in Saxon times, while the early Norman work in Lincoln, that of Bp. Remig, earliest cathedral, on the contrary, was rough worked, with wide joints.

On Thursday, August 1, the program provided for a visit to the ancient town of Boston, proceeding from the Great North Station. Boston was reached by 12 o'clock.

\* An illustration of this will be found in the *Builder*, February 9, 1884; and one of the sedilia in the *Builder*, November 5, 1887.



and the party proceeded under Mr. Loftus Brook's guidance to inspect the grand old Church of St. Botolph, the steeple, or "stump," as it is popularly called, having been a conspicuous object in the journey of approach. After inspecting the interior, and the welcoming of the party by the vicar, the history of the building was briefly told within its walls. The building is remarkable for its extreme lightness, the width and height being great, while the pillars are extremely slender in relation to the area covered by the roofs. Mr. Brook assigned dates for the various portions, but he pointed out that the recorded year when the foundation of the steeple was laid, 1309, could not apply to the present fabric, which is wholly of the early part of the sixteenth century, and one of the latest triumphs of Gothic architecture. A canopy doorway, of about 1330, has, however, been re-erected in its west front. The foundation referred to most probably related to an earlier tower, belonging to the earlier church superseded by the present one. The communion railing is a remarkably good piece

of Renaissance metal-work. A just tribute of respect was paid to recent good taste, which, in the restoration of the church, caused the old wooden pulpit, in which Dr. Cotton used to preach, to be preserved, although its style is not Gothic.

An adjournment to the vicarage was then made to inspect a remarkable example of wood-carving. This is a small panel only, containing a coat-of-arms, supposed to be that of one of the Abbots of Bardney, but the workmanship is of the highest order. Traces of two of the old Friaries were then inspected, also the capital half-timbered structure called Shodriars' Hall, now well restored as a public hall or entertainments, and also the curious incised slab representing a merchant, Wiselius Smalencurgh, dug up about eighty years ago. It has been several times figured, and the party found it still preserved, fixed against the external wall of one of the houses in Spain-court, recently covered with a coat of paint, doubtless to its preservation. The old Grammar School, and the curious red-brick tower formerly belonging to the Hussey family, were inspected, and on the return journey from the latter, a brief halt was made at the Guildhall, formerly the Guild of St. Mary.

After luncheon, Tattersall was reached by 4 o'clock, and a visit was paid to the ruined keep of Tattersall Castle, built of red brick with stone dressings, and still, although roofless and floorless, in perfect condition, so far as regards the stonework of the walls which retain even the harness of the pointing, as left by the builders in the fifteenth century. The Tower is one of great beauty, and was erected by Cromwell, Earl of Essex, Keeper of the Purse to Henry VII. The elaborately carved chimney-pieces, in which the purse appears under several species, and alternating with heraldic shields, well-known by the casts in South Kensington Museum, are still in fairly good condition. But why cannot the custodians provide a projecting ledge of slate or lead to give them some little protection from the elements? At present, the descent of rain-water from the summit of the lofty walls is bound of necessity to pass over the chimney-pieces in question, and the ledges suggested would easily and cheaply afford a good deal of protection. Mr. Brook, in describing the building, referred to the plan of the castle, unusual for the period, the keep being almost a return to the arrangements of a Norman castle, at a time when elsewhere in England the open hall with its gallery and contiguous withdrawing-room had quite superseded older arrangements. The explanation was, prob-

ably, the proximity of the castle to the sea-coast, and the consequent necessity for protection against sudden invasion. Adjoining to the castle is a grand old collegiate church, consisting of a low, solid, western tower, a spacious nave, side aisles, and north porch, transepts as high as the nave, and a chancel of lofty dimensions. Traces of low buildings exist all along the chancel on the south side, apparently never completed. There is, internally, a fine stone rood loft, and in the north transept there are a great many brasses of considerable beauty. Fragments of elaborate oak screen-work are preserved in the church, and the whole of the lower portion of the large east window is filled with fragments of very good fifteenth-century glass, removed from other windows and placed here for preservation. The chancel only is used for worship by the parishioners, and the appearance of so large a structure in so small a village is not a little remarkable. The nave, aisles, and transepts are entirely open, and are not filled in with seats. The font is in part a relic of a church 100 years older. The



Rood head 6 Sails

Newark Church

Communion Rail, Boston Church

vicar, the Rev. Mr. T. Latham, met the party, and rendered many items of information relative to his beautiful church. While the castle is mainly of red brick, the church, erected at the same time, is wholly of stone. Owing to the difficulty of approach, a visit to Kirkstead Chapel, a gem of early thirteenth-century art, had reluctantly to be given up. This is the more to be regretted since the organisers of the Society were anxious to make its condition of decay publicly known. Unless some steps are taken for its preservation, it is greatly feared that it will soon be among the things of the past.

After the return to Lincoln, a public meeting was held at the School of Science and Art, when a lecture was given by the Rev. Precentor Venables, illustrated by lime-light views of all the principal ancient buildings of Lincoln city, including many of the demolished churches and of the city gates. Owing to the lateness of the hour, the following papers, proposed in the programme to be read, had to be postponed:—1. Roman Discoveries at Lincoln, by Mr. M. Drury. 2. The Legend of the Lincoln-green Lady, by G. E. Wright, F.S.A.

Friday, the 2nd, was devoted to the survey of the old town of Newark and a visit to Southwell Minster, the former place being reached at 10.15.

A visit was at once made to the fine old ruin of the Castle, which overlooks the river. It is now seen to great advantage, owing to the public spirit of the inhabitants, who have recently laid out the grounds with pretty walks, and, by judicious planting, the whole area is made a place of much beauty, the Castle ruins bounding one side of the enclosure. Great dignity is given to the town by this pleasant promenade, and all the more so since it is placed at the principal entrance from the railway (Midland) station. The archaeologists were met by the Mayor, various members of the Corporation, the clergy, &c. Mr. Loftus Brook, F.S.A., described the building, which was another of Bishop Alexander's castles. Here King John died. The Castle was dismantled after the Civil Wars, and has now been acquired by the town authorities. After pointing out the general plan of the Castle, Mr. Brook concluded by referring to the recent praiseworthy action of the town in having thus laid out and secured the ruins, giving thus a good example to other municipal bodies, which, it is to be hoped, they will follow, and thus, while they adorn their towns, they will be effectually preserving some object or other of national importance.

At the fine old church of Newark the party was again met by the Lord Bishop of Nottingham, who briefly and clearly described the

history and the architectural peculiarities of the beautiful structure. The oak screens are lofty and of great artistic merit, as are also many other features of the building.

An old crypt, beneath the chancel, has not long since been cleared out, and it was inspected by the party. It is of the same age as the cruciform church which once occupied the site, and of which the only other visible portions within are two of the piers of the crossing, now worked up into the existing nave arcades. While some of the curious old houses of the town were being inspected, a visit was paid by some of the party to the church at Hawton, about two miles distant, where a pretty rood-screen was inspected, and a remarkable Easter sepulchre, doubtless formed by the same workmen who erected that at Heckington, the workmanship being very similar. The east window, too, has similar peculiarities. Above the upper part of the sepulchre is Our Lord's ascent from the Mount of Olives. As if to record the old tradition of Our Lord's footprint being preserved there, the sculptor has skillfully carved the impress of a foot on the rocky foreground.

The Hawton party, on the return journey to Newark, had a good view of the beautiful spire, which is a very conspicuous object for many a mile.

Progress was next made to Southwell, under the guidance of the Bishop of Nottingham. Arriving within the old Minster, the Bishop gave an ample description, after which the party followed him to the partially-restored Bishop's palace, where he favoured the members with a description of the remains and of the new works already carried into effect. Here leave was taken of the Bishop, with many expressions of thanks for all courtesies rendered. Proceeding back to the Chapter House of the Minster, Mr. Loftus Brook exhibited a series of large plans of the fabric, showing the relative positions of the various works, and the architectural growth from Early Norman times, when the Saxon church was rebuilt. These had been sent specially by Mr. Ewan Christian, who was unable to join the party, and they were accompanied by sufficient descriptive particulars, which were read. The existing Early English choir had been built around the Norman one, while the latter was standing, and the junction of the old and new works, after its removal, explained some curious discrepancies of the string-courses. The floor levels are singularly different one from another, and the old lines have been exactly followed in the restoration by Mr. Christian. A remarkable stone, covered with early interlaced figures, doubtless a relic of the Saxon church, was inspected. It was used by the Norman builders as old material in the west wall of the north transept.

The curious old hostelry, the "Saracen's Head," where King Charles I. made terms



with the Scotch Commissioners, was inspected by many of the party, after which the return journey was made to Lincoln in time for the members to be present at a conversation given in honour of the Congress, by the Sheriff of the city and Mrs. Whitton. It was largely attended, and the company broke up at a late hour.

Saturday, the 3rd, was the closing day of the Congress, and its early hours were devoted to a visit to Gainsborough and to the Church of Stow, the Mother Church of Lincoln, as it is popularly called by tradition through many ages. Arriving at Gainsborough, the party was met at the station by the vicar, the Rev. Canon Warner, who from the station platform pointed out the scene of the battle here during the troubles of the Civil War, and the morass where Colonel Cavendish fell. On arriving, the grand ancient Hall was inspected by the members under the guidance of Sir Hickman B. Bacon, Bart., who exhibited a large plan of the fabric, which made his remarks very easy to be followed. The building consists of a centre and two wings, facing the cardinal points, the great hall being in the centre, from which access is gained to the first-floor by a circular staircase. The great bulk of the building—all the central part, in fact—is of timber, the hall having a fine, open, arched roof, and a small stone oriel window, groined. The remainder is either of half-timber on a brick base, or wholly of brick. The kitchen is of enormous size, with huge fireplaces. On the first-floor there is a spacious withdrawing-room and many other apartments, now used by Sir Hickman Bacon for the display of many beautiful examples of ancient furniture, carpets, &c., of which he is an enthusiastic collector. A brick tower of much beauty exists on the east side, having chimney-stacks curved on plan.

The members heard with much gratification of a proposal on part of the present owner to present the Hall under certain conditions, to the town. The dreary, open approach could readily be transformed by the hand of taste into a lasting ornament to the somewhat gruesome town. The party then proceeded to the parish church, a structure rebuilt in the Palladian style of the last century, except the western tower, which is ancient,—of the fifteenth century. The Rev. Canon Warner had laid open in the vestry a curious series of entries in the parish registers for the inspection of the members, and also a valuable collection of letters from various members of the Cromwell family, some of which were read. After inspecting the church plate, many of the members proceeded through uninviting courts and alleys in quest of old, brick-built houses, of which there are a certain number having some pretence to beauty, a merit which is not possessed by very many, although the town has a certain picturesque appearance,—“Dutch,” as one member of the party was pleased to call it.

The carriages were then resumed, the first stopping-place being the curious little church at Coates. Coates Church is a small building with a double bell cot at the west end, a circular south door having large dog-teeth carved around it, and a font of very ancient date, probably earlier than the Norman walling of portions of the exterior. The interest of the building consists in its beautiful rood screen, which still preserves its cornice, gallery, and parapet. There is no chancel arch, and the gallery and parapet probably owe their preservation to the fact that their removal would have laid bare the rough beams of the roof. These latter are covered with upright boarding upon which a pattern had been painted, and also probably the figures of the rood. A portion of a single figure on the left-hand side is still observable. The archaeologists saw in the centre of the parapet a similar projection of original work to that which had exercised them at the Sleaford screen. There are some curious monumental tablets in the church, of late date. The journey was then continued to the village of Stow, whose huge church had been seen looming in the distance high above the little houses of the village for a goodly distance. On being assembled within the spacious nave, the vicar, the Rev. W. N. Usher, bade the party welcome, and proceeded to unfold the early history of the building. Founded in early Saxon times, there were records of rebuildings after the church had been burnt by the Danes in 870. Afterwards it appeared that the nave and choir had been rebuilt in early Norman times.

Mr. Loftus Brock, F.S.A., then sketched the architectural history of the existing fabric, and began by saying that, although there had been

great discussion as to where was the ancient Bishop's See of Sleaford, and there was no documentary evidence to fix it at Stow, yet we might be assured that it actually was here from the fact that here were substantial remains of the largest Saxon church in England. The transepts, from north to south, measure 85 ft. within the walls; the square of the great tower measures 36 ft., or but 3 ft. 9 in. less than the Norman central tower of Southwell Minster. The great proportionate height was before them, and we might well, in consequence of these facts, be assured that this was part of the lost Saxon Cathedral, so called by ancient tradition. Proceeding to the structural evidence he said that they were confronted with two varying works. Firstly, that of the nave and choir, which were plainly of Norman work, fine-jointed, with the zig-zag ornaments, and agreeing in every material particular with the work of Bishop Alexander at Lincoln. Secondly, that of the four tower arches, their piers, and the great bulk of the walling of the transepts. In these two different periods would be observed, although very much like one another, but one was marked by signs of a great conflagration, the other not. That these works were anterior to the Norman portions was practically evident, not only on account of the style but by the fact that some of the stones were to be seen re-used as old material by the Norman masons.

Many technical details were then referred to, the principal being that the wrought stones of the Saxon portions were of large size, saw cut; that the faces were smooth, and in some instances some of the faces were covered with peculiar, irregular, toolmarks, and these were visible on the stones re-used as old material.

A window in the south transept was pointed out as having toolmarks over all the surface left and right of a smooth band around the outer face, similar to what was shown at the Church of St. Peter at Gowts. The early date of the work at Stow is indicated tolerably well, whether it is regarded as being anterior to the burning in 870, or after the rebuilding, the work of both dates being very similar. At the north-west angle of the north transept, Mr. Brock measured before the members present one of the saw-cut joints of the massive quoins, to prove that fine-jointed masonry actually existed in Saxon times. The joint hardly measures a 20th of an inch. This angle is undoubtedly a portion of the oldest part of the fabric, and the evidence, although unexpected, is beyond all doubt.

The four fine arches which once supported the Saxon central tower now no longer do so. Within their square on plan other piers and arches have been erected, thus reducing the size, in thirteenth century times, and these now carry the present fifteenth century tower.

The chancel is a good example of Norman work, vaulted, and with an arcade all round, internally. The Vicar said that several years ago, when these walls had to be underpinned, traces of the bases of columns were found, showing that, in Saxon times, there had been aisles to the chancel.

Lincoln was reached in good time, and the proceedings of the Congress were brought to a close by a dinner at the White Hart, the Earl of Winchelsea and Nottingham presiding; after which, thanks were rendered to all who had helped the Association to realise what has been a meeting of great interest and enjoyment, particularly to those of the party interested in the study of ancient buildings. The number of beautiful churches inspected has been very great, and the workmanship has been of all ages and styles, erected with good, durable stone, and still, in very many cases, in perfect condition. The weather was particularly fine.

Monday was the first of the special days, and it was devoted to a visit to the ruins of Thornton Abbey, and to the two churches at Barton-on-Humber. These buildings were inspected and described by the Rev. G. Hogarth, vicar of Barton; Mr. John Reynolds, and Mr. Loftus Brock. The remarkable Saxon tower of St. Peter's received special attention, and Mr. Brock pointed out what may be a matter of some comment in years to come. It is that certain of the stones are jointed with mortar formed of pounded red brick. This is not Roman mortar, or mortar made by Saxon builders after the Roman manner, as might, presumably, be supposed, but the work of some local plasterer, not many years ago. It occurs also at the Church of St. Mary's. Tuesday's programme included visits to the village churches of

Navenby, Wellingore, Welbourne, Leadenham, and Brant Broughton, concluding with a visit to the ruins of Somerton Castle. Wednesday, the 7th, saw the conclusion of the after-days of the Congress, which was devoted to visits to Grantham, for the inspection of the grand old Church of St. Wulfran, Belvoir Castle, and Bottesford Church.

## Illustrations.

### CHURCH OF ST. JOHN-THE-DIVINE, STANSTEAD-MONTFICHET.

THE Church of St. John-the-Divine has been erected in the centre of the scattered Essex village of Stanstead-Montfichet, as a chapel-of-ease to the parish church, which lies some distance away on the outskirts.

Local red bricks have been used for the exterior, with Bath and Ketton stone, the latter in exposed positions.

Internally, several oolites, namely, Ketton, Casterton, Weldon, Corsham, and Stoke Ground, have been mixed indiscriminately, giving a varied effect of colour.

The general character of the church is Late Perpendicular, which becomes semi-Classic in the stall-work.

The carving has been admirably executed by Mr. Hitch, of Harleyford-road, Kennington.

The builders are Messrs. J. Shillitoe & Son, of Bury St. Edmunds.

The organ is by Mr. August Gern; and the two organ-cases by Mr. Robinson, of Broad-street, Bloomsbury.

The architect is Mr. W. D. Caroe, M.A.

### BILLIARD ROOM.

AN addition to a mansion, about 58 ft. long by 40 ft. wide, was designed by Mr. George Aitchison, A.R.A., to provide an additional drawing-room and this billiard room on the ground-floor, and two stories of bedrooms above, and was occupied at the end of last year.

The decoration of the drawing-room, including the ceiling, was given in this journal on Nov. 2, 1888, and we now give illustrations of the billiard-room.

The owner had purchased some old carved oak panelling, including a chimney-piece, said to have come from a French chateau, and, to adapt these to the room, new panelling, over doors, and window dressings had to be designed and carved. The large and very high chimney opening was reduced by means of a specially designed chimney-piece in Bleu Belge marble inlaid with Irish green.

The ceiling, in plaster, which we illustrate, was designed to accord with the room.

The walls above the panelling are hung with Japanese leather paper, the ground of which is cream colour, with the pattern in greenish grey, and the cornice is painted and gilt to match.

The floor is of oak, with a black parquetry border inlaid with white.

The drawings from which the illustrations are taken were hung in the Architectural Room of the Royal Academy exhibition this year.

### SKETCHES FROM THE MARSHLAND CHURCHES.

THESE sketches of detail from the churches of Walpole St. Andrews, and St. Margaret's, King's Lynn, are a portion of some illustrations which Mr. Arnold B. Mitchell kindly placed at our disposal some time ago, to illustrate an article which we published on the architecture of the Marshland churches. There was space to publish the whole of these illustrations at the time; and as attention is being directed to the ancient architecture of this part of the country just now, by the excursions in the district of the Archaeological Institute and the Architectural Association, we give them here, contributions towards the illustration of the subject.

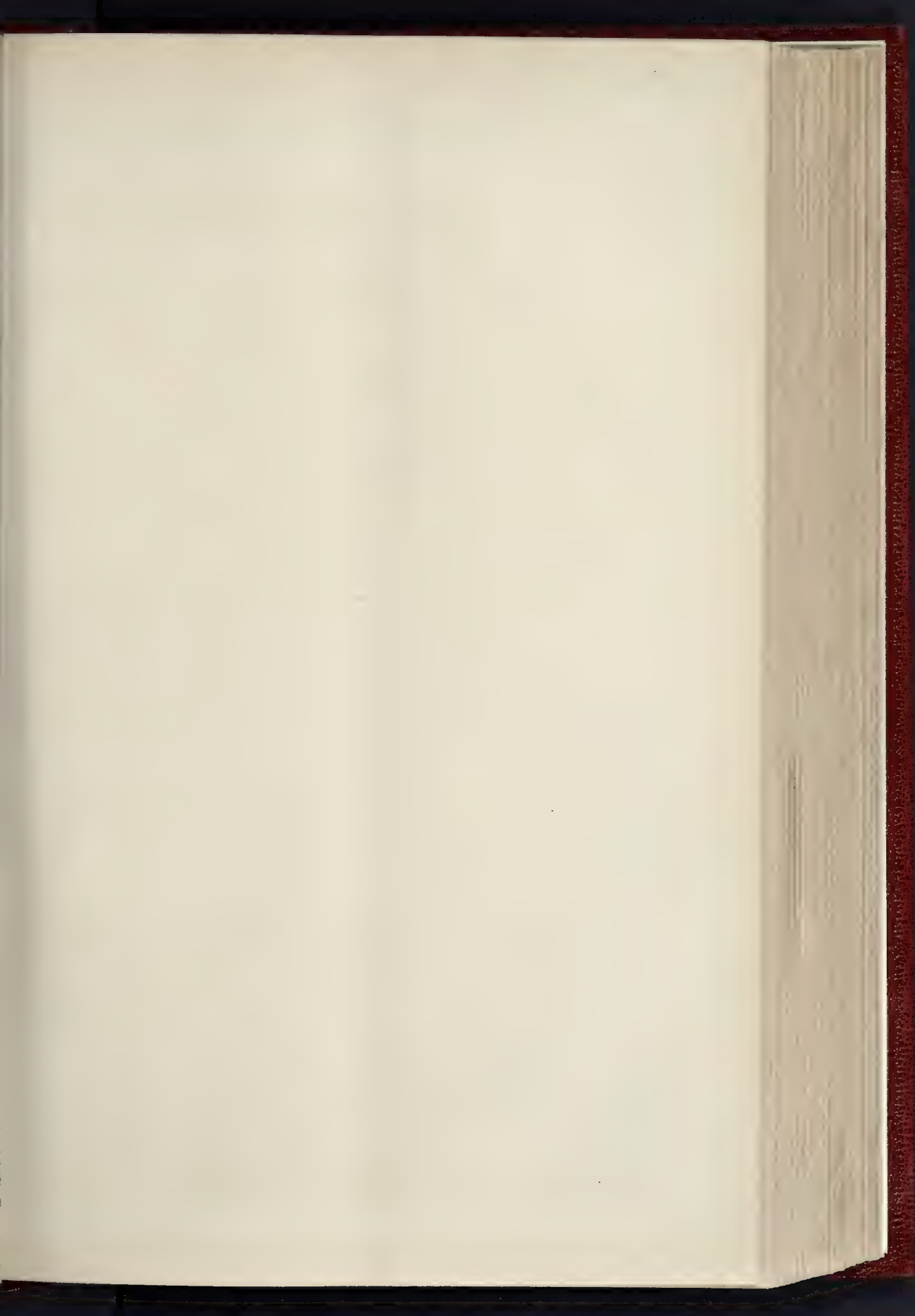
### HAUTOIS HALL.

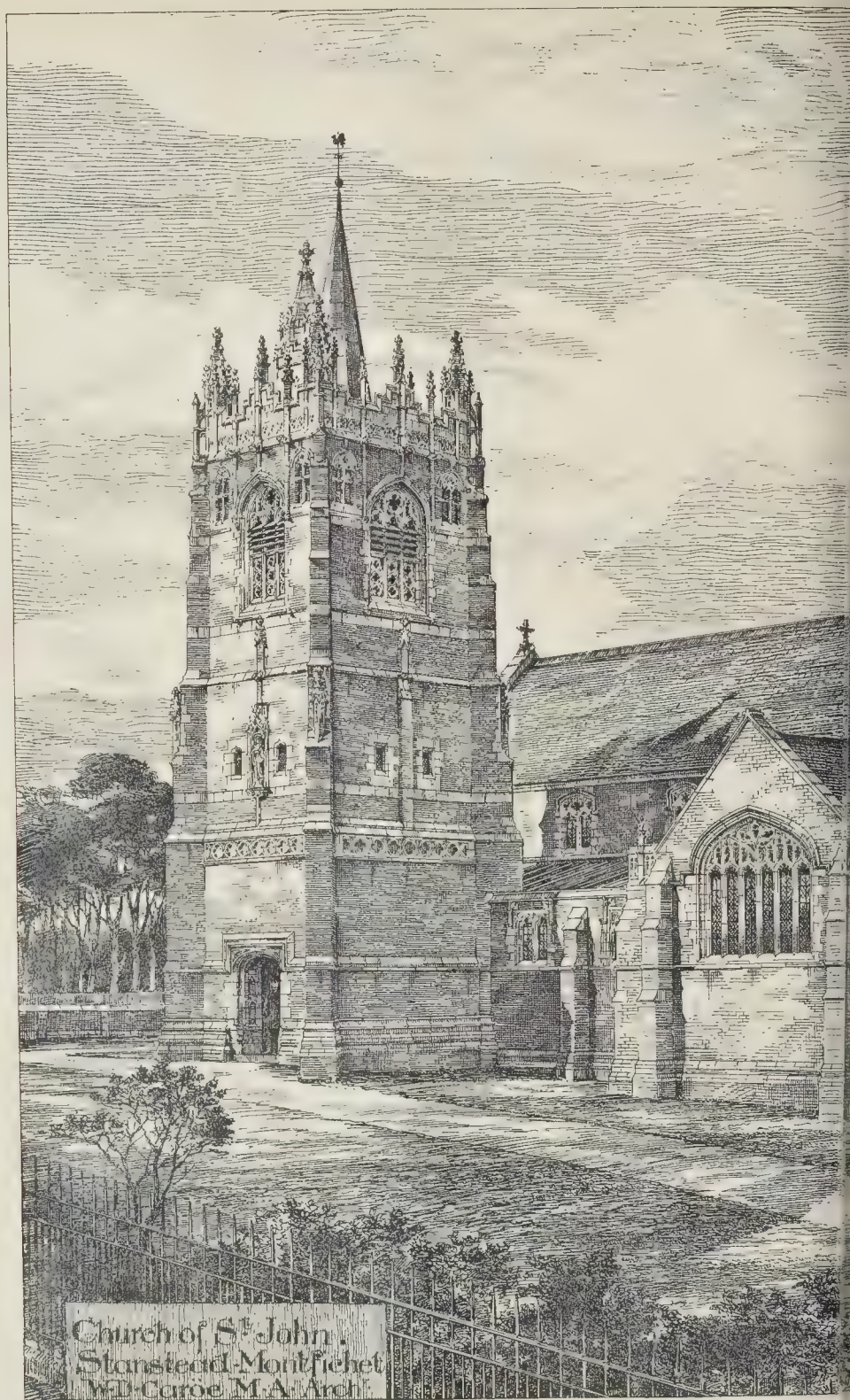
THIS Hall is an interesting example of brick architecture of the north of Norfolk; the locality now principally being visited by the Royal Archaeological Institute.

The house and the farm-land attached to it, “Warner's Charity,” and the income derived therefrom is administered by the North Charity Trustees for the benefit of the poor of the parish of St. Peter-per-Mountgare.

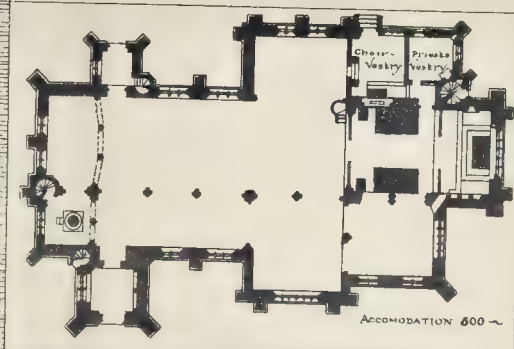
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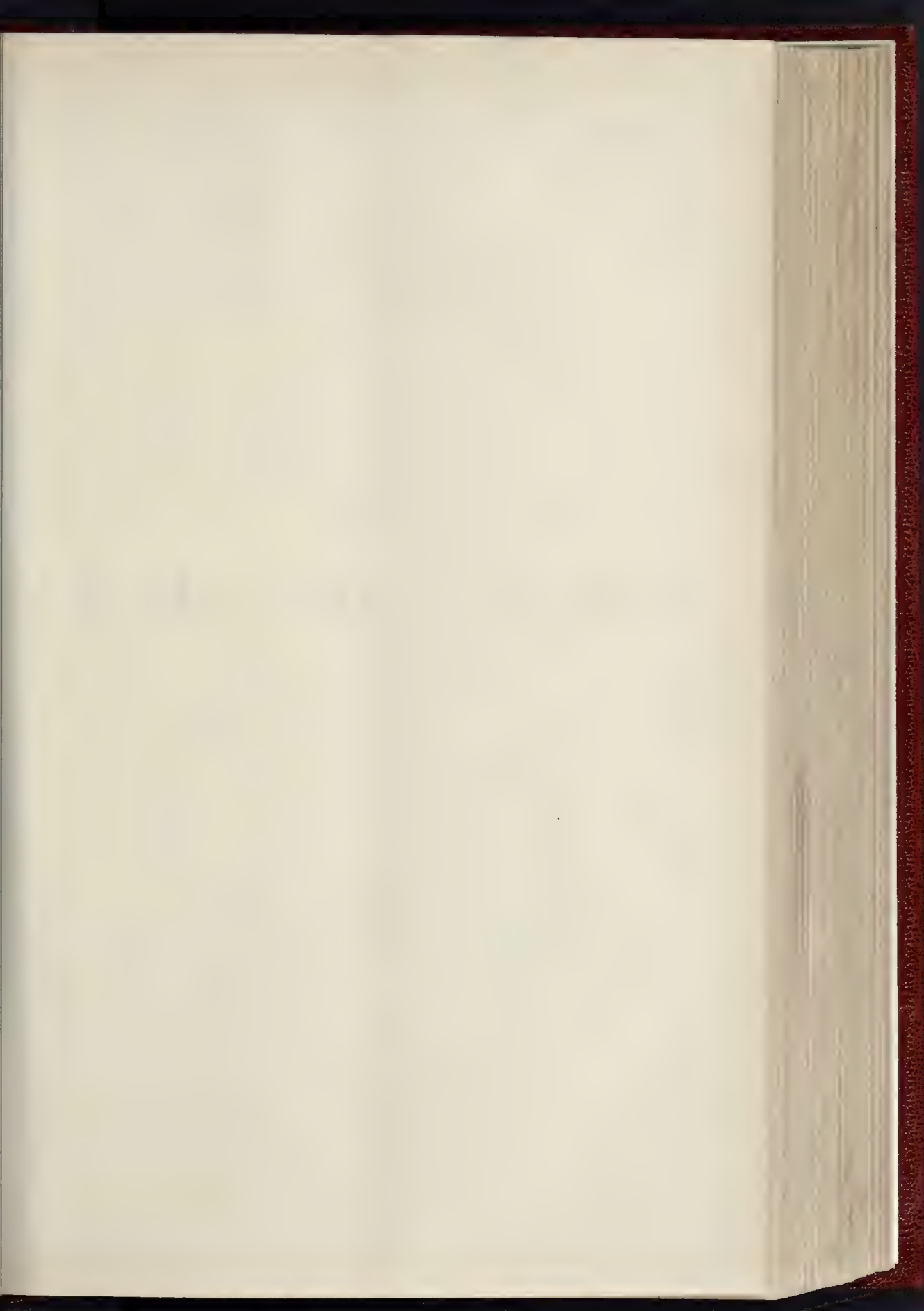




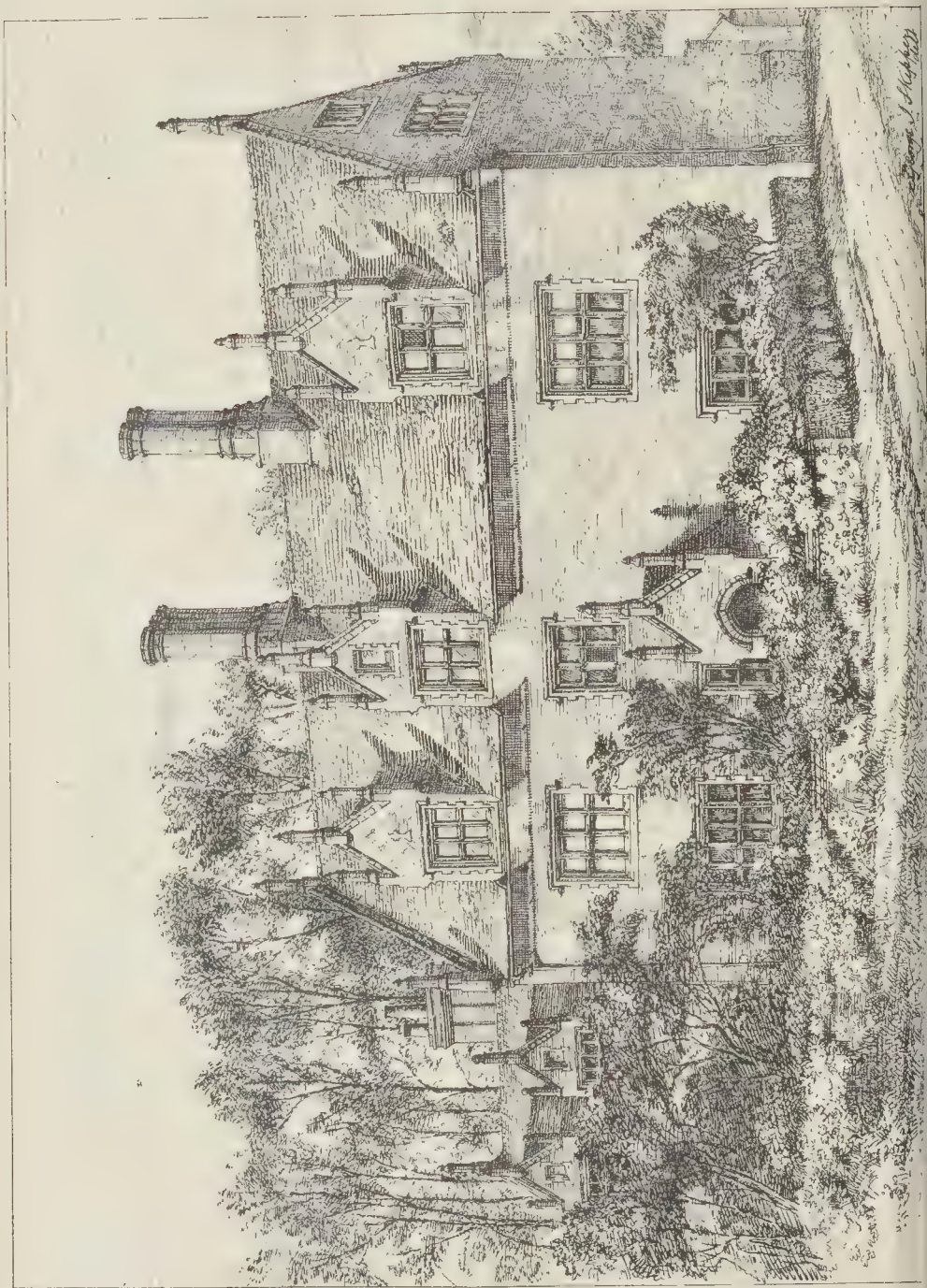






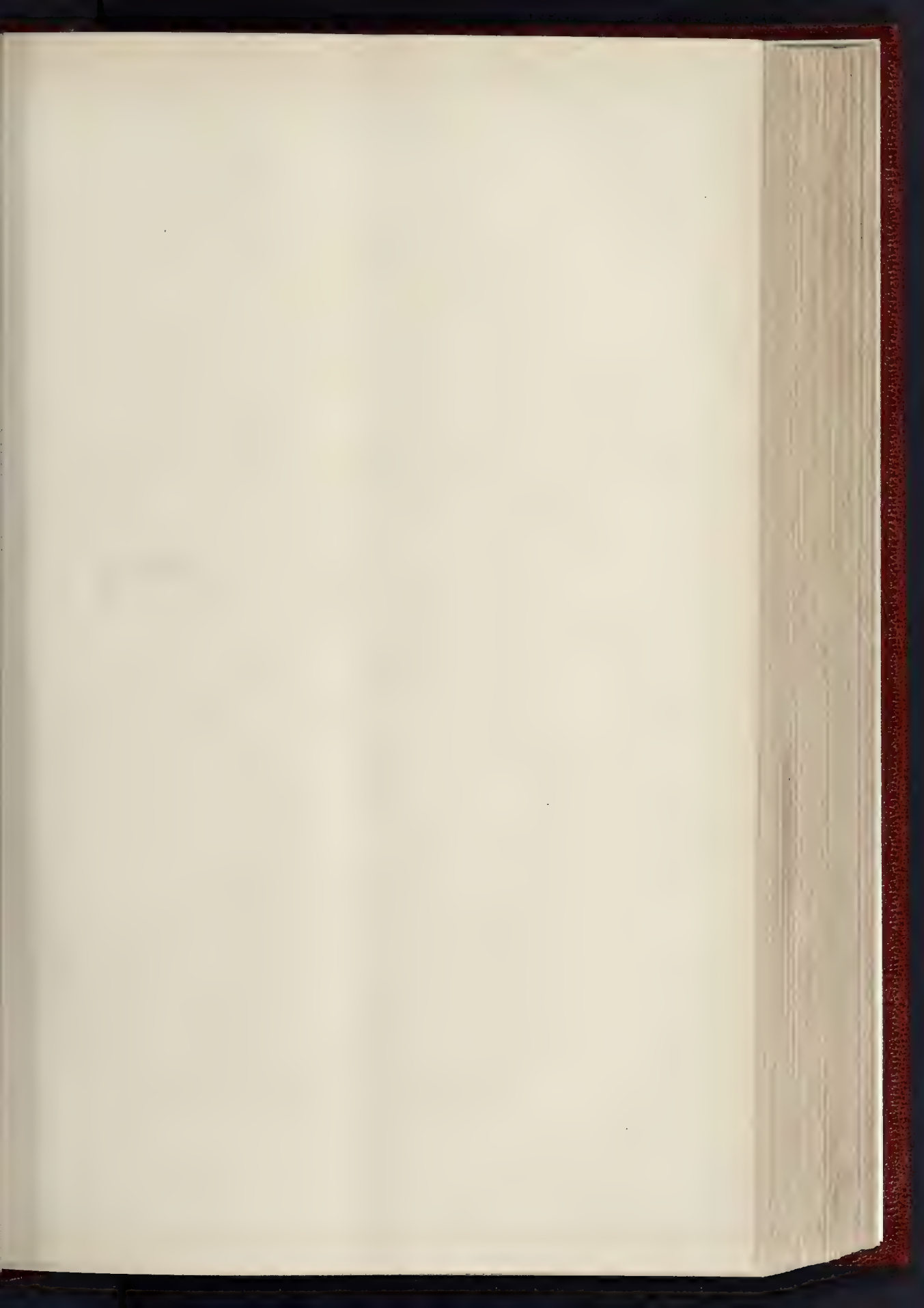


THE BUILDER, AUGUST 10, 1889



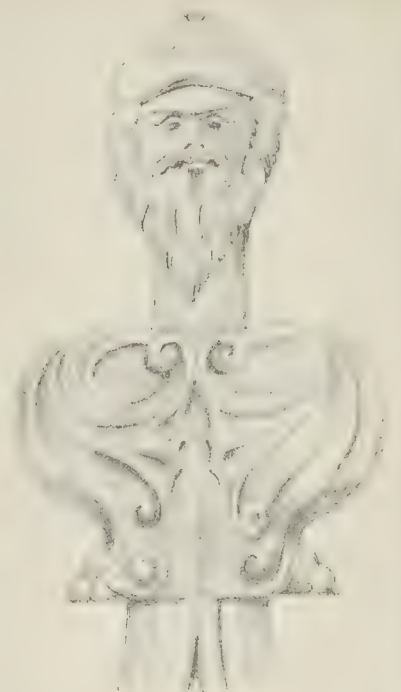
George J. H. H. H.







A BENCH END.



A BENCH END.

ST. MARGARET'S—KINGS LYNN



A BENCH END.



PISCINA.

WALPOLE, ST. ANDREW'S.

"INK-PHOTO" SPRAGUE & CO. LONDON

SKETCHES FROM THE MARSHLAND CHURCHES OF NORFOLK.—By MR. ARNOLD B. MITCHELL, A.R.I.B.A.





CHARLES W.  
CHURCH FUR  
ST MARGARETS CH  
LYNN NORFOLK



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SKETCHES FROM THE MARSHLAND CHURCHES OF NORFOLK.—By MR. ARNOLD B. MITCHELL, A.R.I.B.A.

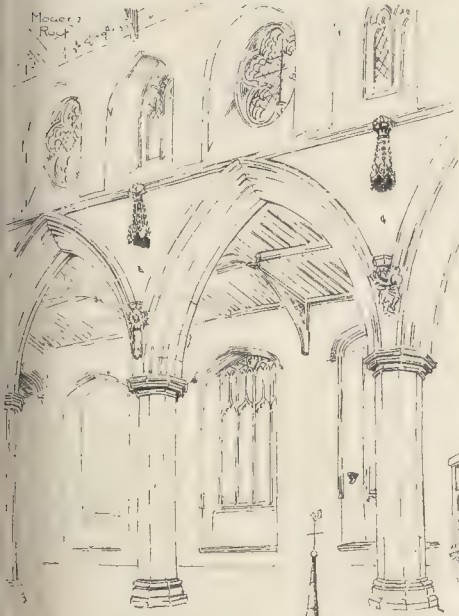




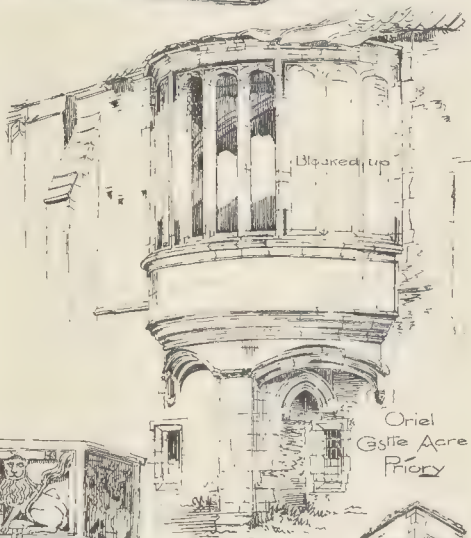
House 23, 1889



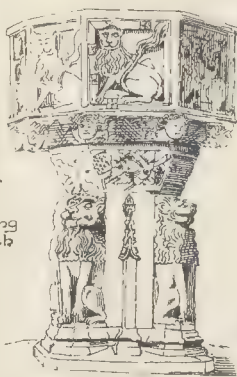
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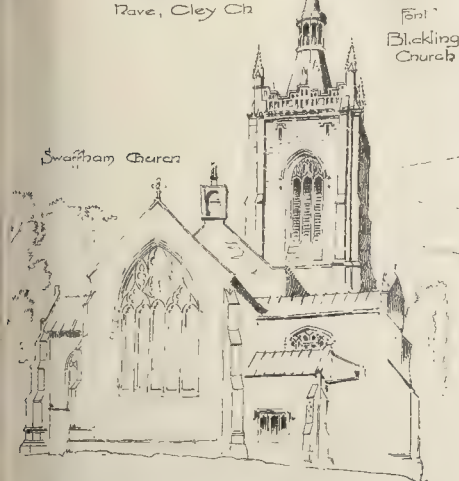


Oriental Gate, Acre Priory



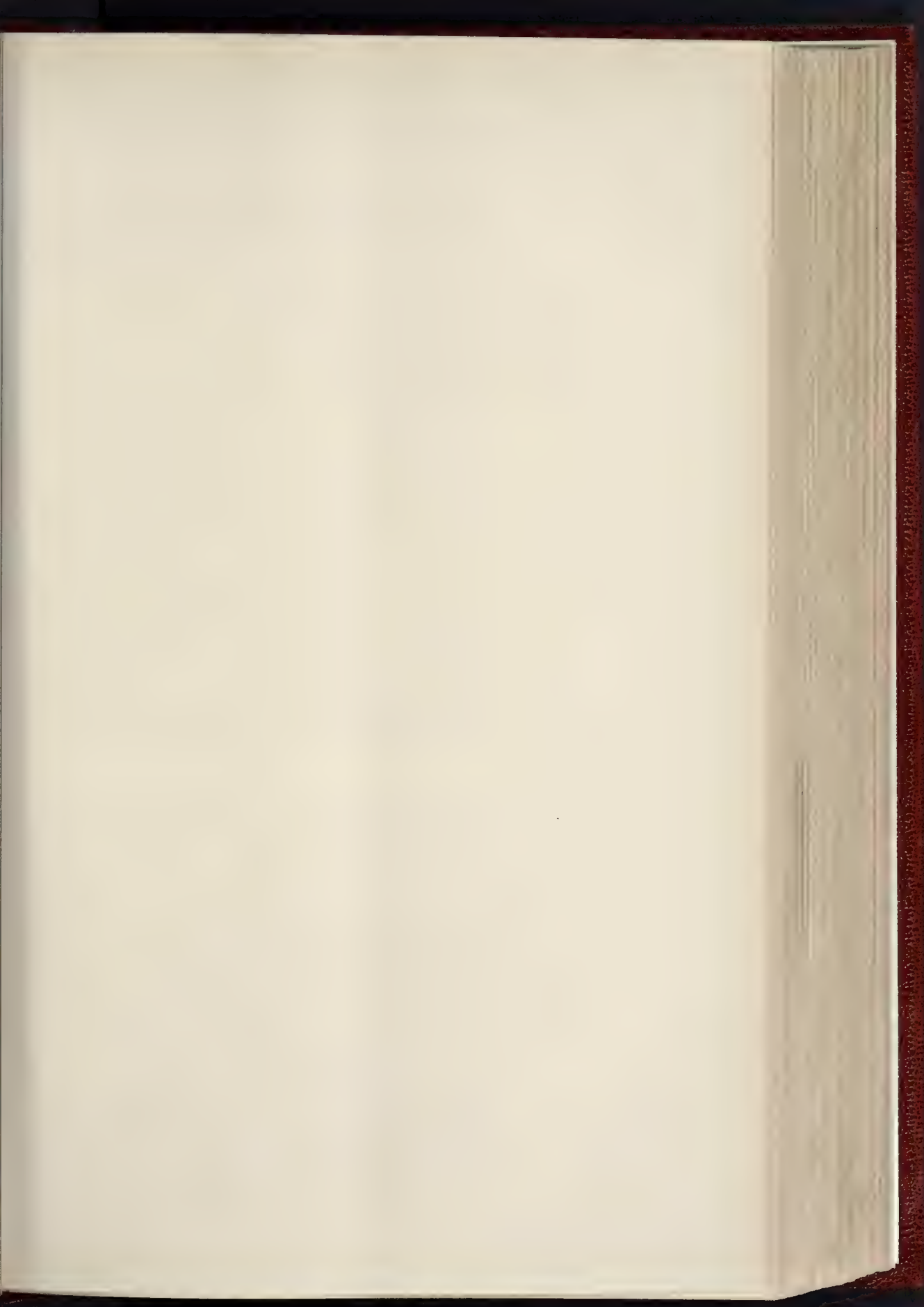
East End, Blakeney Church

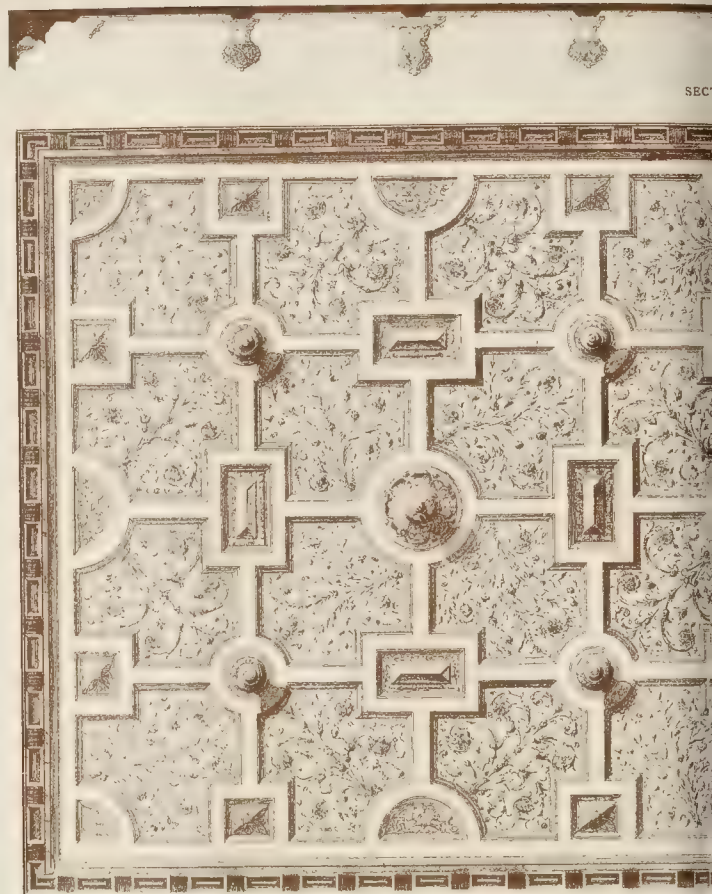
Swaffham Church



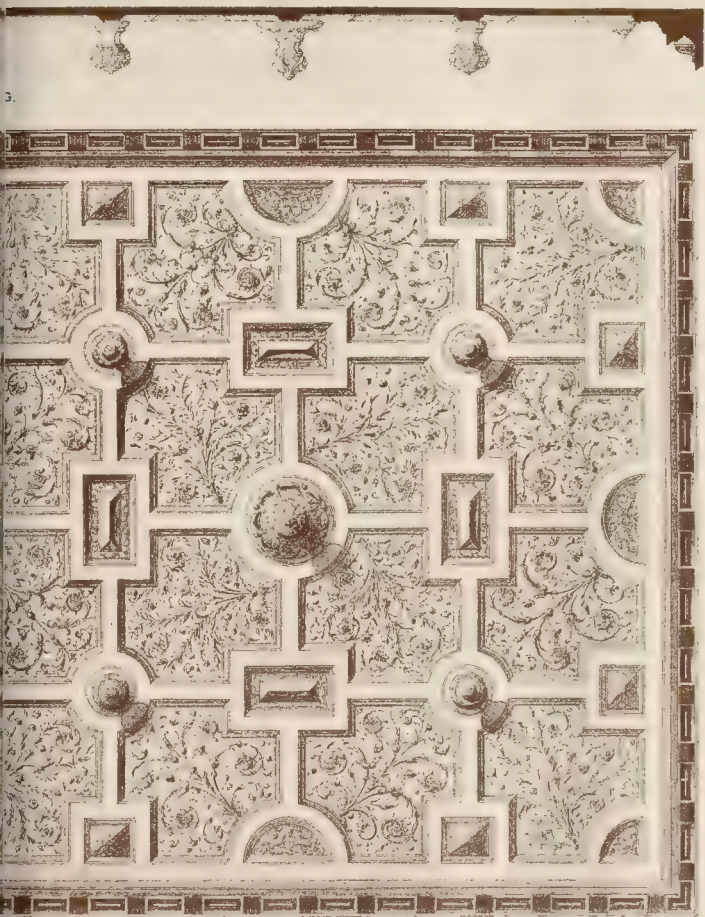
















pass into the hands of the Corporation of Great Yarmouth if the present trustees allow it to fall into dilapidation.

The building is a conspicuous object on the left-hand side of the railway, between Cottishall and Buxton-Lammas stations, over the route to be taken by the Society on Monday next.

GEORGE J. SKIPPER.

# SKETCHES ILLUSTRATING THE MEETING OF THE ROYAL ARCHEOLOGICAL INSTITUTE.

THIS sheet of sketches, illustrating a few of the objects of interest visited this year by the members of the Institute and their friends, will add some interest to our account of the proceedings. It is reproduced from tracings of pencil notes by Mr. Walter Millard and Mr. Leonard Stokes that were kindly placed at our disposal for the purpose. The sketches that accompany our account of the meeting at Lincoln of the British Archeological Association are similarly reproduced from tracings of sketches by Messrs. L. Stokes, W. H. Bidlake, and F. Hooper.

## THE ROYAL ARCHEOLOGICAL INSTITUTE AT NORWICH.

THE members of the Royal Archeological Institute commenced, on Tuesday, their Congress,—or annual meeting, as they prefer to call it,—in the ancient City of Norwich, where they had held one of their earliest congresses in 1847, just forty-two years ago. Of the persons who took part in that Congress, few, alas! now survive. The Marquis of Northampton, who was then its President, has passed away; so also have Dr. Stanley, then Bishop of Norwich, and his still more celebrated son, Dr. A. P. Stanley, Dean of Westminster. Gone, too, are Mr. Albert Way, Mr. Henry Hallam, Mr. J. H. Markland, Lord Talbot de Malahide, Mr. John Henry Parker, Mr. Matthew H. Bloxam, Dr. Guest, Professor Willis,—and, indeed, all excepting two or three of the members present on that occasion.

The city also, so grand and picturesque, is scarcely as interesting now—externally, at least—to the antiquarian student as it was when the late Lord Northampton occupied the Presidential chair of the Institute. It still, indeed, shows many signs of its former grandeur,—remains of a day when it was the second or third town to the south of the Trent, rich in its manufactures and its commerce, as more recently it became rich in schools of art and literature; and even now, though it can no longer boast of its "old" and "young" Crome and its Cotman, its Opies, Martineaus, and Taylors, it can reckon amongst its residents or neighbours representatives of the Gurneys, the Buxtons, and the Clarksons, and of others who joined in the crusade preached by William Wilberforce against the horrors of the African slave trade. Architecturally, however, though much has been done to improve the streets and the housing of the working classes, it may be doubted whether Norwich is now as interesting to the archaeologist and antiquarian architect as it was when our Queen had sat only ten or twelve years on the throne. However, the city was chosen this year, not unadvisedly, as the place of meeting; and, to judge from the first two or three days of the Congress, not without good promise of satisfactory results, the Mayor and Corporation of the city and the local gentry, and the Norfolk Archeological Society, having all combined their forces with a view to this end.

On Tuesday, in fine weather, varied with occasional showers of rain, the annual meeting was opened in St. Andrew's Hall, Norwich. The President of the Institute, Earl Percy, was unable to be present, being detained in London by his political duties; but the Duke of Norfolk, as President of this year's meeting, made an excellent substitute, and everything went smoothly and pleasantly. The walls of the grand old hall never looked more gay and bright, hung round as they were with flags and banners and flowers. As soon as the clock struck at noon, the Mayor, Mr. J. F. Ranson, the Deputy-Mayor, Mr. Harmer, and the Sheriff, Mr. G. White, proceeded in their robes from the Guildhall, preceded by their mace-bearer, and followed by their brother aldermen and town councillors. Having taken his seat, the Mayor expressed, in a brief speech, the

pleasure which it caused himself and his brethren to welcome so distinguished and learned a body within that ancient and historic city. The city had always been loyal to old traditions, and on this occasion he believed its citizens would not be likely to be found wanting in hospitality. Both Norwich and the entire county of Norfolk were as rich as most, perhaps richer than many, parts of England in ancient memorials well worthy of attentive study. It is true that Norwich is not now the second or third city of the kingdom, as it was in the days when the Huguenots, expelled by Louis XIV. from France, brought to it the art of manufacturing those textile fabrics for which it was so famous in the days of our grandparents, the greater part of that industry having retreated into the northern counties. Still, however, enough remained to show at least the former greatness of the city, and to interest those who, like the members of the Archeological Institute, were of necessity zealous students of the past. His Worship ended his speech by an expression of regret at the absence of Earl Percy and of Sir F. Boileau, who, like his father before him, was a great admirer and student of ancient buildings and institutions.

At the close of the Mayor's speech, Mr. J. T. Micklethwaite, F.S.A., as the senior Vice-President who was present, made a brief speech, touching on the great archaeological interest of the district which he and his friends were about to visit,—a district famed for the splendour of its churches and its monastic institutions, which was the result, doubtless, of its devotion to commerce, and to manufacturing and agricultural industries. He ended by presenting the Duke of Norfolk to the Mayor as the President Elect of the meeting, and by vacating the chair in his Grace's favour.

The cheering with which the Duke of Norfolk's name was received was doubtless all the more hearty, since his grace's appearance as President of the Norwich meeting was regarded by the good people of the city as a step towards the reconciliation of an ancient feud which, a century or more ago, had led one of the Duke's ancestors to abandon the palace of the Howards at Norwich as a residence, and to settle down in Sussex instead of in the county from which they derived their title, and in which they once were resident landholders. The Duke said that while he felt it both an honour and a pleasure to act as President of the Institute for the week, he could not feel that he was entitled to put himself in the position of one who understood the topics to be considered, so well as many of those gathered before him. He had come to learn, not to teach or preach. His first duty was to return thanks to the Mayor for the welcome he had given him to that ancient and interesting city. It was a pleasure to all the members that the civic chief of Norwich had met them so cordially, and to find that the Corporation and the inhabitants of the city appreciated the selection of Norwich for this visit. The last visit of the Institute to Norwich was in 1847. That was a very interesting visit. But there was one element connected with this visit that ought to make it more interesting, for nearly another half century had passed away to give a greater antiquity to the buildings than they had in 1847. All must feel when travelling about the country a very keen regret at seeing how much destruction had taken place among our ancient monuments and records, how decay was continually further impairing them, and how things which ought to be carefully chronicled were slipping into oblivion. That arose very much from the ignorance prevailing in the localities—from a want of knowledge as to what was interesting, and a want of appreciation of local traditions and monuments. It was therefore extremely profitable to localities that congresses of this kind should be held in them, and that they should be visited by persons who were really masters of such subjects. Such visits must give special encouragement to local antiquaries, who devoted much of their time and attention to such topics, but very often found it difficult to stir up sufficient interest in them amongst those living around them. As their work was often made much harder through discouragements of various kinds, local antiquaries, he thought, should feel encouraged when people from all parts of the country came to comment on their local monuments. Then it was a great benefit to visitors to come amongst local antiquaries. Though it was possible to grope among relics of the past and try to learn what there was to be learned, yet it was impossible to know and fully to understand their

special characteristics unless they had guides better instructed than themselves. Thanks were therefore specially due to those on occasions of this kind brought before them the result of the labours of many years, so that they might share in the discoveries and in the interesting observations they had made. Without such aid it was impossible to study history with advantage. They might waste their time in looking for things in places where they were not to be found, and miss that which should rivet their attention. It was gratifying that Norwich should have been selected for this meeting, as it was one of the cities rich in ancient records especially relating to the municipality. It had been only too carefully impressed upon all their minds how great an interest there was in the question of local government. That being so, it was interesting and instructive to search the records of the past relating to that question, and to see what lessons could be derived from them. Norwich was especially fortunate in this respect, for it had very valuable records, and Mr. Hudson had shown zeal, energy, and ability in elucidating them. He also noted with pleasure sundry inquiries which had been made into the monastic life of the past, a subject which had been much neglected. It had been too often approached in a spirit of prejudice, though it was one which commanded, and would repay, careful study. Perhaps the greatest incentive to popular interest in this matter was the very able paper lately published by Dr. Jessopp on "Daily Life in a Mediaeval Monastery." That paper had created great interest and sensation, and, no doubt, had tended very much to direct the minds of people to the subject. Then Mr. St. John Hope had been unearthing the buried remains of many monasteries, so that the ground plans now might be compared with the statutes and other written documents. This had been fruitful of happy results in showing what really was the daily life in monasteries. It was right and fitting to take a special interest in the subject, because it was very much owing to the inmates of monasteries handing on the torch of learning that we are now able to acquire knowledge.

It was not to be expected that the members of the Institute would leave the great hall, of which Norwich is so proud, without desiring to hear some account of its history. This was supplied by a local antiquary, Mr. Mottram, who told the meeting how it had once been the nave of a Dominican Church, and how the brethren of the Order of St. Dominic, on coming to Norwich in the thirteenth century, settled in Norwich on the north side of the river, close to the church of St. John the Baptist. The "Brethren of Penance" not long afterwards settled on the south side of the river in Hungate, where they built a chapel or oratory. This Order, however, offended the Pope, who dissolved them, and the Black Friars, as the Dominicans were called, obtained their possessions. During the time when the influence of the Lollards was growing in Norwich, the Black Friars made efforts to build a grand and large church; and, to carry out their plan, it was necessary they should acquire possession of a lane which ran from Bridge-street to Elm-hill, and the line of which would run obliquely from the west to the east end of the church. Their efforts to obtain possession of this lane met with strong opposition from the citizens. A fire destroyed part of the church and conventual buildings early in the fifteenth century, so that the friars had to return to their old quarters. It was after this fire that the church, now St. Andrew's Hall, was rebuilt. Robert de Erpingham, a brother, devoted his patrimony in helping to build the fabric, and the shield of Erpingham is displayed between the windows of the southern clearstory. Sir Simon de Felbrigg, standard-bearer to Richard II., who, with his second wife Katherine, is buried in the church, though his brass is at Felbrigg, contributed to the building of the octagonal central tower, which fell in 1727.

Mr. Micklethwaite next pointed out that the churches of the Friars Preachers were more or less public, and designed for public preaching. Being wanted for use they were planned very like the parochial churches. The nave was the great auditorium. The friars held their own private services in the choir (recently used as the Dutch Church and now called Blackfriars' Hall), which was nearly cut off from the nave. The choir was almost as separate from the nave in the Middle Ages as now. Although based upon the plan of most Benedictine monasteries,



the conventual houses of the friars differed from them. With the friars the cloister was not the living-place as with the monks, who had no cells, while each friar had his separate chamber. The south side of the church was built earlier than the north side. The south windows, as Mr. Micklethwaite pointed out, are Decorated, while the north are Perpendicular. The fine east window, in the choir, is of the Decorated date. It may be added that some of Friar Brackley's letters in the Paston Correspondence were written from this convent. A perambulation was made of the church, choir, and conventual buildings, which undoubtedly owe their preservation to the citizens of Norwich having persuaded Henry VIII. to sell them for a consideration as a civic hall.

A start was next made for the Cathedral, where a large gathering took place in order to hear Prof. J. Willis Clark, of Cambridge, open the Architectural Section by a lecture on the structure and history of the Cathedral, which was illustrated by a series of diagrams, ground-plans, and elevations (prepared for the 1847 Congress by his uncle, the late Professor Willis), which hung on the walls. The first portion of this lecture was delivered in the middle of the nave, the rest being reserved for delivery as the party walked round the various parts of the building. We condense the following account of the lecture, with corrections, from the *Eastern Daily Press*. He claimed for this structure that it stands almost alone among the cathedrals of England as a purely Norman one, with no suspicion of any admixture of Saxon work, and with little alteration in later times. Nearly seven centuries have elapsed since its foundation by Bishop Herbert, who transferred the see from Thetford to Norwich in 1096. According to the Registrum of Binham, being anxious to settle his cathedral in some sure place, he purchased a certain spot near Norwich Castle, called Cow Holm, a pasture belonging to the manor of Thorpe, close to which is Holm (now Bishops-gate) street. This acquisition was confirmed by King William Rufus. To secure free egress and ingress from and to his own grounds and church and the dwellings of his monks, Bishop Herbert obtained in exchange from Roger Bigod, Earl of Norfolk, his palace in front of the gate of the monastery, together with lands in St. Michael on Tombland, where was a chapel that was removed to another site, while the spot where it had stood was marked by a cross. The palace at that time was at the south end of Tombland; the cross was erected opposite the Carnary (now the Grammar School). In 1319, Edward II. granted Bishop Salmon leave to increase the site of his palace. Bartholomew Cotton, a monk of the Norwich convent, author of a good deal that is recorded in its "Registrum Primum," says that Herbert finished the cathedral in his lifetime as far as the altar of the Holy Cross, called in Cotton's time the altar of St. William, which stood a little to the west of the existing central screen.\*

Cotton says that Herbert also built the episcopal palace, except the great hall. The work was begun in 1096 at the place where in Cotton's time stood the early English chapel of St. Mary, beyond the present semicircular eastern wall of the church. Herbert died in 1119, and was buried in the church in front of the high altar. He was succeeded by Bishop Eborard, who, loving the monks at Norwich with great affection, began the work where his predecessor had left it, and completed the nave. Eborard died in 1146. During the episcopacy of William Turb (in 1171) the church was almost destroyed by an accidental fire. On this occasion the Bishop made a vow that he would not go any further than twelve leagues from his church, unless compelled by absolute necessity, until it was rebuilt. Sometimes he sat in a chair at its door, asking for contributions. In two years the choir was repaired, and the Bishop died. His successor, John of Oxford, is said to have built the infirmary of the monks, and to have remitted the tax imposed by Herbert on every message in the diocese for building the church. In other words, this Bishop wound up the building account. This completes the history of the Norman church, the erection of which had occupied the best part of a century. As to the conventual buildings, Bishop Herbert is said to have built the dwellings of the monks, and John of Oxford the infirmary. The outer wall of the cloister is Late Norman; the inner wall is of later date. The chapter-house

stood on the east face of the southern transept, and between it and the transept was, a few years ago, a passage called the Slype. The foundations of the chapter-house have been excavated, when there was discovered a semicircular apse. Thus it appears that there must have been a Norman chapter-house,\* which was rebuilt or much altered by those who built part of the cloister. Immediately above the east cloister walk was the "dorter" or "dormitory" of the monks. On the south side of the cloister was the "fratery." There remains of it a beautiful range of Norman windows. At some distance south are the ruined columns of the "infirmary," which was pulled down in 1806. At the west end of the south side was the kitchen, and alongside it the "guest hall." A detached belfry stood just within the original monastery gatehouse, close to the site of the Erpingham Gate. Between 1245 and 1258 Bishop Walter de Suffield took down the Norman Lady Chapel, and replaced it with a new one, and all that remains of the Early English chapel that was pulled down by Dean Gardiner in the reign of Elizabeth, is the beautiful pointed arch of its doorway. The great Riot of 1272, continued the Professor, was a very important event in the Cathedral's history. He quoted from the best authorities in order to give a history of this riot, which, he said, is fully and well told by Mr. Walter Rye in his *Antiquarian Miscellany*. The accounts of this riot, he added, are curious and valuable as illustrating the state of feeling between the laity and secular clergy on the one hand, and the regulars on the other. It all arose between the monks and the citizens after the setting up of a quintain by the latter on Tombland. In a general scuffle which followed, the prior's retainers were driven within the monastery gates. A multitude of citizens defied the prior. One of them was shot and killed, and, as the City Coroner found the prior's men guilty of murder, the citizens were excommunicated. Subsequently hostilities were renewed. Prior Brunham then brought from Yarmouth, in three barges, armed men, who marched into the city, sounding trumpets and beating drums. They robbed and set fire to some houses. The city authorities complained to Henry III., who was at Bury St. Edmund's. On August 5 a considerable force of citizens and fifteen clergy and chaplains came together, and, according to one account, attacked the Prior, while another said that the people outside were shot at and slain by mercenaries in the belfry. Finally, the southwestern gate of the monastery and the Church of St. Ethelbert were destroyed. Then the west gate was forced, the belfry caught fire, and the flames spread to the church. Whatever could be burned was burned, with the exception of a single chapel. The citizens were condemned to pay 3,000 marks towards the rebuilding of the church and monastery. A jury at the inquisition found that the fire in the belfry was caused by the carelessness of those mercenaries who had defended it. Six years after this disaster, Bishop William de Middleton dedicated the church (as that had never been done) in the presence of Edward I. and many nobles. No important event in the history of the church occurred thenceforward till 1362, when England was visited by a violent hurricane, which greatly damaged buildings in various parts of the country. Bishop Percy gave 400 marks out of his own treasury to repair the presbytery, which had been thrown down by the great wind, and obtained subscriptions from the whole of the clergy in his diocese. Bishop Alnwick marked his incumbency by erecting the great west window, similar in design to that in Westminster Hall. In 1463, during the episcopacy of Walter Lyhart, there was a third fire, the accounts of which are meagre. The chancel was struck by lightning, and was partly burned. Lyhart was buried in the nave in front of his new work called the reredos, remains of which Mr. Willis Clark subsequently pointed out in the easternmost bay of the nave against the screen. Then a fourth fire took place in 1509, when the roof of the north transept was burned. Then Bishop Nix vaulted it with stone. In the cathedral were practically two churches, that of the citizens, and that reserved for the monks. Bishop Herbert left a cruciform church, the transept of each having a chapel on its eastern face. There is a processional path along the whole, with curious circular chapels with semicircular

\* The site of the walls of this ancient relic, lately discovered, were pointed out to the members of the Congress by the Professor.

apses on their eastern faces on each side of the cathedral, called, that on the north, the Jesus, and that on the south St. Luke's chapel. Bishop Eborard finished the central nave, and his work extends from the twisted pillars to the west end of the church. The central tower is Norman, but as to when it was built there is no direct evidence. A wooden spire was built between 1291 and 1297, at a cost of 248*l.*, and that would be the spire which was broken down in the great storm of 1362. Blomefield asserts that Bishop Goldwell finished beautifying the tower, which might or might not mean also that he added the spire. The Norman nave had a wooden roof, but that was probably destroyed by the fire of 1463, for the stone vaulting is due to Bishop Lyhart, whose device recurs among the bosses. Passing next to the choir, or, as it is locally called, presbytery, the Professor asked, Who built that beautiful work which forms the eastern limb of the church? Bishop Goldwell made the stone vaulting, because his device is upon it, and put up the flying buttresses to carry it. But who built the walls? Goldwell probably did not. There was a uniform tradition that this was the work of Bishop Percy. When the wooden campanile fell in 1362, could it have damaged the walls so completely as to render it necessary to rebuild them? Would it not rather damage the roof? Professor Willis never could arrive at any definite conclusion as to the accuracy of this. There is a wooden roof above a stone one that might well have been built in Percy's time. If the view were accepted that the walls were built by one of Percy's predecessors the only one who could be selected was Bishop Middleton, who repaired and restored the church.

A perambulation was then made of the choir and presbytery, most of its objects of interest being pointed out by Mr. Willis Clark. He drew especial attention to the comparatively recently discovered Medieval painting of the Passion, which had since the Reformation been used as a table. But the most curious relic in the cathedral he pronounced to be the ancient episcopal throne, which is of stone, and is situated in the easternmost bay of the presbytery. He directed attention to the remains of the elbow of the lofty stone seat, and showed where in the adjoining bays there are the remains of a concentric arrangement of seats for the clergy. Thus, the Bishop sat high above the clergy, who were arranged in two or three tiers on either side of him, and looked over the high altar down to the west end of the church. This is the only stone throne of a bishop known in England. There are two on the Continent, one at Torcello and another at Aquileia in Italy; but no others are known to exist except in Rome.

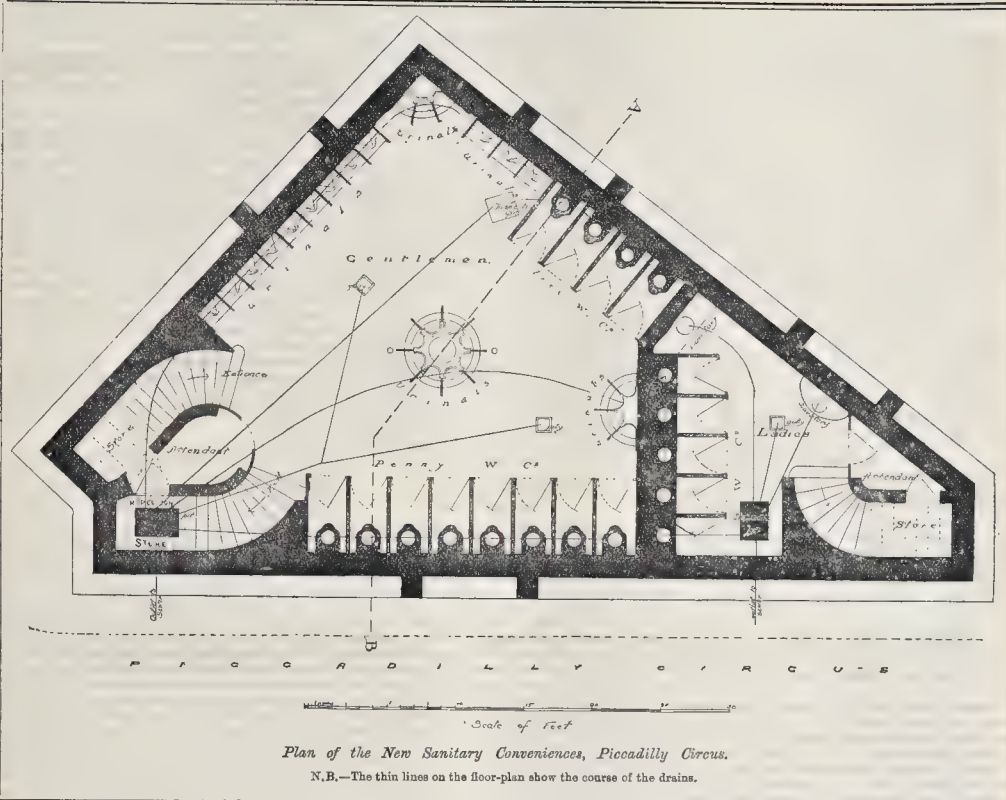
The Professor having concluded his lecture, the Rev. Mr. Sewell pointed out a sealed altar in the Jesus Chapel. The altar slab, which rests on five columns, has let into it a square piece of marble, with the cross incised in several places. It was customary from the time of the Council of Calcedon to deposit relics, three particles of the Holy Eucharist and three grains of incense in the cavity or sepulchrum of an altar. That was probably done in this case, though when the seal was raised in the presence of the Cathedral dignitaries, nothing was found within it. Probably the relic, which originally was very small, had wasted and crumbled away as to be no longer discernible.

We will continue our report next week.

**The Corinth Canal.**—The work upon the Corinth Canal is still almost at a standstill, one section being only proceeded with. The contractors have received no payment since the suspension of the Comptoir d'Escompte, and their claim now amounts to 500,000 francs. They are, however, willing to continue the work provided they obtain a share in the canal, but this cannot be arranged, as the canal is already mortgaged. However, the prospects of the work being resumed are not unfavourable, inasmuch as the Greek Government seems disposed to support the undertaking, for which purpose an engineer has examined the canal and furnished a report, setting forth the time and money required for its completion, but as yet the Government has arrived at no decision.

**Technical Grants in Norway.**—The Norwegian Government has granted six architects and technologists various sums of money in order to carry out certain studies abroad, as, for instance, in England the study of the heating of dwellings, construction of hotels, &c.





# NEW SANITARY CONVENIENCES, PICCADILLY-CIRCUS.

ON Tuesday last the Vestry of the Parish of St. James, Westminster, afforded a private view, prior to the public opening on Wednesday of the new conveniences for both sexes which that body has, with commendable public spirit, constructed at Piccadilly-circus, beneath one of the triangular plots of land hitherto unappropriated to any purpose. We give a plan of these conveniences, from which, and from the following description, it will be seen that they are on a larger scale and more luxuriously provided than any others of the kind in London. One admirable feature about them is that they are well provided with daylight through the glass lights in the pavement. The following is the official "history" and description of the works:—

"The conveniences at Piccadilly-circus, which are to be opened to the public on Aug. 7, have been constructed by the Vestry of the parish of St. James, Westminster, at a cost of about 3,500. The Vestry have for many years felt the necessity of increasing the number of public urinals in the parish, and as the district is yearly becoming less residential in character, accommodation of the kind is more and more needed for the growing number of people brought into the neighbourhood for business purposes. It is probably generally agreed that the number of public urinals in most parts of the metropolis is totally inadequate to meet the requirements of the present population, and there is also a general consensus of opinion that, whatever may be an appropriate site for such a structure, any position which may be selected is the most objectionable site that could be chosen—from the point of view of residents in the immediate vicinity. Within the last ten or twelve years many projects for increasing necessary accommodation have been formed, and the majority of them have been abandoned in deference to the strongly-expressed dissent of neighbours. In one case, indeed, as recently as 1879, the Vestry disregarded the opposition of the residents and erected a public urinal in Old Burlington-mews, deeming the objections that were taken to the proposal to be without good

foundation. An undoubted nuisance existed on the very spot selected for the urinal, and it appeared to the Vestry desirable, alike in the interests of decency and health, to provide a suitable structure. The inhabitants, however, appealed to the Courts of Law, and in the result succeeded in obtaining an injunction restraining the Vestry from continuing the urinal, and throwing the costs of the proceedings (amounting to several hundreds of pounds) upon the Vestry. At various times proposals have been made to construct underground urinals in some of the larger spaces in the parish, such as Great Marlborough-street, by the Police-court and the Circuses, but on each occasion strenuous opposition was threatened, and the schemes were, with some reluctance, abandoned. It is obvious that public urinals are very largely used by strangers to the neighbourhood, and that, to be of the maximum benefit, they should, therefore, not be placed in obscure corners, but in such situations as not to require a prolonged search. At the same time, the natural prejudice against the construction of urinals in prominent positions on the part of ratepayers in the vicinity, who have to defray the cost of constructing and maintaining the conveniences, must be respected, and thus the action of the Vestry is considerably fettered. Signs are not wanting, however, that this prejudice is becoming weaker, and it is possible that in comparatively few years a well-appointed and carefully-attended urinal will be regarded as far less objectionable than a continuance of street nuisances. The Vestry believe that they have shown, in the case of the underground conveniences at Piccadilly-circus, that it is possible to make provision of the kind without offence to the eye or any other sense.

The construction of the conveniences at the Circus has been under consideration for some years. Before the new street, now known as Shaftesbury-avenue, was completed, the Vestry suggested to the Metropolitan Board of Works that advantage should be taken of the improvement to provide some such accommodation. On the 13th July, 1885, a deputation of the Vestry waited upon the Board with a memorial, praying that the space which is now enclosed with

bulks of timber might be formed into an ornamental space, with perhaps a fountain or statue in the centre, and an underground urinal, with proper approaches, constructed under the same. No definite reply being received to this memorial, the Vestry again waited upon the Board in the following year, and requested to be allowed to utilise the space themselves in the manner suggested, if the Board were unable or unwilling to do so. It was not until nearly two years later (January, 1888), that the Vestry received an intimation of the views entertained by the Board on these two suggestions. They then learned that the Board had decided that, in view of all the circumstances, it was not expedient to comply with the request of the Vestry. The site first suggested was, as it still is, enclosed, but a triangular space to the east of the entrance to Shaftesbury-avenue had been paved and added to the street. It had thus, under the provisions of the Special Act of Parliament authorising the improvement, passed to the Vestry, and the latter at once intimated to the Metropolitan Board of Works their intention of exercising the powers conferred on them by the Metropolitan Local Management Act, 1855, and of providing public conveniences on, or rather under, that site. The Board, in reply, intimated that they would oppose the carrying out of this intention, and brought pressure to bear upon the Commissioners of Woods and Forests, to whom the freehold of the ground would revert if the surface ceased to form part of the street, to prevent the construction of the conveniences. The Vestry freely recognised the propriety of deferring to the views of the Commissioners of Woods and Forests, and therefore approached Colonel Kingscote with plans of the proposed works, to which they sought the assent of the Commissioners. Some correspondence ensued, and ultimately the Vestry were gratified to learn that although Colonel Kingscote, in face of the objections taken by the Metropolitan Board of Works and a few occupiers of Crown property in the vicinity, felt bound to decline to give any approval of the scheme, yet as the Vestry appeared to be still of opinion that the conveniences were needed in the interests of the public, he would not further oppose their construction in accordance with the drawings



submitted, subject to certain specified amendments. The Vestry were thus spared the necessity of considering whether they should not exercise the power which they undoubtedly possessed, apart from any consent, of constructing public conveniences at the Circus on the level of the street.

The conveniences have been constructed by Messrs. B. Finch & Co., of Belvedere-road, Lambeth, whose drawings were accepted by the Vestry, after limited competition (five firms of sanitary engineers having been invited to submit designs), subject to some slight modifications. The superstructure, consisting of a group of ornamental lamps on a polished granite base, was designed by Mr. H. J. Treadwell, F.S.I., who was appointed special Surveyor to advise the Vestry on questions of detail and to supervise the carrying out of the work. The conveniences are divided into two sections, each having a separate entrance from the street, the larger being designed for the use of gentlemen, and the smaller for ladies. Both sections are approached from the street by a stone staircase, there being two flights of stairs—one for entrance and one for exit, for the men, and a single staircase for the ladies. The accommodation provided in the men's section consists of 27 urinals, and 12 water closets. The urinals are of the most approved lip pattern, in white glazed ware with chocolate and gold lines, with flushing rims, and are fitted with patent drip pans or gutters at the floor level. These are flushed at every discharge of the cisterns, thus ensuring perfect cleanliness. The divisions are of polished natural "dove" marble, and the backs of polished "rouge royal," with "dove" marble cappings and skirtings, the foot pieces being of white Sicilian marble. The urinals are flushed by means of patent automatic flushing cisterns. These are formed in "dove" marble with plate glass fronts, and ensure a regularly recurring flush. Most of the urinals are ranged round the walls, but there is a central group of eight directly under the dome, which is formed by the granite lamp base over, presenting an effective feature in the interior arrangement. The water-closets are Finch's "Holborn Combination," and are flush-out apparatus, with trap combined, and of an ornamental pattern, with polished mahogany seats, which are fitted with balance-weights, maintaining the seat in a vertical position when not in use, and thus helping to ensure cleanliness. Each water-closet is provided with a three-gallon syphon flushing cistern of approved pattern connected to the apparatus with a 1½-in. lead pipe, and producing a perfect flush. The divisions between water-closets are single slabs of polished "dove" marble, and the fronts and doors are formed in pitch-pine with chamfered and moulded framing. Each door is provided with a patent indicating bolt, showing at a glance which closets are in use. The accommodation provided in the ladies' compartment consist of five water-closets and two lavatories. The water-closet apparatus provided here is of the valve pattern, with mahogany seats made in the usual form, excepting that they are made to open readily for cleansing purposes. The divisions and fronts match those in the men's portion. The two lavatories are fitted with white and gold oval basins of the best pattern, with polished "dove" marble lavatory tops, and mahogany fronts. In this division are provided two mirrors, brushes, combs, &c., the idea being to provide all necessary accommodation for ladies shopping or doing business in the West-end. The entrance at the foot of the staircase is carefully screened by a heavy curtain, and the railings at the pavement level are lined with ornamental iron screen-work, in order to secure as much privacy as possible. The structure will be completely shut in after closing hours by the Bostwick Company's patent gates fixed at the foot of each staircase. The walls generally are lined with best-quality white glazed bricks, and the ceilings are finished in Parian cement. The floors are laid with tiles of bright and ornamental patterns, by Messrs. Carter, Johnson, & Co., of Kennington-park-road. Light during the day is obtained by means of Hyatt's patent pavement lights, and through the openings in the dome formed by the granite base of lamp. The artificial lighting is at present by gas, the Wenham Company's patent lamps being used for the general area, and each w.c. being also supplied with a small burner. As soon, however, as the electric mains are completed in the vicinity (which it is expected will be within a few weeks), the electric light will be fitted and supplied by the St. James's and Pall-mall Electric

Lighting Company, of Mason's-yard, S.W. Ventilation is obtained through fresh-air inlet gratings at the street level and by the entrance staircases. The foul and heated air is drawn up into the central dome, where an upward current is formed in the shaft of central lamp by means of a small sunlight, which is kept burning at its base. The group of lamps in the street is designed in the free Renaissance style, and consists of a central pillar with four smaller ones surrounding it, the whole being raised on a base and dome of polished Aberdeen granite, which is enriched with swags of flowers, and the arms of the City of Westminster. The lamp not only forms a handsome ornament to the Circus, but also acts as a ventilating-shaft for the underground portion, the dome forming a reservoir for the heated or foul air. The execution of the work was entrusted to the following firms:—The main structure, Messrs. B. Finch & Co.; granite work, Messrs. Fenning & Co.; lamp columns, Messrs. McFarlane & Co.; lanterns and gasfittings, Messrs. W. Sugg & Co.; and fixing the granite base, lamp columns, &c., Messrs. Peto Bros. No charge will be made for the use of the urinals, but it will be charged to each person using the water-closets, and 2d. for the use of the lavatories; the latter are provided in the ladies' compartment only."

#### OBITUARY.

Mr. George J. J. Mair, F.S.A., who had been in failing health for several years, died on the 17th ult. Born at Aberdeen on January 18, 1810, he was articled to Decimus Burton in 1826, and in 1830 was admitted a student of the Royal Academy. He was one of the founders of the Architectural Society, to which he was elected Honorary Secretary in 1831. Mr. Mair visited Italy in the year 1832, returning home in the following autumn, when he commenced practice in London as an architect and surveyor. In 1842, when the Architectural Society joined the Royal Institute, Mr. Mair was admitted a Fellow, and served on the Council during the sessions 1842-44, 1848-50, 1853-55, and 1863-64. In 1844 he was elected a member of the Surveyors' Club, which was established in 1792. Mr. Mair was one of the first Life Members of the Architects' Benevolent Society, and served on the first Council from 1850 to 1872.—a period of twenty-three years; and on the death of Sir William Tite in 1873 he was elected Honorary Treasurer, which office he only resigned in 1886, being, however, again elected a Member of Council. Failing health prevented Mr. Mair from attending the meetings as often as he wished, and in 1887 he declined re-election, but was unanimously elected Vice-Treasurer. In 1877 he retired from practice, and resigned his Fellowship of the Royal Institute; but he was elected an Honorary Associate in 1880. The following are a few of the buildings designed and executed by Mr. Mair:—Kneller Hall Training School at Whifton, Middlesex; Northwood House, Cotes; Flass House, Westmoreland; Scarsgill House, Cumberland; Coombe Lodge, Surrey; Longfield Rectory, near Dartford; Penrhos Rectory and school buildings, Monmouthshire; National Schools at Crofton; and various villas, schools, and additions to private residences, banks, &c., in London and the provinces. Kneller Hall, the building of which was begun by Sir Godfrey Kneller in 1709, stands between Hounslow and Twickenham; it was opened in 1850 as a training school for male teachers under the authority of the Committee of Council on Education. Mr. Mair's design, which is an excellent one [see *The Builder*, vol. viii., No. 366, Feb. 9, 1850], was carried out at a cost of about 20,000*l.*, and afforded accommodation for 100 pupils, with apartments for three masters and a separate residence for the principal. The building is now the Royal Military School of Music.—*R.I.B.A. Journal*, Aug. 1.

**New Partnership.**—Mr. G. A. Pryce Cusson, quantity surveyor, has taken into partnership Mr. Wm. G. Leigh (who for the last twenty years has been with Messrs. Karlake & Mortimer). The business will be in future carried on under the style or firm of "Pryce Cusson & Leigh."

**Theatre Lighting.**—The Wenham Company write to say that they have this year again secured the contracts for Lighting Covent Garden Theatre and Her Majesty's Theatre during the run of their Promenade Concert season.

#### THE LONDON COUNTY COUNCIL.

The last meeting of the London County Council prior to the adjournment for the recess was held on Friday, the 2nd inst., at Spring-gardens, Lord Rosebery in the chair.

**The Theatres Bill.**—The Chairman stated that Sir John Lubbock (the Vice-Chairman) had received a letter from the Right Hon. W. H. Smith, with regard to the Theatres Bill, stating that he had conferred with the Home Secretary on the matter, to whose department the matter was more specially subject, and that there was no probability of the Government seeing their way to passing this Bill through the present Session. The right hon. gentleman pointed out that the Bill would need considerable amendment before the Government could pass it, and he would suggest that the Council should take the opportunity of communicating with the Secretary of the Home Department, and also with the proprietors and others interested in theatres, with the view of redrafting the measure.

**Tenders.** The Chairman opened several tenders for the erection of lodges and other works in Dulwich Park. These were referred to a Committee, with power to accept and seal the lowest, or such other tender as might, upon inquiry, be deemed satisfactory.

**Building Act Business during the Recess.**—The first paragraph of the Report of the Standing Committee was as follows:—"The Chairman of the Building Act Committee has called attention to the desirability of arrangements being made by which, during the Council's long vacation of two months, applications made to the Council under the Metropolitan Building and Management Acts, with reference particularly to new streets and buildings, may be considered and dealt with. Applications of this kind are made (though in smaller number) in August and September, as well as in other months of the year, and there is of course inconvenience to applicants if the matters in which they are interested, and upon which they need the decision of the Council, are unduly delayed."

The Chairman suggested that there should be one meeting of the Building Act Committee about the middle of the vacation, and that the Committee should, at such meeting, have power to grant or refuse, on behalf of the Council, applications made by builders or others for the Council's approval of plans. The only condition with regard to your Committee expedient to attach to the delegation of this power to the Building Act Committee is, that any decision upon which the Committee may act should be the unanimous decision of the members present, and that every case so dealt with should be reported to the Council at its first meeting after the vacation. The recommendation which your Committee submit is—

"That the Council do, under the provisions of the Local Government Act, 1888, sec. 28 (2), delegate to the Building Act Committee power to hold one meeting during the recess, for the purpose of considering applications made by the Council under the Metropolitan Building and Management Acts, and at such meeting to act on behalf of the Council, and to grant or refuse such applications; provided, however, that the Committee shall only act upon such applications as shall be unanimously agreed to by the members present, and that all such decisions shall be reported to the Council at its first meeting after the recess."

This recommendation was agreed to.

**Proposed New Council Chamber and Offices.**—The Council Chamber and Offices Committee presented the following report:—"Your Committee, on July 9, 1889, reported to the Council that, with regard to the further reference to the Committee as to acquiring a site for a Council Chamber and offices, they had appointed a Sub-Committee to ascertain, if possible, the terms upon which the Corporation would be likely to dispose of a suitable portion of their site on the Embankment for the purposes of the Council. Your Committee have now to report that their Sub-Committee have had a conference with the City Lands Committee on the subject, but they find that until the Council has passed a definite resolution that a site shall be purchased, they are not in a position to enter into practical negotiations for that purpose."

**Millbank Prison.**—The Committee on the Housing of the Working Classes presented the following report:—"Your Committee have to report that they have received from the Home Secretary a letter, intimating that the prison at Millbank would shortly cease to be used as a prison, and that the site upon which it is built would become available for other purposes. The 2nd section of the Act 48 and 49 Vict., cap. 72, gave power to the Secretary of State to sell the site to the Metropolitan Board of Works at a fair market price, but the Board did not think it expedient to avail itself of the offer made to it to that effect in June, 1888. The Secretary of State renewed the offer to the Council on the 14th April last, and your Committee have been in communication on the subject with the Charity Organization Society, the Vestry of St. Margaret and St. John, Westminster, Canon Farrar and Canon Furze, and other persons acquainted with the locality. A Sub-Committee has also made a thorough inspection of the site and



its surroundings, accompanied by a representative of the Home Office, and has obtained a large plan of the ground. The site contains an area of between twenty-two and twenty-three acres. It is low-lying and damp; in fact, when originally purchased by the Government in 1799, it appears to have been a marsh or swamp. Although the existing building is very strongly built, there are signs in every direction of the treacherous nature of the sub-soil, as settlements have evidently taken place below many portions of the boundary wall and also of the prison building. Some idea can be formed of the enormous expenditure which would have to be incurred by building upon this site from the fact that the prison cost 500*l.* per cell, whereas the prisons of modern construction cost about 75*l.* The old foundations, moreover, would be of no avail for new buildings, as the prison seems to have been built upon piles, which by this time would probably be rotting. Before the site could be laid out for building purposes it would have to be raised several feet in order to give a proper fall to the drains, and the very small frontage which the site would have to the river to some extent with its development. This frontage would have to be further reduced by the formation of a roadway. Your Committee have reason to believe that the erection of some artisans' dwellings would be of benefit to the neighbourhood, but they feel themselves unable to come to an decision without first ascertaining what the probable cost of the land would be, and having regard to the very expensive operations that would have to be entered into before the site would be available for building purposes. Your Committee have been in communication with the Home Office, but the Secretary of State has not, up to the present time, sent any answer to their inquiries, beyond the statement that the matter is receiving attentive consideration, and that an answer may be shortly expected. Your Committee are, therefore, of opinion that no conclusion can be come to as regards the purchase of the whole or part of the site for building purposes or for an open space (as has been suggested by the Parks and Open Spaces Committee) until an answer is received from the Government as to the probable price of the land."

*The Metropolitan Sewage Outfalls.*—Mr. Beal's notice of motion on this subject, to which we made reference last week, was ruled out of order on technical grounds, but Mr. Aeneas Smith said that the Council would have to take up the subject in earnest soon, and give days to its consideration. After clearing the paper of business, the Council adjourned for the recess.

#### DEPARTING FROM THE ORIGINAL PLAN OF BUILDING.—INJUNCTION.

REINHARDT V. MENTASTI BROTHERS was an action by the lessee and occupier of 14, Coventry-street, W., against the owners of the Hotel Privilège in Arundel-street, which is immediately adjacent to the back of the plaintiff's house, and only separated from it by a party wall. The defendants recently rebuilt their hotel, and placed a large closed range in one of the kitchens in the basement, —formerly an unused chamber, —and constructed a shaft for carrying off the hot air. The stove did not occupy the site of the fireplace, which must be taken to have existed since the house was first built, and thus far the defendants departed from the original plan of the building. The heat occasioned by the stove passing through the wall injured the plaintiff's cellar on the other side, so that he could no longer store his wine there. Judgment was reserved on the ground that the result of the case would affect many localities and many persons. On the 2nd inst. Mr. Justice Kekewich granted an injunction, stating that he had not been able to find a line of demarcation between those nuisances which may be said to partake of the character of trespass and those of which this cannot be averred, as in the present case, nor a disposition on the part of the Court to grant injunctions more readily against the former than the latter. He approved of the recent ruling of Lord Bramwell, that what makes life less comfortable and causes sensible discomfort and annoyance is a proper subject of injunction. The injunction was not to be enforceable for three months, to enable the defendants to consider and do what is best under the circumstances.

#### BUILDING ACCORDING TO ARCHITECT'S PLANS.

The Licensing Act, 1874, section 22, provides for a provisional grant of a licence to a public-house about to be erected according to certain plans with which the Justices are satisfied, and when the house has been built an application may be made to them to have it declared "definite," and then it becomes a fully-licensed house; but a refusal to make the provisional licence definite must be on one or two particular grounds,—as for example, that the house is not in fact built in accordance with the plans. In a case before the Queen's Bench Division on Monday, it appeared that some houses having been pulled down in the course of improvements at

Hamptoad, transfers of licences were made by the magistrates, and there was a plot of land on which it was proposed to build a public-house to be called the "Three Horseshoes," and a provisional licence was granted, and when the house was completed an application was made to have the provisional licence declared definite; but the magistrates, being of opinion that the house was not built according to the plans, refused the application. Subsequently the application to renew the provisional licence was granted by them, although this was opposed by dissentient inhabitants, who desired the plans to be strictly adhered to. The Queen's Bench Division, being moved on the part of the dissentient inhabitants, granted a rule for a *certiorari* to bring up the renewal order to be quashed.

#### CONCRETE FLOORING.

SIR,—The able and extremely interesting articles on the above subject, by Mr. Frank Caws (published in your issues of July 27 and August 3), have been read by me with very great pleasure.

Owing to ill-health and other causes, I have been able to make but few additional experiments since the publication of my little work ("Iron and Concrete as a Building Material") some dozen years or so ago; the last ones made by me being not later than 1883. From these last experiments I drew the conclusion at the time that, for perfect beam strength, a concrete slab, whatever its size, should be wholly made by the dump of a single mass of the plastic material; for I found, in every instance, that the slabs made by successive layers gave way under bending stress by horizontal cleavage between the layers; and this, however small the intervals of time between the on-puts of the added material. I do not, however, regard my conclusions as by any means fixed. More experiments are needed; and I hope that some one younger and better fitted for the work than I am will make them, in the interests of architectural science and the general welfare of mankind.

The work upon which Mr. Caws has entered with so much ability and zeal is more than scientific,—it is humanitarian. I trust his efforts will be met by an equal and corresponding zeal among his brother architects.

THADDEUS HYATT.

#### THE CHANNEL DRAIN-PIPE.

SIR,—It is very amusing to read Mr. T. L. Watson's special pleading, on page 85, in reply to the strictures on page 41. So also is his assumed ignorance of the existence of practical means for examining the interior of drain-pipes previous to the existence of the channel pipe patented by him in May, 1884. It so happens, however, that in the fourth edition of my book on Plumbing and House Drainage, I show my private access to the pipe, and refer to their use in conjunction with the ordinary or other round pipes for examining the interior of the pipes to see that the joints were all right and no foreign matter left in them. In the said book I also mention that these inspection pipes had been used by various architects, including "Mr. Thomas Watson, architect, Glasgow." Now, supposing Mr. Watson wished to be able to get his hand at the inside of every joint on his drain after it had been laid, he did not require to use an open drain pipe like a U with a lid along its whole top. He could have used one of my access-pipes alternately with an ordinary pipe, and so made a ten times better and stronger job than with his channel-pipe. I do not consider it necessary in practice, however, to have an access opening every 5 ft. or 6 ft. One every 10 ft., 20 ft., or 30 ft. or so is enough, as a lighted candle can be pulled along from opening to opening to see all the interior of the pipe clearly. For Mr. Watson to boast of a U-shaped pipe with a cover all along its top as perfection in drain-laying is the height of absurdity. He has double the amount of jointing than with the ordinary drain-pipe with access-openings at regular or requisite intervals, while, if the long top cover of his pipe were once cemented down (especially if with Portland cement), as he says, then he could not lift a single lid so easily as he imagines, but would probably break one or more pipes as well as his lid.

Another silly plan is to cut away a piece at the faucet and spigot end of each pipe in order to get in to see the inside of the joint. This is as bad as Sir Isaac Newton's large hole in his door for the cat and the small one for the kitten. Neither Mr. Watson nor Mr. Shaw seems to see that the proper place for the hole is in the centre of the pipe, as I had it, and make the hole long enough when one hole does for two or more pipes. Moreover, my lids can be easily lifted off and put on repeatedly, if wished, without damage. "*Ne sutor ultra crepidam*" must have been forgotten by some people in this connection.

W. P. BUCHAN.

Glasgow, 3rd August, 1889.

#### The Student's Column.

##### WATER-SUPPLY.—VI.

##### IGNEOUS AND METAMORPHIC ROCKS.

IN Great Britain Æolian rocks are not very well represented, and although their mode of origin is widely different from the aqueous rocks, their distribution and water-bearing properties are somewhat similar. They occur as drifts and ridges, sometimes having a rough kind of stratification, and are usually arenaceous in character. In Holland and Belgium, the water found in the "sand-dunes" bordering the sea-coast is largely drawn upon by drainage systems. It is even contemplated, amongst other schemes, to supply the City of Ostend from this source.

Igneous rocks, also, do not cover very large areas in England. They are principally found in Cornwall, Devon, Leicestershire, Northumberland, the Lake District, and in many parts of Wales. They occur either as rounded masses a few square miles in extent, or as thin streaks running over the country. Their origin is so far as it governs their mode of occurrence, distribution, and as affecting water-supply may be summarised as follows:—

They have all been in a state of fusion at some time or other, and it depends on the conditions under which they have cooled as to what their structure is. Leaving on one side the questions of mineralogical and chemical composition, which do not concern us at present, we find that the igneous rocks may be divided into two great groups, the *crystalline* and the *amorphous*, and there is every gradation between these two types of structure. The thoroughly crystalline (of which granite is a good type) have cooled at some considerable depth within the earth's crust under the enormous pressure of superincumbent rocks and lateral strains, which latter were gradually removed by the overlying rocks being slowly denuded, before the once deep-seated molten matter was subsequently brought into the light of day. The amorphous igneous rocks, on the contrary, consolidated either at the earth's surface or at a very shallow depth within it. In short, the crystalline rocks may be regarded as the cooled reservoirs of volcanoes, or the former interiors of mountain ranges, whilst the amorphous are merely injections into surrounding rocks from these reservoirs, such as enormous cracks filled with molten matter, which, if it had come to the surface, would be regarded as lava, necks of volcanic vents, &c. At the surface we have lava, ashes, and breccias, which are also classed as igneous. Of course, a great deal more could be said respecting the origin of this class of rocks, and certain qualifications are needed in any attempt to give a brief outline of the subject. What has been said, however, is sufficient for our purpose. It shows the student that igneous rocks are not stratified, and the manner in which water circulates in them, as compared with the aqueous rocks, is so entirely dissimilar as to involve separate consideration.

The crystalline igneous, as we have said, usually occur in large masses; and they penetrate to an unknown depth,—it may be that they compose the whole sub-structure of the earth,—and the rocks surrounding them, whether at the surface or not, are frequently highly indurated, and altered from their original character, by heat. It is well-nigh impossible to state definitely what becomes of rain after soaking into such material, and although shallow wells have been sunk in granites with some success, this is primarily due to the knowledge of the existence of innumerable cracks present in the rock, and to the general water-level of the district. The chief supplies of water from granite are obtained from springs, when the quantity available can usually be approximately ascertained.

The amorphous igneous rocks,—lavas and the like,—although locally important, are not drawn upon very much for water. Perhaps the greatest importance of this class of rock in England and Wales is in its cutting off and modifying the amount available from aqueous rocks. It will be seen that the igneous class burst up through the aqueous, and destroy their continuity. Imagine a considerable stretch of water-bearing aqueous rocks in which a great crack is suddenly formed and filled with lava, running as a more or less vertical sheet in a definite direction for miles through them. The lava sheet (or dyke as it is called) would certainly cut the aqueous rocks under consideration into two parts, and for all intents and purposes they must hence-







By BENTLEY, SON, & VINCE.  
Gray's Inn-rd.—4, Gough-st., u.t. 30 yrs., no g.r., also a l.g.r. of £10 p.a., u.t. 30 yrs. 2450  
Bloomsbury—12, Silver-st., u.t. 40 yrs., g.r. £8, r. £80 p.a. 600  
Leyton—L.g.r. of £200, u.t. 37 yrs., g.r. £10, r. £70, p.a. 2,640  
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Camden Town—120 and 122, Camden-rd., u.t. 36 yrs., g.r. £4, r. £120 p.a. 1,120  
124 and 126, Camden-rd., u.t. 36 yrs., g.r. £4, r. £120 p.a. 1,100  
167, King's-rd., u.t. 36 yrs., g.r. £2, r. £44 p.a. 400  
1 g.r. of £2 10s. p.a., u.t. 36 yrs. 126  
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Walsfield Division—A chief rent of £50, secured by a r. of £750 p.a. 1,650  
F. farm, 40s. 3r. 7p., r. £57 p.a. 1,500  
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124 and 126, Cr. 1p., in West Ardsley, r. £30 18s. 9d. 1,150  
F. farm, containing 20a. Cr. 15p., r. £40 p.a. 1,360  
Upper Green Farm, 12a. 3r. 30p., f. r. £27 18s. 9d. 1,780  
Top Fold Farm, 1r. 30p., f. r. £25 p.a. 1,000  
The Howley Park Dry Works, and 5a. Cr. 33p., f. r. £60 p.a. 1,300  
"The Cardigan Arms Inn," at Morley, f. r. £12 p.a. 450  
Numerous enclosures of arable, pasture, building, and woodland, containing 77a. Cr. 7p. 19,987  
Rent charges of £18 16s. 10d. p.a. 424  
Five plots of land, f. 1,940  
Two f. plots of garden land 220  
E.g.r. of £2 p.a., amply secured 75  
Eight f. cottages, r. £93 8s. 8d. p.a. 1,755  
Leeds Division—1, Stanley Steam Laundry in Cardigan-lane, f. r. £23 p.a. 540  
E. land, "The Cricket Fields," 17a. 3r. 6p. 7,600  
Moor Grange Farm, 76a. 2r. 19p., f. r. £195 p.a. 6,000  
The f. residences, 10, Abbey-st., and 41a. 3r. 36p., r. £60 p.a. 3,150  
The Woodside Paper Mills, and 4a. 3r. 34p., f. r. 58 p.a. 900  
A f. farm of 10a. 2r. 7p., at Farley Moor Top, f. r. £27 p.a. 800  
A f. farm of 16a. 3r. 18p., at Farley Moor Top, f. r. £20 7s. 8d. p.a. 760  
Church Farm, 22a. 3r. 30p., f. r. £44 p.a. 1,100  
Towlers Farm, 12a. 3r. 10p., f. r. £20 p.a. 610  
Park Spring Wood, 45a. 3r. 8p., f. r. 800  
Park Spring Quarry, 22a. 1r. 10p. 730  
Fleetham Farm, 61a. 1r. 38p., f. r. £112 p.a. 3,600  
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Five plots of f. building land 3,360  
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Hoxton-sq.—No. 48 and stabling, &c., f. r. £158 p.a. 1,980  
No. 9, Broad-sq., f. r. £60 p.a. 820  
4 and 6, Rutland-st., f. r. £30 p.a. 610  
Shoreditch—120 and 122, Laburnum-st., f. r. £54 p.a. 610  
Kenningham—2, Dorset-st., f. r. £53 4s. p.a. 905  
By C. D. FIELD & SONS.  
Harrow—3 to 3, Wealdstone-villas, u.t. 92 yrs., g.r. 234  
New Southgate—3, 4, and 6, Connaught-ter., u.t. 80 yrs., g.r. £13 10s., r. £46 16s. 125  
Peckham—2, Marmont-st., u.t. 67 yrs., g.r. £10, r. £35 p.a. 215  
By R. B. BIRCHLEY.  
Walworth—144, Brydon-rd., u.t. 62 yrs., g.r. £6 10s., r. £34 300  
By STAFF & CURTIS.  
Gunnerybury—5, Gordon-villas, u.t. 99 yrs., g.r. £5 10s., r. £32 275  
Wandsworth—8, Cleric-villas, u.t. 98 yrs., g.r. £7, r. 36 p.a. 325  
By NEWBORN & HARDING.  
Islington—49, Parkington-st., u.t. 47 yrs., g.r. £6 6s., r. £50 400  
6, Church st., f. r. £40 430  
Pekering-st.—A plot of f. land 95  
Holwerth—30, Dursley-rd., u.t. 68 yrs., g.r. nil, r. £70 p.a. 625  
147, Seven Sisters-rd., u.t. 61 yrs., g.r. £6, r. £65 p.a. 420  
Clerkenwell—Close, Dorset-st., f. r. £56 p.a. 850  
13 and 14, St. James-st., f. r. £95 p.a. 1,400  
Wandsworth—F.g.r. of £35, with reversion in 87 yrs. to e.r. of £250 p.a. 855  
F.g.r. of £18, with reversion in 46 yrs. to e.r. of £140 p.a. 405  
Clapham—53 to 59 (odd), Solon New-rd., u.t. 90 yrs., g.r. £28 300  
Chalk Farm—44, Noel-gate, u.t. 74 yrs., g.r. £8 10s., r. £48 p.a. 405  
83, Belmont-st., u.t. 74 yrs., g.r. £8 6s., r. £46 p.a. 405  
Hornsey-rd.—21, 23, and 55, Marcelus-rd., u.t. 91 yrs., g.r. £15 420

Aug. 2.—By W. W. JENKINSON.  
Croydon—8, Amberley-gr., f. r. 2940  
[Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

# MEETINGS.

SATURDAY, AUGUST 10.  
Royal Archaeological Institute of Great Britain and Ireland.—Norwich Congress, continued. (For programme, see Builder for July 20, p. 48).  
Crystal Palace School of Engineering.—Award of Certificates (Sir Douglas Galton, F.R.S., in the chair). 1 p.m.

MONDAY, AUGUST 12.  
Architectural Association.—Annual Excursion: King's Lynn.  
Clerks of Works' Association (Carpenters' Hall).—Mr. W. Horn on "Turkish Baths." 8 p.m.  
Royal Archaeological Institute of Great Britain and Ireland.—Norwich Congress (continued).

TUESDAY, AUGUST 13.  
Architectural Association.—Excursion (continued).  
Royal Archaeological Institute of Great Britain and Ireland.—Norwich Congress (continued).

WEDNESDAY, AUGUST 14.  
Architectural Association.—Excursion (continued).  
Royal Archaeological Institute of Great Britain and Ireland.—Norwich Congress (continued).

THURSDAY, AUGUST 15.  
Architectural Association.—Excursion (continued).

FRIDAY, AUGUST 16.  
Architectural Association.—Excursion (continued).

SATURDAY, AUGUST 17.  
Architectural Association.—Excursion (continued).  
Royal Archaeological Institute of Great Britain and Ireland.—Norwich Congress (continued).—Visit to Rowallan House, near Kilmarnock.

## Miscellaneous.

The State of Strasburg Cathedral.—Last year the municipality of Strasburg, in order to have an authoritative opinion on the condition of the Cathedral, requested M. Boeswillwald, the French inspector-general of historical monuments, and Herr von Schmidt, the architect of St. Stephen, Vienna, to make an exhaustive examination of the whole structure. The two architects have agreed upon a report, which has now been printed and circulated. According to this report, the structural solidity of the principal portions of the edifice is unimpaired, notwithstanding rather considerable cracks, especially in several buttresses and walls of the towers and the principal front. The interior of the cathedral, after the repairs made since 1870, shows no serious defects. It is different, however, with its exterior, which is reported to be in a serious state of decay in many places. Some parts of it are so much damaged that the work of strengthening and restoration should not be delayed, while the repairs of other portions may be undertaken within the next twenty years. No estimate is given as to the cost of the repairs recommended.

The Scott Monument, Edinburgh.—"Civis" writes as follows to the Scotsman:—"A principal eyecore in Edinburgh is the unfinished monument to our most distinguished citizen, Sir Walter Scott, in its most prominent position in Princes-street. A copy of the structure as intended to be finished was furnished to each of the subscribers in aid of the fund for erecting the monument. It shows the ornamental stone screen around the base, and to any person of proper taste such an addition is necessary to give effect to the general appearance of the monument. There are several hundred pounds in the hands of the Town Council derived from the visitors' fees. More would be obtained if asked for to almost any amount by the numerous admirers of Sir Walter Scott in Edinburgh. Some one should take the matter in hand."

London and County Banking Company (Limited).—The report of the directors of this company, presented to the shareholders at the half-yearly meeting held on the 1st inst., states that, after paying interest to customers and all charges, making provision for bad and doubtful debts, allowing for rebate on bills not due, and transferring 15,000*l.* in reduction of Premises Account, the net profits for the half-year ending June 30 amount to 225,237*l.* 15s. 7d. This sum, added to 29,404*l.* 2s. 4d., the balance brought forward from last account, produces a total of 254,641*l.* 17s. 11d. An interim dividend for the half-year of 10 per cent., which will absorb 200,000*l.*, has been declared, leaving the sum of 54,641*l.* 17s. 11d. to be carried to the Profit and Loss New Account. The balance-sheet will be found printed in our advertisement columns.

Openings for the Building Trade.—From some recent reports of British Consuls on the condition and trade of their various districts, we give the following particulars:—*Bordeaux.*—

"A large hotel, containing all modern conveniences, is greatly needed here. If a suitable site be selected, capital would be well employed in such an undertaking. The population of Bordeaux is about 250,000, nearly 1,000 of whom are British." *Nice.*—"There is an opening at Cimiza for the erection of one or more high-class hotels, that hill, as well as the Montebarron, presenting unrivalled sites as yet wholly unoccupied, while the one hotel and the pension at present existing there are over-crowded, although they are too far from the town of Nice to profit by all the advantages of their proximity." *Finland.*—"There is scope for more enterprise in British trade with Finland. Much more might be done in exporting building-materials, &c. The population of Helsingfors, for example, increases very rapidly, necessitating the construction of many new public and private buildings, some being of great size, five and six stories high. In these new edifices, at which work is often carried on night and day by the aid of the electric light, the most improved machinery, iron beams, girders, &c., are extensively used. German houses get most of the orders for these materials, which could be provided at least as cheap and as well by our own manufacturers."

Kirkstall Abbey.—At a meeting of the Council of the Thoresby Society, held in the Red Hall on Thursday last, attention was drawn to the necessity for taking immediate steps for the preservation of Kirkstall Abbey, and it was resolved that "this Council desires to respectfully draw the attention of the Corporate Property Committee of the Town Council to the necessity of taking immediate steps for the preservation of Kirkstall Abbey, and that as many members of the Council as possible wait upon Sir Edwin Gaunt for this purpose." In pursuance of this resolution, a deputation, headed by Mr. J. R. Ford, one of the Vice-Presidents of the Society, was yesterday received by Sir Edwin Gaunt, Chairman of the Corporate Property Committee. In handing to him a copy of the resolution, Mr. Ford said that the deputation was most desirous to strengthen the hands of the Corporation in this matter, and especially desired to direct their attention to two points, the prevention of injury to the Abbey by visitors, and the permanent preservation of such parts as were falling into decay. In reply, Sir Edwin expressed his concurrence with the wishes of the Society for the effective preservation of the Abbey, a matter which was receiving the serious attention of the Corporate Property Committee, and promised to bring the matter before the members. After thanking Sir Edwin for his courtesy the deputation then withdrew.—*Leeds Mercury*, Aug. 3.

A System of Self-adjusting Louvres.—Major Bale's self-adjusting louvre, for ventilating and lighting buildings and other spaces, has been patented by Mr. Powis Bale. The louvres are made with adjusting rods, pivoted to levers on the back of the louvres at each end, the louvres are hung on centres by pivot screws through levers, near to the louvre, and working in the jambs of louvre-frame, in window, or other openings. The louvres balance open at the required angle, and are automatically controlled by having counterbalance weights, which may rest on the window-sill, or be put out of sight, at any distance, and connected by a wire or chain to the adjusting rods, each weight being made in three graduated sections, which are raised in succession by the adjusting rods as the louvres close in proportion to the pressure of atmosphere or wind upon them, thus equalising the admission of air. The weights are cut, each, in three horizontal sections (increasing in arithmetical progression), the upper section provided with hanging ring, or loop, on the top, and a piston-rod screwed in under, which passes vertically through the middle and lower sections bored to receive it. The piston is provided with a fixed washer, or nut, on its length, to lift the middle section of the weight, and a moveable nut screwed on the end of the piston, to bring the lower section into action.

Premises near Westminster Bridge.—Mr. George Jennings, of Stangate, writes to say that the lease of the extensive premises situated near Westminster Bridge, lately occupied by the well-known firm of boat-builders, Messrs. Searle & Son (who have removed to Henley-on-Thames), has been acquired by him for an extension of his business.







CARDIFF.—For making Newland-street, Barry Dock, on the Wye, the Castle Estate. Messrs. Richards & Gehlin, surveyors.  
D. Love, Cadocion (accepted)..... £230 0 0

CARDIFF.—For the erection of summer residence at Barry, on the Glamorgan Estate, for Captain Marrell. Messrs. Richards & Gehlin, architects. Quantities by architects:—  
Jones Bros, Cardiff..... £1,300 0 0  
D. Davies, Cardiff..... 1,292 0 0  
Shepherd & Son, Cardiff..... 1,232 0 0  
D. J. Davies, Cardiff..... 1,210 0 0  
J. Allen, Cardiff..... 1,121 0 0  
W. Bowers & Co., Hereford..... 1,055 0 0  
W. Crisp, Barry (accepted)..... 1,125 0 0

CARDIFF.—For the erection of offices at Barry Docks, for Messrs. D. A. Thomas, M.P., Riches, & Co. Messrs. Richards & Gehlin, architects.  
Shepherd & Son, Cardiff..... £261 0 0  
R. Price, Cardiff (accepted)..... 247 0 0

CARDIFF.—For making Lombard and Regent streets, Barry Docks, the Holton Barry Syndicate. Messrs. Richards & Gehlin, surveyors. Quantities by the surveyors:—  
W. Crisp, Barry..... £250 0 0  
D. Love, Cadocion..... 469 0 0  
J. Barrow, Cadocion..... 461 11 4  
W. Adamson, Cadocion..... 441 0 0  
E. J. Ince, Cadocion..... 399 0 0  
J. Brock, Cadocion (accepted)..... 300 0 0

CHISWICK.—For repairs, decorations, and alterations at Nos. 54, 55, 56, 57, 58, 59, and 60, Uxham Park-road, Chiswick, for Messrs. Woodbridge & Sons. Mr. S. Woodbridge, jun., surveyor, 210, High-street, Brentford:—  
F. Hewett..... £343 7 0  
H. J. Robinson, Brentford (accepted)..... 388 3 0

FOREST GATE.—For the erection of a shop at Upton Lane, Forest Gate, E., for Mr. C. Knowler. Mr. J. F. Wesley, architect and surveyor, 278 Romford-road, Forest Gate. Quantities by the architect:—  
Bauer..... £1,870 0 0  
J. Holland..... 1,871 0 0  
North Bros..... 1,790 0 0  
J. W. Wiles..... 1,701 0 0  
W. Watson, Hford (accepted)..... 1,700 0 0  
W. Parsons..... 1,681 0 0  
Hearle & Sons..... 1,673 0 0

GREAT YARMOUTH.—For new schools, alterations, &c., for the Great Yarmouth School Board. Messrs. Bottle & Olley, architects:—

New Girls' School, Stradbroke-road Schools, and alterations to Boys' and Infants' Schools.  
J. S. Cooper..... £2,319 16 0  
R. Leggett..... 2,315 10 0  
R. Eastoe..... 2,305 17 0  
J. H. Hawes..... 2,278 2 0  
Rand & Cooper..... 2,275 0 0  
Grimble & Watts (accepted)..... 2,270 0 0  
G. J. Fuller..... 2,270 0 0  
Cork & Beach..... 2,262 0 0  
T. G. Leggett (accepted)..... 2,240 6 0  
[Architect's estimate, £2,260.]

Alterations and Additions to Cobholm Island Board School, Infant's Department.  
J. H. Hawes..... £217 18 0  
J. S. Cooper..... 779 10 0  
J. S. Leggett..... 778 10 0  
Grimble & Watts..... 772 10 0  
Rand & Cooper..... 765 0 0  
R. Eastoe..... 760 8 0  
Cork & Beach..... 747 10 0  
G. Beckitt..... 726 0 0  
J. Batchelor..... 718 0 0  
J. Harman (accepted)..... 685 0 0  
[Architect's estimate, £280.]

Addition to St. George's Board School, Infant's Department.  
M. Barnard..... £116 0 0  
J. H. Hawes..... 385 5 0  
J. Harman..... 316 16 0  
J. S. Cooper..... 287 0 0  
Grimble & Watts..... 252 0 0  
J. Leggett..... 275 0 0  
R. Eastoe..... 272 8 0  
Rand & Cooper..... 272 5 0  
Cork & Beach (accepted)..... 263 0 0  
[Architect's estimate, £280.]

ILFORD (Essex).—For additions to hospital chapel of 88, Mary and Thomas the Martyr, Ilford. Mr. J. Martin Brooks, architect, 35, Wellington-street, Strand. Quantities by Mr. John Young, 3, Great Winchester-street, E.C.:—  
W. Watts, Ilford (accepted)..... £1,737 0 0  
[There were five other tenders.]

IPSWICH.—For the erection of a residence at Ipswich, for Mr. W. Booth. Messrs. John S. Corder and Frank Brown, joint architects, 9, Thoroare, Ipswich:—  
Catchpole..... £1,450 0 0  
Bennett..... 1,410 0 0  
Girling..... 1,375 0 0  
Grimwood (accepted)..... 1,370 0 0

IPSWICH.—For alterations to the "Great White Horse" Hotel, for Mr. M. E. Clark. Mr. John S. Corder, architect, 9, Thoroare, Ipswich:—  
Bennett..... £127 0 0  
Grazzini..... 115 0 0  
Coe (accepted)..... 120 0 0

LONDON.—For alterations to Christ Church, Gipsy-hill. Messrs. Giles, Gough, & Trollope, architects:—  
H. L. Gough..... £260 0 0  
Nightingale..... 659 0 0  
Avis..... 629 0 0  
Jerrard..... 671 0 0  
W. & H. Carter..... 657 0 0  
Bower..... 657 0 0

LONDON.—For new sewers in Chalk Farm-road, Fordland-street, Hawley-road, Powlett-place, Hawley-street, and Prince of Wales-road, for the Vestry of St. Pancras:—  
J. Neave & Son..... £19,890 0 0  
J. H. Culverhouse..... 14,069 0 0  
J. Dixon..... 14,590 0 0  
G. Bell..... 14,590 0 0  
J. Meers..... 13,701 0 0  
Bloomfield..... 13,000 0 0  
W. Neave & Son..... 12,751 0 0  
T. Adams..... 12,598 0 0  
R. Ballard..... 11,750 0 0  
C. Killingback (accepted)..... 11,500 0 0

LONDON.—For the erection of a new branch bank at No. 91, Mile End-road, for the Central Bank of London, Limited. Messrs. Hammack & Lambert, architects, 69, Bishopsgate-street-within, E.C.:—  
Higgs & Hill..... £5,240 0 0  
Thomas Boyce..... 4,398 0 0  
Charles Cox..... 4,538 0 0  
E. & F. J. Wood..... 4,800 0 0  
Drew & Cadman..... 4,760 0 0  
W. Brase & Son..... 4,553 0 0  
Holloway Bros..... 4,483 0 0  
J. Hearle & Son (accepted)..... 4,389 0 0

LONDON.—For sanitary repairs, &c., at the Infirmary, Prince-street, Old Gravel-lane, E., for the Guardians of the Poor of the Parish of St. George-in-the-East. Messrs. Wilson, Son, & Aldwinckle, 2, East India-avenue, Leamhall-street, E.C., architects:—  
Holiday..... £1,375  
Staines & Son..... 1,087  
J. Holland (accepted)..... 1,079

LONDON.—For the erection of five dwelling-houses and shops in the Roman-road, North Row, for Messrs. Freund & Co., "for providing part materials." Mr. Charles E. Jackson, architect, 185, Grove-road, E.:—  
North Bros..... £3,280 0 0  
G. W. Beale..... 2,663 0 0  
Boulter & Lee..... 2,548 0 0  
Connell Bros..... 2,547 0 0  
C. Everett, Lucas Works, Lucas-road, Abbey-lane, Stratford \* Accepted. 2,069 0 0

LONDON.—For alterations and additions to the "Golden Lion," Dean-street, Soho, for Messrs. Sutton & Carden. Mr. R. E. Niblett, architect:—  
Burman & Sons..... £1,350 0 0  
J. Ivory..... 1,110 0 0  
J. & H. Cooks..... 1,090 0 0  
C. Deering & Son..... 1,080 0 0  
G. Veale..... 1,038 0 0

LONDON.—For constructing station at Great Dover-street, Southwark, R.E., for the City of London and Southwark Subway Co., being one of six. Mr. T. Phillips Figgis, A.R.I.B.A., architect. Quantities by Mr. R. C. Giesed:—  
Brickell..... £1,864 0 0  
Wall Bros..... 1,854 0 0  
Holiday & Greenwood..... 1,778 0 0  
W. Downs..... 1,773 0 0  
J. & J. Greenwood..... 1,728 0 0  
Lawrence & Sons..... 1,697 0 0  
Simpson & Son..... 1,679 0 0

LONDON.—For alterations and additions to 176 and 108, Regent-street, W., for the London Stereoscopic and Photographic Company, Limited. Mr. R. B. Marsh, architect. Messrs. D. Campbell & Son, surveyors:—  
Peto Bros..... £4,257 0 0  
Mowlem & Co..... 4,247 0 0  
J. & J. Greenwood..... 3,988 0 0  
Ashby & Horner..... 3,893 0 0  
Lawrence & Sons..... 3,573 0 0  
B. E. Nightingale (accepted)..... 3,546 0 0

LONDON.—For painting, &c., at the South-Eastern Hospital, for the Metropolitan Asylums Board:—  
Welch, Great Dover-street..... £1,460 0 0  
Watts & Long, Dulwich..... 1,460 0 0  
Hooper, Wandsworth..... 1,082 0 0  
Stewart & Co., Chapter-road, Walworth..... 768 8 8  
Fullager, Kingland-road..... 749 8 8  
Gamage, New Cross-road (accepted)..... 745 0 0

LONDON.—For the erection of stabling, coachhouse, &c., for Mr. F. Bailey, Addick-road, Kensington, W. Mr. F. L. Rosagion, F.S.I., architect and surveyor, 1, Gresham-buildings, Basinghall-street, E.C.:—  
W. H. Lucallies & Co..... £286 0 0  
Mark Gentry..... 890 0 0  
Kirk & Randall..... 889 0 0  
E. Lawrence & Sons..... 870 0 0  
Staines & Son..... 838 0 0  
J. Langham, Holloway (accepted)..... 795 0 0

LONDON.—For additions and alterations to warehouses for the Standard Asbestos Company, Lion Wharf, Bankside, Southwark. Mr. F. Harger, architect, 26, Budget-row, E.C.:—  
A. B. Clarke (accepted)..... £200 0 0

\* LONDON.—For repairs and alterations to premises, Nos. 209, 210, Blackfriars-road, and No. 59, George-street, Blackfriars-road, S.E. Mr. J. T. Alexander, architect:—  
Rider & Son..... £273 0 0  
Hoare & Son..... 249 0 0  
A. B. Clarke..... 247 0 0

LONDON.—For general dilapidations to house, Tudor-place, Tottenham Court-road, W. Mr. B. Reid, architect, 31, Great Marlborough-street, W.:—  
A. B. Clarke..... £215 0 0  
Clark & Manock..... 1,180 0 0  
Hoare & Son..... 1,123 0 0

LONDON.—For reinstating house and premises at 647, Rotherhithe-street, for Mr. Thomas White. Mr. W. I. Smith, architect, Victoria-street, E.C.:—  
Stewart & Co., Chapter-road, Walworth (accepted)..... £173 15 0

LONDON.—For providing and fixing a plain slate public urinal at Sermon-lane, near Liverpool-road, for the Vestry of St. Mary, Islington. Mr. Charles Higgins, surveyor:—  
Doulton & Co..... £115 0 0  
B. Finch & Co..... 89 0 0  
George Jennings (accepted)..... 79 0 0

LONDON.—For alterations to the "Queen's Head" public-house, Little Faltene-street, W., for Mr. G. A. Young. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C.:—  
C. F. Hewitt..... £260 0 0  
Allen & Sons..... 284 4 0  
Turtle & Appleton..... 465 0 0  
W. H. Smith..... 459 0 0  
A. W. Hammond (accepted)..... 417 0 0

For Counter and Pewsters' Work.  
Sanders & Son..... £60 0 0  
Buckley & Beach (accepted)..... 65 0 0

For Gas Fittings.  
C. J. Davis..... £78 15 0  
Vaughan & Brown..... 70 0 0  
Buckley & Beach..... 62 5 0

LONDON.—For painting and decorating, &c., the interior of Fleet-road Schools, for the School Board of London. Mr. T. J. Bailey, architect:—  
Sealey..... £455 0 0  
Williams & Sons..... 408 0 0  
Blade..... 375 0 0  
R. & H. Thorpe..... 347 0 0  
Marchant, Lady Somerset-road..... 321 0 0

LONDON.—For painting and decorating the interior of the Burghley-road School, for the School Board of London. Mr. T. J. Bailey, architect:—  
Williams & Sons..... £258 0 0  
G. H. Sealey..... 510 0 0  
H. G. Marchant (accepted)..... 470 0 0

LONDON.—For painting and decorating the exterior and interior of the Great College-street Schools, for the School Board of London. Mr. T. J. Bailey, architect:—  
Hornett..... £372 0 0  
Foxley..... 307 0 0  
Stephens..... 282 0 0  
Marchant..... 243 0 0  
Flaxman..... 233 0 0

LONDON.—For cleansing, painting, and redecorating interior and exterior of the Farmer's Schools, Approach, Victoria-park, for the Governors of the Farmer's Charity. Mr. F. J. Smith, architect:—  
J. Ivory..... £345 0 0  
A. Hood..... 323 0 0  
F. & F. J. Wood..... 310 10 0  
Thomerson & Son (accepted)..... 308 0 0

LONDON.—For alterations and decorations at Nos. 5 and 7, Southampton-row, W.C., for Mr. J. Braines. Messrs. Finker & Morewood, architects and surveyors, 4, New Inn Chambers, Wych-street, Strand, W.C.:—  
Alterations. Decorations.  
Heath, Brompton..... £310 0 0  
John Jones, Chelsea..... 280 0 0  
Banks, Bloomsbury..... 197 64

LONDON.—For repairs, cleaning, painting, &c., at Oldfield-road Schools, Stoke Newington, for the School Board for London. Mr. T. J. Bailey, architect:—  
Barley Bros..... £168 10 0  
Skitter & Son..... 161 15 0  
H. Knight & Son..... 117 0 0  
J. Colwell & Son..... 110 0 0  
J. W. Nottingham..... 110 0 0  
J. Grover & Son (accepted)..... 110 0 0

LONDON.—For the erection of new offices and engine-room, and other works connected therewith, for the Mining and General Electric Lamp Company, Limited, 64, Millbank-street, Westminster. Mr. James Norris, surveyor:—  
F. A. Ansar & Son, 1, Wood-street, Westminster (accepted)..... £185 0 0

LONDON.—For alterations for the Home and Colonial Trading Association, Limited, at the premises named. Mr. Robert Willey, architect:—  
303, Mare-street, Hackney.

Nightingale..... £349 0 0  
Hayward..... 310 0 0  
Rowe..... 298 0 0

241, High-street, Camden-town.  
Nightingale..... £320 0 0  
Rowe..... 295 0 0  
Smith..... 270 0 0

113, Whitechapel-road.  
Good..... £297 0 0  
Down..... 246 0 0  
Nightingale..... 227 0 0

LONDON.—For decorative repairs to No. 15, Pemberton-road, Holloway, N. Mr. Edmund J. Harrison, architect, 72, Chancery-lane, W.C.:—  
J. H. Fernley (accepted)..... £145 0 0

LONDON.—For painting and re-instating thirteen houses at Adelaide-square, Shepperton-road, Islington, N., for Mr. F. C. Nicholas. Mr. Edmund J. Harrison, architect, 72, Chancery-lane, W.C.:—  
Stevens Bros, Holloway..... £890 0 0  
C. Deering & Son..... 836 0 0  
Wm. Styles, Islington (accepted)..... 585 10 0  
H. S. Stephens, Islington (accepted)..... 585 10 0

LONDON.—For painting, decorating, and general repairs at the Surrey Commercial Dock Tavern, for Mr. C. G. Dille:—  
Stewart & Co., Chapter-road, Walworth (accepted)..... £138 10 0

NOTTINGHAM.—For supplying single-nook fittings and mantelpieces at Mapperley Hall, for Colonel Wright. Mr. J. A. Stenhouse, architect:—  
C. Hindley & Sons (accepted)..... £212 0 0



**PENARTH.**—For the erection of stable, Penarth, for Major Thornley. Messrs. Richards & Gethin, architects:—  
T. Evans, Penarth ..... £15 0 0  
Jones Bros., Cardiff ..... 181 0 0  
R. Price, Cardiff ..... 178 0 0  
T. Griffiths, Penarth ..... 168 0 0  
J. Jones, Penarth ..... 160 0 0  
G. Griffiths, Cardiff ..... 135 5 0  
Shepton & Son, Cardiff ..... 125 0 0  
Shepherd & Son, Cardiff ..... 124 0 0  
E. Page, Penarth (accepted) ..... 124 0 0

**PENARTH.**—For the erection of cow-houses at Rwr Delya, near Penarth, for Mr. T. R. Thompson. Messrs. Richards & Gethin, architects:—  
G. Griffiths, Cardiff ..... £227 0 0  
R. Price, Cardiff (accepted) ..... 210 0 0

**RHINEFIELD.**—For completing the carcass, and partially finishing a mansion (exclusive of stable court) at Rhinefield, near Brockenhurst, Hampshire, for Lieut. Munro, M.N. Messrs. Romaine-Walker & Tanner, architects. Quantities supplied by Messrs. Pryce Cuxson & Leigh, surveyors:—

Dove Bros. .... £20,526 0 0  
E. Lawrence & Sons ..... 20,475 0 0  
Holland & Haimes ..... 20,514 0 0  
Trollope & Sons ..... 20,120 0 0  
Hall, Beddall, & Co. .... 19,977 0 0  
J. T. Chappell ..... 19,615 0 0  
E. Abley ..... 19,300 0 0  
Hy. Lovatt ..... 19,300 0 0  
Shillito & Son ..... 19,275 0 0  
Ward, Clarke, & Co. .... 19,258 0 0  
Holloway Bros. .... 18,513 0 0  
J. McWilliam & Son (accepted) ..... 18,390 0 0

**SEVENOAKS (Kent).**—For the erection of a pair of semi-detached residences, in Vine Court-road, for Mr. J. H. Marchant. Mr. J. W. Brooker, architect, 13, Railway-approach, London Bridge, S.E.:—  
Wilshire, Sevenoaks ..... £2,150 0 0  
Garratt & Son ..... 1,510 0 0  
Kirk (accepted) ..... 1,583 0 0

**STANSTEAD (Essex).**—For building one pair cottages. Mr. W. D. Carro, M.A., architect:—  
W. Gladding (accepted) ..... £240 0 0  
[No competition.]

**STOCKTON-ON-TEES.**—For erecting St. Peter's Church Schools, Stockton-on-Tees. Mr. Eugene E. Clephan, architect. Quantities by architect:—  
John Cook ..... £2,168 0 0  
W. C. Aikinson ..... 2,148 2 6  
Crang & Benson ..... 2,113 10 0  
John Davison ..... 2,000 0 0  
John Parks ..... 1,940 0 0

**TUNBRIDGE WELLS.**—For erecting and completely finishing a master's house at the Second Grade Boys' School, for the Worshipful Company of Skinners. Mr. E. H. Burnell, surveyor, 32, Bedford-row, W.C. Quantities by W. R. Mallett, Great St. Helens, S.E.:—  
Punnett, Tonbridge ..... £2,549 0 0  
Wilshire, Sevenoaks ..... 2,798 0 0  
Peto Bros., London ..... 2,750 0 0  
Holloway Bros., Battersea ..... 2,721 0 0  
Pattman & Fotheringham ..... 2,700 0 0  
Strange & Son, Tonbridge Wells ..... 2,608 0 0  
Allen & Son, Kilburn ..... 2,400 0 0  
Wm. J. Mitchell, Dulwich ..... 2,365 0 0  
\* Accepted.

#### TO CORRESPONDENTS.

W. P. B.—R. W.—I. D. E. (please send address, in order that your drawing may be returned).—E. L.—A. S. E. (it seems an arrangement by a necessitous draughtsman, probably).—J. D.—S. E. T.—H. M. (probably you are not entitled to be considered with the competition in regard to London property of the class referred to. To any one who is, the idea of calling landlairs "an unfortunate class" would appear a kind of grim irony).—M. & M.—(Hornsey School Board) (the correspondent who sends us a statement as to this competition must have a high sense of our simplicity of mind if he imagines we are going to publish his "fact" with no better voucher than an anonymous letter).—M. H. (below our mark).—C. J. & Co. (we cannot insert such lists. Were we to do so, every firm would favour us with excerpts from its "order-book").  
All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline printing out books and giving addresses. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.  
We cannot undertake to return rejected communications.  
Letters or communications (beyond mere news items) which have been duplicated for other journals, are NOT DESIRED.  
All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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**THE INDEX AND TITLE-PAGE** for Volume LVI. (Jan. to June, 1889) were given as a Supplement to our number for July 12.  
A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office.  
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Addressed to No. 46, Catherine-street, W.C.

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# The Builder.

VOL. LVII. No. 2423.

SATURDAY, AUGUST 17, 1899.

## ILLUSTRATIONS.

Entrance Hall of Residence, Palace Court, Kensington.—Messrs. W. Harvey and Bernard Smith, Architects	Double-Page Photo-Litho.
St. Michael's R.C. Home for Girls, Waterloo Villa, Hants.—Mr. Leonard Stokes, Architect	Double-Page Ink-Photo.
"Rhinefield," Hampshire.—Messrs. Romaine-Walker & Tanner, Architects	
Chancel of St. Andrew's Church, Heckington, as restored by Mr. James Fowler, Architect	Double-Page Photo-Litho.
Snettisham Church, Norfolk	Single-Page Ink-Photo.
Leverington Church, Norfolk	Single-Page Ink-Photo.
Blocks in Text.	
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### "Expositions diverses" at the Paris Exhibition.



THE vague but comprehensive title of "Exposition diverses" includes all the galleries forming the great square block behind the central dome of the Paris Exhibition.

tion, and branching out on either side from the main gallery connecting this dome with the Galerie des Machines. The exhibits included under this heading are mostly such as would come under the heads of furniture and of personal adornment. On the right are sections devoted to furniture, *horlogerie*, bronzes, and ceramic work, &c.; on the left are represented dress, textiles, jewellery, and a small and rather poor exhibit of stained glass. Ironfounders' work and other practical industries also come into the "Expositions diverses," but the main portion is given up to that kind of work which occupies the borderland between art and manufacture, and may be artistic or not, as it is treated.

This portion of the exhibition is of enormous extent in itself, and of course, a great deal of it is mere shop work, but not without interest even so, as indicating the prevalent taste and fashions of France in various classes of furniture and manufacture; and here and there we come upon work of real artistic interest. The modern Gobelins tapestry exhibits are to be seen in two recesses opening from the gallery that runs round the interior of the dome. They are admirable in workmanship, but mostly mistaken in aim; a great many of the works are landscapes, better done than one would have thought they could be done in tapestry, but mistakes at the best. The purely decorative work consists mostly of panels covered with vases, cupids, and scrolls on a yellowish ground; *rococo* in design and showing very poor feeling for colour. The decorative figure subjects are better, though several of these are far too picture-like and quite wanting in the true characteristics of tapestry design. An exception is the portrait of Henri IV. in the east gallery, a half-length in a circular medallion supported by cupids, the whole very decorative in effect; this is intended for the Louvre. There is also a rather powerful design symbolical of Printing, the principal

figure in which is very dignified; this is probably intended for some public hall; it bears as a motto the line—

"Machina multiplicat scribentis munera dextro."

But on the whole one comes down from the Gobelins exhibits feeling that though the old name be kept up, the old spirit has departed. On the ground-floor underneath the west Gobelins Gallery is the Beauvais tapestry collection, much the same in general taste, but with a decidedly better feeling for colour; more broken, more rich, and less of that dead "self-colour" yellow ground which looks so commonplace in the Gobelins work.

Under the east gallery opposite is the Sèvres exhibit, and here indeed is something to please both eye and taste, both sense of colour and sense of form. There is little richness of colour here, certainly, but great beauty and purity of tones, and a general beauty and refinement of form which gives a remarkable air of distinction to the whole collection. Fancy and originality are not much displayed, but good taste and perfection of modelling and finish pervade the whole collection, and leave a most agreeable impression on the mind.

Passing inward from the dome to the main avenue, the first compartment opening out on the right or west side is that inscribed with the fascinating legend "Orfèvrerie"; how fortunate the French are in that picturesque and convenient word, for which we can only say "gold and silver-smith's work." We know pretty well, however, what (from an art point of view) a great deal of the work under such a title will be like in a modern French collection, and enter it in the frame of mind of the American moralist, who suggested as the eleventh commandment, "Expect nothing, and thou shalt not be disappointed." The first stall, the brilliant exhibit of Poussielgue-Durand et Fils (whose high altar for St. Ouen, in the nave, we have already mentioned) shows that the French have plunged even deeper into trade Mediævalism than we have; in a country still Catholic as far as it is religious at all this is natural, and indeed the number of costly and elaborate high altars exhibited (most of them commissions) is one of the special points that reminds us we are not in England. And on the whole our shop mediævalism is better than the French; it is less gewgaw and with more smack of Mediæval feeling about it. Of this latter there is in MM. Poussielgue-Durand's brilliant

show about as little as could well be imagined. In Renaissance work the French do of course far better (strange to have to say this of the country that produced the greatest Mediæval buildings of Europe!), and Debain's silver after the Louis Quinze type is very good of its kind. Armand-Calliat, another of the mediæval furnishers, exhibits a tabernacle or shrine presented to the Montmartre Church by the Pope, which has a stamp of originality, especially in the treatment of the four Byzantine-like angels holding up a canopy over the top, their wings stretched out from behind each angle; the designer's name is not given. The same firm exhibit a very gorgeous high altar for Merville designed by M. Cordonnier, the architect; the main feature is a large semi-circular arch over the altar, edged with scroll ornament of Byzantine type, and finishing rather awkwardly in a series of steps above the arch; the interior of the arch is filled up behind the shrine with gilt open-work in an effective manner; but below this it is defaced by imitation metal hangings in sham creases and folds: altogether not a work of much refinement of taste.

Near this exhibit is a small square case in the middle of the floor, which offers an agreeable contrast to the shop exhibits at the side. It is marked with the names of Vernaz and M<sup>me</sup>. Vernaz-Vechte, and contains a few small but precious works in repoussé and chased silver, which for grace of design and delicate beauty of execution it would be difficult to beat anywhere. This is artist's work, not exhibited by a "firm." "Who executed this?" we asked of a quiet little woman who seemed connected with the exhibit. "Moi-même." "And who was the designer?" "Moi-même" also. So we congratulated M<sup>me</sup>. Vernaz-Vechte on her work and that of her husband, and recommend those who visit the Orfèvrerie Gallery to find it out; they will find nothing else so well worth seeing. It was positively refreshing to come across a real artist and her work after going the round of shop exhibits, each infested by persons on the watch to thrust a trade circular into the hand of any visitor who was incautious enough to be seen looking at their goods. There is another separate case of some interest containing ornamental work in tin struck from bronze moulds specially designed by the artist, M. Jules Brateau. This is very pretty work in appearance, with a great deal of individual character about it; each design is an original one by the author, and is only repeated or struck a limited number of times,



so that without making it as common as ordinary casting (which it quite differs from in sharpness of character), an original design can be reproduced sufficiently to give a comparatively low cost to each example. "We do not keep a shop," said M<sup>me</sup>. Brateau (for here again the lady was the custodian), "we are artists"; and the work justifies the claim, and has a unique character of its own.

Among other exhibits that may be mentioned as presenting some special interest are Brunet's pretty Renaissance altar in marble and metal-work; Lambert's case, in the centre of the room, of damascened work, one metal inlaid on another, and Dufresne's case of *objets de luxe* (also a central case), which contains one remarkable work, the "Coupe de plaisir," a great vase in beaten metal with a figure of a man reclining on the lid and taking grapes offered him by a female figure; below the bowl are Siens entwined with serpents, and on the base figures of men bowed in chains, the victims of indulgence, with mottoes between—"Cecus et servus Samson jacet obrutus," &c.; the figures are finely modelled and the whole design effective, and there is a thought embodied in it, which is unusual enough in this class of work. That is the defect of the Christofle exhibit, which is conspicuous in the centre of the gallery; the silver statuettes of rustic figures, marked "Ministère de l'Agriculture," and evidently intended as prizes for some occasion, are pretty objects in their way, but totally commonplace in style and idea, and the whole collection is that of a great establishment for turning out "objects of art"; a very different thing from artist's work.

The next court on the west side is the Ceramic, the façade or screen of which is worth looking at, though a little too gaudy; it consists of an architectural erection in coloured glazed stone ware, with coupled white columns on either side of the central archway, with spiral wreaths of realistic leaves painted and partly relieved on them; a niche on each side holds a figure, placed between the coupled columns, clad in a coloured costume a little too much like Dresden china on a large scale; the figures are, however, pretty in their way: they symbolise Painting and Architecture. In the central avenue, by the way, nearly opposite this court, is a screen or doorway set up representing the work of the "Manufacture Nationale de mosaïque," the general design and mosaic decorative detail by M. Paul Sédille, with figures on each side designed by M. Olivier Merson. The figures are on broad pilasters on each side; these are connected by a segmental arch with a rather coarsely-designed cresting as a finish above. The figures represent "Tapisserie" and "Céramique"; the former is a charming design, but the general effect of the whole, and the character of the detail, are not quite what we should have expected from the talent engaged upon it. To return to the Ceramic Court, we find a fine collection of work here, distinctly more permeated by the artistic element than is the case in the Orfèverie Court. Among the mosaic exhibitors Messrs. Burke & Co. make a good show of decorative work of an ordinary type, but well executed and in good taste. The exhibits of Gilbert Martin and Facchina deal with a more distinctly artistic type of mosaic work; the latter exhibits a good reproduction of a decorative picture of the "Ville de Paris" from the design of the late M. Mazerolle, whose designs are to be seen executed in several decorative processes in various parts of the Exhibition, and who, as formerly noted in our columns, has died since the opening of the Exhibition. Lobnitz's collection shows some fine modelled work of flowers and fruit in glazed terra-cotta, not irreproachable in taste, however; in particular a large stoneware fireplace and overmantel exhibited in this bay, a fine piece of workmanship in itself, is totally spoiled by the detestable trickery of the leafage in realistic colouring trailed irregularly over it.

Among ceramic work in the usual sense the average of work is high, but the most interesting and most truly artistic collection is that exhibited by the Society of "Cham-

brelans," as they call themselves, of Limoges; an expression which we found was not familiar even to Paris architects and art-critics, but which is adopted by artists trained in Limoges work but who produce the work at their own houses or lodgings, mostly in Paris. Here we have again, as in one or two instances already noted in the Orfèverie section, the personal artistic element instead of the shop; and the difference is equally observable in the character of the work exhibited. Every article designed and made by the "Chambrelans" Society is labelled with the name of the artist, a fact which the member of the Society who acted as their representative was careful to point out. And a great deal of the work here is beautiful, both in regard to fancy of design and harmony of colour, and is worthy of the best period of art. The tea-sets and other articles made by M. Dumontet are especially worthy of notice for the true artistic feeling displayed in them. Here is the work of men who take pleasure in their work, and whose designs show what fine decorative artists are to be found in France among those who have preserved their individuality and escaped being drawn into that wholesale trade production which kills out the very soul of art, and reduces the occupation to a business done for wages and according to the dictates of fashion. The characteristics of the best of this modern work of the Limoges school are fancy and variety in outline, the avoidance of hard and rigid lines, a considerable use of open and pierced work, and the painting over of the surface with powderings of little flowers of various types, many of them drawn and coloured with the greatest delicacy, and of course all hand-work.\*

Among the numerous other displays of ceramic ware we may mention some that display special characteristics of excellence. Pull, *père et fils*, have some work that is rather in the style of Messrs. Doulton's ware, and good in texture and colour. Clement Massier, from the Alpes Maritimes district, makes a fine display of lusted ware of really artistic character, good both in form and in decorative detail, and the monochrome vases are very rich and fine in colour. Millet, of Sévres, makes a specialty of gold under enamel, with a very rich effect, and also of a style of decoration imitative of cloisonné enamel; this of course is objectionable in one sense, but if it were not palpably an imitation of another process, or if we did not know the other process, the result must certainly be admired, as the so-called cloisonné lines give a firmness of outline and a vigorous character to the design. Montagnon of Nevers shows a fine collection of ware of a majolica type, blue and yellow as predominating colours. Two very large vases by Aubry form an effective pair, the one showing floral ornament on a white ground, the other design of similar character on a very dark blue ground; the contrast is striking and effective, and the forms finely designed. These are dwarfed in scale again by Greu's immense vase which forms the central object of the room, and stands about 7 ft. high, a splendid piece of work, but more showy than artistic. The exhibition by Fourmantraux runs into Oriental taste in colour and design, the wall tiles being especially good; the "note" of the whole collection is rather that of what may be called the Indian shawl type. The house of Montreux shows good examples of tile-painting of a rather florid type, and that of Emile Levy a very good collection of jars of old Sévres type, blue with gilt mountings, and painted with figures on panels which are very good; the names of the figure artists (nearly all ladies) are conscientiously given. The exhibition by the Deck firm, near the entrance, is also a fine one, and very rich in colour effect. Altogether, from the artistic point of view, the

Ceramic gallery is the most satisfactory part of the "Expositions diverses."

The furniture, a very large collection, occupies the next court on the west side. Two or three of the most sumptuous exhibits occupy bays on either side of the entrance to the court, and facing to the central avenue. That of Damon & Cie. offers only the ordinary characteristics of a Louis Quatorze room carried out in a costly manner; but the exhibition by Charlier & Guenot has some character of its own. They exhibit some remarkably well-made and monumental-looking furniture of a very plain and square type, but which has the merit that it is not an obvious imitation of any past style. These makers also exhibit iron and steel safes, which evince a rather unusual effort to render the outer or screen doors of safes decorative; the large perforated doors of cut and hammered steel to one of these safes form a fine piece of effective design. Jansen's Louis Seize boudoir and bedroom, next to this, is a charming apartment; the prevalent elements are white wood and gilding with a pale blue flowered silk strained as a wall-covering; it is not art, but it is the pink of refined civilisation in the get-up of a room. Of art, indeed, there is little enough in the Furniture Court; it is mostly a "shop" exhibition, showing a great deal of good workmanship, occasionally varied by some originality of method or treatment. Facing us at the lower end of the court as we enter is a huge built-up wooden pavilion, bearing the superscription "Maison Krüger," with a double staircase leading up on each side to a room above. The details of the erection and staircase (meant to be very ornamental) are in wretched taste, but the furnished room at the top, which is the kernel of the affair, is well worth looking at for its original treatment and subdued richness of effect. The walls are silk hung in panels of a low warm tone inclined to crimson, with dark maroon borders; a tapestry frieze with figures runs above; the doors are carved oak; the chairs upholstered with crimson velvet. Light is admitted through a circular stained window in the ceiling. An effect has been obtained of richness combined with repose of tone which is very satisfactory to the eye, and such as would not have been anticipated from the bad design of the staircase leading up to it.

Among the exhibits in the side bays Schmidt & Piollet show that it is possible to combine richness with simplicity in bedroom furniture. It must be observed that the French furnisiers (and therefore we presume their customers) still pin their faith to the huge four-post or canopied bedstead which a better perception of sanitary conditions is now sending out of date with us; but this solemn and ancestral-looking piece of furniture undoubtedly gives them a fine opportunity for effect. In the bay occupied by Potheau frères, for instance, is a great ebony bedstead of this type, carved in Renaissance style, and with a flowered coverlid in deep crimson, which at once makes a picture in its way. Louveau shows a great canopied bedstead, suggesting the idea of a state bed, with brown velvet hangings, and elaborate painted landscapes and figures on the head and footboards. Jeanselme & Co. exhibit another, suggestive of Louis Seize work but with some originality, and with the footboard beautifully inlaid with various coloured woods. Two exhibitors may be noted as showing a certain degree of distinctive style in their furniture; Vallet frères, of Marseilles, whose carved woodwork (like some of the antique woodwork in the Trocadéro) presents a combination of Classic and Gothic elements rather happily blended; and Viardot & Co., who have achieved a manner of their own in their furniture design, which suggests the idea of Japanese *motifs* translated into French workmanship. The work is mostly in ebony or bonised wood with richly coloured upholstery, and is treated with a fanciful avoidance of symmetry, the two arms or sides of an armchair, for instance, being varied in design; grotesque animals disport themselves with an unconventional ease of manner about

\* The Chambrelans de Limoges are represented by their delegate M. A. Gorceix, at 8, Cité du Trône, Paris; and at Limoges at the Place Fontaine-des-Barres, No. 1. We shall be glad if this mention of their work should be the means of bringing to the notice of English amateurs a society of artisans who are doing really artistic work in an artistic spirit, and far superior to what can usually be purchased from general dealers in modern ceramic ware.



the backs or rails of chairs and settees; and so on. The work is really clever, though perhaps the humour of it may seem a little forced.

An adjoining court also dedicated to furniture contains works of a more solid and semi-architectural class, such as Parfoury's sumptuous marble sideboard or buffet. The portion of this above the shelf is formed with three semicircular-headed niches in yellow marble, divided by white marble colonnettes between them; other portions are carried out similarly in variously coloured marbles of monumental thickness and with a general look of great costliness; but the effect lies rather in the quality of the materials than in the design. This court also contains some very elaborate church furniture exhibits by Beer and Desmaret, but not presenting anything of special artistic value. We ought not to forget however, in relation to this portion of the exhibition, the large high altar for Rouen Cathedral which stands in the central avenue near Cavallé Coll's organ, and is from the designs of M. Sauvageot and executed by MM. Trioullier frères. This is not all bright or gilt metal, like the other altar in the central avenue, but is designed with a white marble base and altar, and a white marble reredos with gilt friezes in the panels, while a brass-work tabernacle and spire rises over the centre. There are side tabernacles and spirelets also, which are rather badly joined on to the marble base; but in general there is no doubt this combination of marble and metal is more architecturally effective than making the whole thing of metal. Whether it looks so effective or brilliant as a mere part of the ensemble of the church, when fixed in its place, may perhaps be another question.

The exhibition of tapestries, which is in a court in the rear of the furniture court, is a satisfactory one, and shows that a good deal, at all events, of the modern tapestry work of France is based on good models; in an artistic sense, indeed, the bulk of this work is much better than the Gobelins, which is supposed to be the artistic centre of tapestry work. There are no doubt in this part of the exhibition tapestry landscapes and other pictures which are worse than the Gobelins work of the same kind because, while equally bad in principle, they are not so fine in workmanship; but in general the tapestry work here is truly decorative in character, consisting of large flowing bold designs of conventional foliage, perfectly suited to the capacities of the material. Of course this is rather a prosaic type of design; there is nothing of the fancy and invention that may be illustrated in such tapestry as that of the inner hall at Hampton Court; but it is at all events good of its kind and entirely unexceptionable in point of taste.

The next court is occupied with "Horlogerie," and after looking at the beautiful designs of the old watches in the loan exhibition at the Trocadéro, it is melancholy to find such an almost total want of artistic feeling or interest in this large collection of modern French clocks and watches. We are looking at exhibits, in this article, from an artistic point of view, and really it would be difficult to find an object in this collection which an artist would care to possess for the sake of its design. A clock or timepiece is such a suggestive thing, too, for artistic treatment, that one might expect to find art applied to objects of daily use here if anywhere. But it is not so. Plenty of pretty workmanship there is; but not an idea worth speaking of among the whole. Savoye frères show good taste and a desire for rich effect in their decorative treatment of the backs of watches, though these are nothing more than ordinary scroll-work motifs. There are foolish knick-knacks in plenty, such as Farco's timepieces in the shape of windmills, lighthouses &c.; but in a general way the modern French clockmaker seems to rise to nothing higher in design than a miniature architectural treatment of a timepiece, with Classic columns at the angles. One only original idea we noticed as worth mention, a clock by Améaume in which the dial is a

large disc decorated with foliage meandering over it, and with two apertures on it in which appear the figures showing the hour and minute respectively, a figure dropping and another succeeding it each minute; this disc is held aloft by two draped nymphs in silver, not remarkable for design or modelling; still there is a distinctive idea in this, which does not impress one as if merely turned out of a clock manufactory in the ordinary course of trade.

Much the same may be said of the court dedicated to bronzes. With a few exceptions, these are simply *objets de luxe*, a description which applies to the whole show of work by the great fashionable firm of Barbédienne, who have a whole section of the court to themselves. "They have their reward" we presume, in wealth and great patronage; but it is melancholy to look round all their collection of handsome and costly things without seeing one which bespeaks any higher object than to please popular taste and fill up the saloons of wealthy houses in a showy manner, or which looks as if the mind and feeling and enjoyment of the maker had gone into it. In the centre of the Barbédienne territory is their *pièce de résistance* in the shape of a tumultuous and costly clock-case standing 11 or 12 ft. high, built up in architectural stages with various costly materials; but there is no ruling idea or motive in the design; it is simply to make something as elaborate and costly as possible. Behind this is an erection that really is artistic, though in a material that is not costly or "precious"; this is a fountain in wrought-iron by Ferdinand Marron, a really powerful piece of work, rising in a lofty canopy of foliage around uprights with a figure in the centre; some of the foliage work, unfortunately, is too realistic (the constant stumbling-block of clever wrought-iron workers), but this is a fine piece of work done in the spirit of an artist. Among other objects that are superior in type to their surroundings are L. Martin's large silvered vase showing reliefs of figures entwined with scrolls, of fine design and style; Gosset's wrought-iron repoussé work is good; a large stand in the centre of the court is partly occupied by a collection of admirable models in bronze, small size, by More, from the works of M. Fremiet; and the same stand contains some beautiful toreutic work in the shape of figures of birds, &c., executed in silver with great delicacy. The collection illustrating Thiebaud frères' work in bronze castings occupies an important place in the exhibits of the central avenue; this is splendid as an exhibition of bronze founding, which is what we believe it professes to be, the Thiebauds being reproducers of artists' work. The drawback to the majority of the work exhibited in the bronze court is that it is manufacture pretending to be art.

At the lower end of the east side of the centre avenue is to be found, partly in windows in the building itself, and partly in a small room reserved for it, what stained glass is to be seen in this part of the Exhibition; and a poor show it is, considering the occasion. The house of Champigneulle is responsible for most of it; and the only two things of really high interest in the collection are the two of which we have some time ago published illustrations, "The return of Alsace and Lorraine," and a study of a window in early French Renaissance style. There are three Renaissance-looking windows in each transept of the building at this point, containing much white glass picked out with yellow, and with figures of fine bold design drawn in grisaille, very much like some of the windows in this style that have been carried out in the South Kensington Museum, only not so well done. The small room of stained glass is worth looking into for the sake of one or two little pieces in it of special merit. But it is clear that stained glass art in France is not in a very flourishing condition, if this is all it can show in so important an Exhibition.

The galleries on the east side of the central

avenue are to a great extent devoted to exhibits which do not come under the class of subjects we are now treating of. There is one court devoted to firearms and sporting exhibits, one to dress (which might come into the region of art but mostly does not), and one to textiles, especially Lyons goods, which occupy naturally a very large space. The general character of these silks and other stuffs implies a general level of cultivated taste—there is little, perhaps nothing, that can be said to be in bad taste; but there is also little evidence of that kind of delight in a noble and free style of pattern design which is the glory of Renaissance textiles, and of which there are at all events more and better examples to be found in England than in France at present. Little attention or interest seems to attach to this part of the Exhibition; the court is usually empty. The most popular by far of all the "expositions diverses" is the court devoted to "Bijouterie." This is a very extensive collection, so much so that one would suppose that every jeweller of any importance in Paris must be represented; an admiring crowd press around the principal cases, the majority women, but with a large admixture of the other sex also. Considering how bad is the taste of English dealers and purchasers in this class of work at present, it would be a satisfaction, in spite of patriotism, to find that there was better and more artistic work to be had no further off than Paris; but it is a satisfaction the discerning visitor will not enjoy. Taking the collection as a whole, it proves that at all events Paris is not in this department of work one iota in advance of the standard of Bond-street. Ladies, we believe, think otherwise; but in these matters ladies have mysterious canons of taste of their own, inexplicable from the point of view of art criticism. The designs to be seen in this immense collection consist merely of the most ordinary devices of arrangements of stones in star shapes, or in imitation of sprays of leaf &c., repeated with little variation and no invention. Here and there are to be seen some silver and gold bracelets, such as those of Savard in "argent ciselé," which are superior to the general run of work; and there is one case by Amant-Benard which shows really artistic work, and in this sense stands almost alone in the collection. These consist of delicate openwork caskets and ornaments in gold and silver, very minutely modelled, entirely in conventional designs of great beauty and individuality, and without a trace of the imitations of leaves &c., which seem to form the highest flight of the bulk of the designs. Some of these are quite Greek in delicacy and refinement, and unlike anything else to be seen in their neighbourhood.

A review of the art work in this extensive quarter of the Exhibition leads, in short, to the conclusion that, while France is at the head of the world in sculpture, and taken all round perhaps in painting also (though in certain fields England may claim superiority), in the class of ornamental work which more than any other forms the gauge of the prevalent artistic taste of a nation, she has no claim to that superiority in artistic taste or feeling which is sometimes thoughtlessly claimed for her. She is a profuse and splendid manufactory of *objets de luxe*, that is all; and that is not art.

#### Crystal Palace School of Engineering.

—Sir Douglas Galton distributed, on Saturday last, the certificates gained by the students in the Crystal Palace School of Practical Engineering. In the course of his address, Sir Douglas reviewed the progress of engineering during the century, dwelling specially upon the increased accuracy of work, which is largely due to the initiative of Sir Joseph Whitworth, to advances in metallurgy, and other circumstances which give new opportunities to the engineer. He adverted to the careful work and thorough training given in the school. The report was read by Mr. Shenton, and showed an increased number of students, and that the successes have been numerous. The examiners of the term were Mr. H. V. Rudston Read, Mr. J. H. Cunningham, and Mr. Leonard Milne.



## NOTES.

**T**HE Board of Trade have issued a circular relating to the procedure they intend to adopt at the hearing of objections to the railway classifications. It is satisfactory to learn that the latter are, as far as possible, to be made uniform throughout the United Kingdom. They are already identical in many respects, and the schedule of the London and North-Western Company will be taken by the Board as a representative one,—though only for the purpose of discussing the classification and general conditions. It yet remains to be seen what course will be adopted with regard to the mileage rates; but it would be manifestly unfair to again take the London and North-Western schedule as a basis, seeing that the charges that Company propose to make are considerably higher than those of several of the other trunk lines. It would certainly be a great gain if all the rates could be made uniform as well as all the classifications; but, as the existing powers of the Companies (which vary so considerably) cannot in fairness be altogether ignored, perhaps this is too much to expect. The Board boldly propose to take the subject of station terminals at the first sitting (Oct. 15), and notify that objectors may appear themselves or by any authorised representative. Judging from the general tone of the speeches at the half-yearly meetings, the conferences of the last few weeks have not been altogether fruitless. Lord Colville of Culross, at the Great Northern meeting, said that there was every reason to hope that an arrangement satisfactory to both parties would be arrived at; while Sir Richard Moon (London and North-Western) said that in some few cases objectors have shown no disposition to negotiate; but in many others a willingness has been manifested to assist the Board of Trade and the railway companies in the difficult task imposed upon them, and that satisfactory progress has been made. On the other hand, the Chairman of the Lancashire and Yorkshire (Mr. Armytage) stated that they had a difficulty in finding a recognised body who thoroughly represented all the trades; and pathetically remarked that they were longing for rest and peace, so that they might look after their business without so many interruptions. This would undoubtedly be very welcome to all concerned.

**W**E have more than once expressed the opinion that the doctrine of "common employment" as barring compensation from the employer for injury caused by one of his servants to another, obnoxious as it is to the working classes and their political partisans, is in itself a wholesome and even necessary enactment to safeguard the employer from being victimised. But we must admit that it may be pushed too far, and this seems to have been the case in the matter of *Johnson v. Lindsay*, heard on appeal before Lords Justices Cotton, Fry, and Lopes. The plaintiff was in the employment of a general contractor on a building on which the defendants, iron-founders, were engaged to fit a fireproof flooring on the seventh story. There was to be a platform at the top of the building for the purpose of drying clothes, and this part of the work was to be executed by Lindsay & Co. The main contractors contracted for the whole work, but they were to provide the sum of 213*l.* to be paid to Lindsay & Co., "or any other firm approved of by the architect," for this particular work. One of the defendant's men let an iron bucket fall on the plaintiff, causing him serious injuries. The jury found for the plaintiff: 50*l.* damages. The Divisional Court set aside the verdict, and the Court of Appeal upheld its decision by a majority of two of the Judges, on the ground that the defendants were in the employ of the contractors, and that it was a case of "common employment." Lord Justice Fry dissented, on the ground that the defendants were independent contractors. He con-

sidered that they were specialists brought on to the job to do certain special work by their own skilled men who were under their own orders, and not under the orders of Messrs. Higgin & Hill the general contractors. The learned Judges who ruled otherwise took the line that the general contractors and the defendants were working together for a common object. No doubt in a sense they were; but the men employed were certainly not under a common employer, and though the case is no doubt a difficult one both in regard to law and justice, it appears to us that there is at least strong presumption in favour of Lord Justice Fry's ruling. The plaintiff was not in the service of the defendants, and the defendants were carrying on independent work, by arrangement, with their own men and (as far as appears) their own plant. They were certainly not, in the ordinary acceptation of words, in the employ of the contractors, and that they were so in a legal sense seems a conclusion very much open to question, to say the least.

**A** CURIOUS controversy is going on in regard to the tower and spire of St. Michael's, Coventry, which, as many of our readers will be aware, has been undergoing some absolutely necessary repair and restoration under the care of Mr. J. O. Scott. It is now a question whether the tower is strong enough to make it prudent to hang again the peal of ten bells, and the evidence of the architect and the bell-founders seems conclusive that it is not. It has been suggested that the bells should be rehung to chime only, but as a member of the Restoration Committee remarked, "The people of Coventry would not care a farthing rushlight for that"; and they are right. A committee of honorary architects, consisting of Messrs. Ewan Christian, Herbert Carpenter, Jas. Brooks, W. White, and J. P. Seddon, have reported that it would be dangerous to hang the bells unless the north and south windows of the tower, including their internal and external arches, were taken out and replaced by solid masonry, and powerful central buttresses of adequate width and projection carried up sixty feet, as far as the springing of the windows on the second story. The report concludes with an expression of opinion "that it is undesirable that the authentic design of one of the finest towers in England should be interfered with, merely for the purpose of ringing a peal of bells, the hanging of which within its walls the original designers, it is quite certain, could never have contemplated." This seems the common sense of the matter; but Mr. Christian has sprung a rider on his co-signatories dissenting from this "archaeological" opinion, and bringing in the authority of Mr. Pearson to the effect that the proposed buttresses and closing up of the windows would be quite a proper course to take. This only shows what an unsafe and capricious guide Mr. Pearson is in such matters. He has been occupied at Westminster Hall in purely "archaeological" erections, and now he wants to take the opposite line and entirely alter a famous tower for the sake of hanging bells there. Now if the bells were a necessity, or formed part of the design, there would be reason in this: but St. Michael's tower was not built for bells; it is a work of art, as well as of archaeological interest, and to alter it to this extent for such a purpose, especially as a subscriber has promised to give half the cost of a new tower adequate for the bells, seems to us nearly if not quite inexcusable. For the present the matter is in abeyance. As our readers know, we have never supported the purely archaeological view of ancient buildings; but this is a proposal to alter and certainly to some extent deform the design of an ancient and very fine tower and spire, for the mere object of hanging bells in it. The Restoration Committee had much better build a new bell-tower, towards which they are offered material assistance, and leave the old tower unaltered.

**T**HE portfolio of drawings of full-sized Greek mouldings and decorative detail, which Mr. Schultz has brought back from Greece, and which we have had the opportunity of inspecting, ought to fully answer the wishes of those who, as notified from time to time in our columns, subscribed to the "Greek Mouldings Illustration Fund" for enabling Mr. Schultz to devote more time than he could otherwise have given to this interesting and valuable work. He has made good use of his time, and brought back a large collection of the class of drawing which was specially desired by those who promoted the work, viz.: the full-size and accurately-taken profiles of Greek mouldings. In addition to this, Mr. Schultz has made a considerable number of carefully realistic sketches in water-colour of portions of Greek masonry showing remains of colour. The texture and lines of the weather-stained marble, and the precise extent and nature of the indications of colour remaining, have evidently been carefully copied, and if some of these coloured sketches can be reproduced in facsimile by chromo-lithography, they will add to the value of the collection, which, when published (as we hope it will be before long), will be a very important contribution towards the illustration of Greek architecture in matters of detail which cannot be said to have been adequately illustrated as yet.

**T**HE curate of St. Edmund the King, Lombard-street writes (in the *Athenaeum*) to the effect that whilst the Bishop of London's Commission has not yet reported, a unanimous decision against the church's destruction is confidently expected. It appears that any of the vestries concerned can alter the scheme. "So far, then," he adds, "from the destruction of the church being decided upon, the fact is that, thanks to the noble stand made by the parishioners and congregation, the church is safe. . . . But, on the other hand, it is not at all unlikely that the Commission may recommend the destruction of All Hallows, Lombard-street." The latter church, which has long served for the united parishes of All Hallows, or All Hallows Grass Church, St. Bene't, Gracechurch, St. Dionis Backchurch, and St. Leonard, Eastcheap, was completed in 1694, after Wren's designs, at a cost of 8,058*l.* 15*s.* 6*d.* Nearly hidden by buildings around, and with a not very striking exterior, it contains a beautiful marble font with a cover, from St. Bene't, and some very fine wood-carving, particularly over the two door cases or lobbies, now used as cupboards. The pulpit, its sounding-board, and the lower part of the reredos, are attributed to Gibbons. In the "void" is a handsome trophy of the Royal arms. The ten coloured windows are the work of Mr. Alexander Gibson. The old Lombard-street gateway was removed into the vestibule, beneath the tower, at the south-western angle, in 1865. The organ, by Harris (1695) was rebuilt by Gray & Davison, together with the restoration of the fabric by Messrs. Francis, architects, in 1870. The interior had been "repaired and beautified" in 1847; in 1880 it was re-decorated, and lighted from the roof. The parish stands in the three Wards of Bishopsgate, Bridge, and Langbourne; the benefice, now worth about 700*l.*, is a "peculiar" of Canterbury, having been given to that See by one Brightmer, in 1053, under name of Gerscherche. The old church was rebuilt by John Warner, sheriff, in 1494, and his son Robert. Here, after service on Good Friday, is observed the will, dated April 24, 1686, of Peter Symondes, citizen and mercer, by the gift to sixty of the younger Bluecoat boys of a bag of raisins and a new penny. A Bible (1613), together with Erasmus's Paraphrase on the New Testament, in 2 vols. (1548-9), are relics from the Great Fire which destroyed St. Bene't's Church. The interior is almost a model, in practical qualities, of a church for congregational worship, besides containing much fine work in detail; it would be a thousand pities it should be destroyed.



WE hear that the new palace for the Gaekwar of Baroda, which was designed by the late Major Man, of the Royal Engineers, and which has been already eight years in course of erection, is now approaching completion. According to the *Indian Engineer*, the exterior portion of the edifice consists exclusively of stone, being described as in "the late florid style of Upper India," with a large element of Gujarati details. The proportions are immense, the façade having a total length of 500 ft., while the Durbar hall, with its flat roof, presents a clear span of 54 ft., and is thus one of the largest in India. This apartment is adorned with an elaborate enamelled ceiling, executed in coloured arabesques, separated by moulded gold ribbing. The floor and walls will be inlaid with marble and enamelled mosaic work, on account of which a number of Italian workmen have been specially engaged to perform this part of the undertaking. Messrs. Damon & Cie., of Paris, have been instructed to carry out the task of ornamenting several other apartments in the interior. The total outlay is estimated at 250,000*l.* (exclusive of the rich interior decorations), thus forming one of the most costly and extensive modern buildings throughout the whole of India. So far the information of our Indian contemporary; but as to the real artistic quality in a building designed by an English engineer and furnished by a firm of French fashionable upholsterers, we may be permitted to entertain much misgiving.

IN Freebridge-Lynn hundred, and within a few miles of Castle-Acre, where extensive explorations have been undertaken, stands Middleton Towers, which, together with an estate of 711 acres, is placed in the market. The house, restored and enlarged in 1860, stands about four miles distant from Lynn, by the road to Swaffham. Formerly known as Tytherington Hall, it was originally built temp. Henry VI. by Thomas, Lord Scates, K.G., a distinguished soldier in our wars with the French. The Middleton property passed to the Woodvilles by the marriage of his daughter Elizabeth to Anthony, Earl Rivers. The Lords Scates had been settled here since the reign of Henry II., when Roger de Scates married Muriel, daughter and co-heiress of Jeffrey de Lisewis. Roger and his wife brought a band of monks to Middleton, then called Shiplade, and established them, together with some religious women, in the now ruined Blackborough Priory, in the vale of the river Nar. Their son, Robert, re-dedicated the priory to the Virgin and St. Katharine, and settled it upon a party of Benedictine nuns. At the suppression the property was valued as being worth 76*l.* 3*s.* 9*d.* a year. Edward VI. granted it to the bishops of Norwich. A view of the moated tower will be found on the title-page of the "Beauties of England and Wales," vol. xi. (1809).

IN the current number of the *Portfolio* the pen-and-pencil illustrations of Westminster Abbey, by Mr. Loftie and Mr. Railton respectively, are continued, dealing in this number with Poet's Corner and the Chapter-house. Of the interior of the Chapter-house Mr. Railton contributes a full-size plate which rather exemplifies the danger into which his style of handling is apt to betray an architectural artist, of making artificial effects of contrasted light and dark; the central pier being represented in a patchwork of black and white which is far too forced. The number is headed by an appreciative article on the sculpture work of Mr. Roscoe Mullins, by Mr. Walter Armstrong, illustrated by a small illustration of the Preston pediment sculpture, and another of one of the sculptor's most graceful works, the statuette entitled "Memories." It is odd, however, that Mr. Armstrong should have omitted all mention in the article of what was not only one of Mr. Mullins's best works, the "Esau and Isaac," but the one which first gained him a central position and a great deal of public notice at the Academy Exhibition.

A REPORT by Mr. Spear to the Local Government Board (June 27) on the causes of fatality from croup and other throat affections in the Horwich Registration sub-district, reveals a truly delightful state of things in regard both to sanitary conditions and sanitary legislation. Horwich is, it appears, a town recently developed from a village, owing to the formation there of extensive locomotive works for the Lancashire and Yorkshire Railway: and this is the kind of way in which it has developed:

"In effect, whole streets and rows of houses stand in a perfect sea of mud and slush, sewage still trickles in foul gutters over the bare surfaces, and so little regard has been paid to the enforcement of the local building bye-laws that important sanitary requirements in the construction of new houses have been habitually infringed. . . . The main highway of the town, paved or macadamised, is in most places in a state of great dis-repair and full of holes, a condition which leads to much lodgment of moisture. Of some seventy to eighty private streets only five had, up to April, 1889, been 'metalled, paved, and channelled, although I was told that, according to contracts entered into by the Authority 22 should have been completed in the previous October. Even these few completed streets, owing to the passage on to them of traffic from excessively miry surroundings, and to defective scavenging, were on my inspection only distinguishable from the rest by the absence of the deep ruts and holes into which the muddy surface of the latter had been ploughed. As to many of these latter, it is no exaggeration to say that access to the houses could only be gained by wading for considerable distances ankle-deep in slush,—a mode of progress only occasionally to be avoided by the use of the insecure stepping-stones which the inhabitants had laid down. . . . For excrement disposal privy-middens are a universal use, and even in the newer property these receptacles are so constructed as to present all the chief faults of the old-fashioned middenstead. They are of large size (about 8 ft. by 4 ft.), sunk some 3 ft. below the level of the ground, and of porous material. Excavated in a damp soil, they are not unfrequently flooded to over-flowing with surface water, and where this is not the case their contents are habitually wet. They are emptied at irregular intervals by contractors in the service of the Authority. The solid contents are thrown on to the bare surface of the back lanes to await the arrival of the scavengers' carts, while the liquid remains in or about the middenstead. The people generally complain much of this state of things, saying that they are prevented from opening their back doors and windows by the foul odours. One woman, living in Autumn-street, quite a new street, but one that has already suffered much from preventable sickness, attributed her indisposition, from which she was just recovering, to the excessively offensive condition of the back premises of the dwelling, and these I found on inspection were partially flooded by liquid oozing from a neighbour's middenstead.

The dangers to which the inhabitants of the newer localities are exposed in this connexion might have been avoided had the Authority paid the least attention to the enforcement of their own bye-laws, for by the latter (confirmed by the Local Government Board in July, 1886) a proper and safe method of privy construction is duly prescribed. So little, however, do the Authority recognise this, that in order to obviate, as it is supposed, the intolerable nuisance of a flooded middenstead, the futile and long since discredited plan of *draining* that receptacle by a drain communication with the common sewer has of late been proposed, and this although the plan is expressly forbidden by their own bye-laws."

A **N**OTHER report by Mr. Spear (July 9) deals with the sanitary condition of the Hoo Rural Sanitary District, and is nearly as bad reading. Here, we are told, deep privy pits or large sunk midden-privies are almost universally used for excrement and solid refuse disposal. In many cases they are situated close to the dwellings. The condition of one street, "Wilson's-row," has been gibbeted in a former report. Mr. Spear says:—

"Its condition still is deplorable. The huge privy-middens at the rear are, for the most part, in a ruinous state, and filth of all sorts is littered about the unpaved surrounding surface. The houses at the further extremity are beyond the reach of the drains, and the liquid sewage trickles over the bare ground into foul pools, while at the other extremity of the row the drain connexions are of such a nature, dilapidated surface channels leading to one or two gully gratings,—that the same result is arrived at. The gullies, moreover, are said to be as often stopped as not, and accordingly a large proportion of the liquid sewage is thrown over the bank of an adjoining clay pit. The contents of the privy-middens, too, have been emptied down

the banks of this excavation, so that the latter, which comes close up to the house yards, presents the appearance of a filthy swamp. Wilson's-row is divided into three sections. The well of one is said not to afford good water, and there is evidence of trickling down the sides from the surface; that of another to afford water that "stinks horribly"; and the third section (sometimes, I believe, called "Broad's" Row) is not provided with water. The inhabitants are left to obtain water where best they can, and for the most part a neighbouring public-house is resorted to."

In another paragraph of the report, we read again the tale of official indifference and carelessness:—

"The Authority have made no provision anywhere in the district for refuse removal; and their failure to secure any amelioration of the filth nuisances that prevail must be ascribed chiefly to this initial mistake. . . . Another principal cause of failure has been the complete absence of any proper organisation in the sanitary machinery of the district. The Medical Officer of Health and Inspector of Nuisances never inspect the district in company; they never confer together as to the sanitary condition and requirements of the district; the Inspector never reports for the information of the Medical Officer of Health, and when the latter himself reports nuisances to the Authority, the Inspector, looking at the nuisances from his own point of view, seems not infrequently to make light of conditions regarded by the Medical Officer as injurious to health."

WE referred, in a "Note" in our paper for April 6 last, to the ingenious though simple invention, patented by Mr. Arthur Pickard, of canals on a new principle,—the principle, viz., of an induced current imparted to the water by fixed paddle-wheels or screws. By this induced current the boats are carried along without resorting to propulsion or traction, and as they can be locked up, they require no boatmen or attendants. As we explained in our former "Note," the canal is made with a double channel, each 4 ft. or 5 ft. wide,—just wide enough to take one boat,—the boats being fitted with friction rollers to prevent jamming. The induced current is continuous on each division of the canal,—up one side and down another, one motor only being required for each level. Since our former "Note" was written, we have seen a report which has been made upon Mr. Pickard's system of canal navigation by Mr. Thos. M. Rymer-Jones, M. Inst. C.E., who estimates that "the power required by centrifugal pump or marine screw to generate a current flowing at the rate of three miles an hour, in a channel 4 ft. deep by 4 ft. wide, and one mile in length, will not exceed 10 h.p., and each succeeding mile will require  $\frac{1}{2}$  of one h.p. extra, or a decrease of speed in the same proportion. This is irrespective of the number of boats put upon it." As the boats can be fitted with trolley-wheels, they can be hauled overland to quarries, collieries, factories, &c., for loading and unloading. Mr. Pickard's system of navigation is, as we have already pointed out, capable of application to existing canals. When we wrote last, we had only had an opportunity of seeing some working models of the invention. The favourable opinion which we then formed of its practicability has been confirmed by a visit to the Alexandra Palace, where a company called the Venetian Canal Company have constructed a working canal on Mr. Pickard's system. This small canal, it should be mentioned, is intended only for pleasure traffic, and as such ought at all events to prove a more popular entertainment than the steam round-about. The canal, which is 218 yards long, has a uniform breadth of 4 ft., and an average depth of about 18 in. The entire mass of water is kept in motion by a small stationary upright engine of 1-horse power, working with 200 revolutions per minute. This actuates a paddle-wheel of 9 ft. in diameter, making eight revolutions per minute, the induced current resulting from which carries the boats round the circuit of 218 yards in a period of four minutes. Boats holding from four to six passengers each are conveyed on this current. Three such boats were during the Bank Holiday week in pretty frequent requisition. This canal is, from the necessities of the case, a single continuous one, being an irregular



circle on plan, and consequently it differs in some of its arrangements from an up-and-down-line traffic canal; but it clearly shows the practicability, on a working scale, of Mr. Pickard's invention, which seems likely to play an important part in the future of water-transport.

**THE** ruling of the Court of Appeal in the case of *Cornish v. The Accident Insurance Co.*, and as the case is, ought to act as a wholesome warning to persons who omit to take common precautions for their own safety. The plaintiff was the widow of Mr. Richard Cornish, farmer, who had insured himself for 1,000*l.* in the Accident Insurance Company in case of death caused by personal injury. The policy contained an exception "in the case of death happening by injuries received on the exposure of the insured to obvious risk of injury" (we take the wording from the *Times*' law reports, we do not know whether it is textually that of the Insurance Company's proviso). The deceased was a farmer owning land on both sides of a railway, and in crossing the railway at a place where there was no proper crossing, had just put his foot on the down line when he was aware of a train close to him, and the poor man was knocked down and killed. His representatives claimed that it was an accident such as was covered by the insurance, and as an argument it was adduced that an up-train had just passed and that the attention of the deceased was diverted thereby from the other line. It was contended also that the clause only referred to wilful running into danger. The Lord Chief Justice in the original case told the jury that the danger would be "obvious" if it was such as "ought to be present to the mind of a man of ordinary sense and prudence." The jury found for the company, but under a certain degree of protest that they bowed to the ruling of the Judge. The Court of Appeal, however, has taken the same view as the Chief Justice, that the deceased was not protected against risk which would have been obvious if he had taken care, "for if he had looked he could have seen the train was coming." There is no question the ruling was right in common sense and justice; but we constantly hear of people being killed or injured on a railway because they look along one line to see if it is clear, and not along the other. It seems incredible that a considerable proportion of mankind should be so unfit to take care of themselves as this fact implies; but it certainly is so. Except at a large junction station where no sensible man would think of crossing the metals, there is no reason whatever why any man with eyes in his head should be run over in crossing a railway; and to call such an occurrence an "accident" is a perversion of language. The lesson applies strongly to men engaged in the building trade, who are no doubt exposed to extra risks in their ordinary occupation, but who are constantly meeting with "accidents" (and expecting compensation for them) which are the result not of extraordinary risk, but of extraordinary carelessness.

**The Nicaragua Canal.**—According to advices from Greytown, work upon the Nicaragua Canal is now actively progressing, nearly 1,000 men being employed, for whom barracks have been erected. The topographical survey of the Canal from Greytown, on the Mexican Gulf, to Brito, on the Pacific side, has been fully completed by Admiral Daniel Ammen, president of the canal company. The exact length will be 169.67 English miles, of which only 28.89 miles have to be excavated, and 3.07 miles blasted through rock. The natural water way will consist of 64 miles of the river San Juan and 56½ miles of the Nicaragua Lake and some adjacent rivers. The engineers estimate that the Canal will be completed in 1894.

**New Crematorium in Sweden.**—A new crematorium, the second in Sweden, is now being built at Gothenburg.

#### CHELMSFORD GRAMMAR SCHOOL COMPETITION.

**THE** picturesque and quiet-looking old county town of Chelmsford, like most other places, has been making progress in the last half-century both in population and prosperity. It has now a Mayor and Corporation, the Mayor, by the way, is a well-known architect, the old parish church has been "restored" and considerably enlarged, and several new churches have been built; the buildings of almost all the old public institutions have been either considerably enlarged or pulled down to make way for something bigger and more modern; and now it is the turn of the old "King Edward the Sixth's" Grammar School. The old school stands in grounds of its own, surrounded by high walls, and located between the railway and the town in a very "central,"—perhaps for the purpose rather too central,—situation.

The old buildings are to be pulled down to make way for a school on a more modern plan on some other part of the same site. It was proposed to find another site elsewhere, but that idea is said to be now abandoned. The advertisement for a public competition of architects has resulted in only thirteen sets of plans being submitted. A good proportion of these, however, are of great merit, and there can be no great difficulty in picking out one for execution, though in one sense it would be easier to pick out two. In our opinion the two designs under the mottoes "Salus" and "St. George" are superior in plan, and also in plan and external architectural treatment combined, to the others, but their merits as between themselves are so equally balanced that the arbitrator—if there is to be one, of which we are not certain—will have some trouble in choosing between them. The site is of irregular shape, bounded by a road on the west and south. The old school is in the north-east corner and the property of the George Hotel cuts into the ground at the east end. The best frontage is on the west side, and most of the competitors have placed their building close to that side and facing the road, partly, at least, one may presume, because it would be best seen there. "Salus" and "St. George" have both chosen this position, but it does not appear so good as that proposed by several other competitors near the north side of the ground and facing south, with the play-field in front and the existing pretty old garden adjacent to the master's house on the east. This position seems the more quiet and sunny, and also gives facilities for servants' and working entrances in the rear without cutting paths across the play-field or garden. As might have been expected, where the site is open and the instructions not very binding or explicit, there is a great variety of treatment in the designs in plan and style, as well as in aspect. Several competitors have sought to economise space, and probably money too, by the obvious, and seemingly neat and practical, expedient of putting the large school-room or assembly-hall over the three class-rooms and the corridor connecting them. More perhaps have chosen this plan than any other. Others have put both hall and class-rooms upon the ground-floor, and more or less in connexion with each other. Only three have chosen the now usual arrangement of class-rooms opening out of the assembly-hall.

"Salus" is one of these. In this design the school proper is to the left, or north, of the main entrance, and the master's house to the south, while the school dining-room is in the rear, beyond the staircase to the dormitories and opposite to the entrance; and the dormitories, which are for twenty boys, are symmetrically arranged in two rooms for six beds each and two for four each on the first floor over the dining-hall and the middle of the building generally. The planning of these dormitories, each with its lavatory and linen-store, and with the assistant master's bedroom in the middle, and the bath-room and water-closet conveniently placed at the head of the stairs, is an especially good feature in an excellent design, and deserves to be noticed first. On the ground-floor, to the left on entering, is the assistant master's room, and immediately beyond it the assembly-hall, 50 ft. by 22 ft., with the three class-rooms, each for thirty-two boys, opening out of it at the further end, near the day-boys' entrance and cloak-room. The class-rooms are well lighted from the pupils' left and fitted with dual desks, and are capable of being overlooked from the assembly-hall.

In a well isolated position, over the day boys' cloak-room, and two of the class-rooms, is the chemical laboratory, with the usual fittings, and reached by a staircase beside the playground entrance. The chief defect of the plans is the provision of a very small open court between the master's house and the boarders' cloak-room, it is surrounded by buildings, and is but 11 ft. wide; it, however, only lights subordinate apartments and the buildings on the east side are only one story high. The kitchen and servants' quarters are at the south-east corner of the building, well placed between the house and the boys' dining-hall. The elevations show a quiet and characteristic-looking building of red brick with stone dressings, of late Gothic type, with a stumpy square tower over the main entrance and a rather elongated turret on the roof of the large hall. The perspective drawing is rather weak and timid in colouring, but in other respects the drawings are exceedingly well executed and finished.

The design submitted by "St. George" is very similar indeed in arrangement to that of "Salus." An extra class-room is provided, apparently chiefly for the sake of symmetry, but it might well be omitted with the advantage of getting a little cross ventilation in the assembly-hall. The day-boys' cloak-room is rather larger than in the other design, and the unnecessary extra exit to the playground is omitted. The chemical laboratory is similarly situated. The dining-hall, instead of being in the rear, is to the right of the entrance, throwing the master's house further to the south, spreading out the plan a little but getting rid of the crowded arrangements that resulted in the contracted little courtyard.

The dormitories are again in the middle of the building, but not so symmetrically arranged; their planning is certainly not so attractive, but there is nothing to condemn, and in practice the difference in convenience would probably be unnoticeable. The elevations of this design show a picturesque, simple, and suitable building of red brick, with a little stone, without any prominent feature, unless an unpretentious little turret on the hall roof can be called so, but well grouped and having a piquant and pleasant originality of treatment that fully make up for the loss of the traditional tower. These drawings also are well executed, and the pen-and-ink perspective especially is a clever and artistic piece of work. Of designs of the type in which the assembly-hall is placed over the class-rooms, that by "Discipline" is one of the best. The building is placed on the north side of the site facing south, with a good open space in the rear, a gravelled playground on the west, or school side, the master's garden on the east, and the playing-field in front. The boarders' accommodation—the dining-room on the ground floor and the dormitories on the upper floor—occupy the middle of the building; the school, with its own entrance, is on the left, and the house and its entrance on the right. The class-rooms are well arranged and lighted, and are put in ready communication with the assembly-hall by a good staircase. By separating the class-rooms from the hall any disturbing of the occupants of the latter by passing through it to the rooms is avoided, and the arrangement, especially at examination times, may often be advantageous; but the other system has other advantages, and seems to be now pretty generally accepted as the best one. The plans in other respects are well thought out, and the elevations show a particularly picturesque and well-balanced group of buildings, having a ground story of red brick with a little stone, and a stuccoed or rough-cast upper story with well-proportioned and pretty gables and dormers; the white upper story is, perhaps, more suggestive of homeliness than of culture, and therefore more suitable for a dwelling of some sort than for a school having a semi-public character, but it relieves and brightens the brick and gives a good deal of character, if not quite of the most suitable sort, to the building.

Another design on which a considerable amount of thought has been expended is that under the motto "Jacobus." Unluckily, the care of the author and his general skill do not seem to have been supported by an adequate knowledge of the usual arrangements of a grammar-school. His plans seem to be founded rather upon those private schools which are more adjuncts of the master's house than the principal and essential part of the group of buildings. The house occupies in this design the most prominent corner of the site, and the





Custom House  
Kings' Lynn

school proper is a two-storied building behind it. The plans are ingenious and the elevations good and suitable, but the whole is founded on a wrong type. The drawings are well executed.

"Edward VI.," like the two last, places the hall over the class-rooms, the plans are carefully thought out, the elevations simple and suitable, and the drawings nicely finished. "Lux" (in a rectangle) has adhered to the ordinary type of plan with the class-rooms opening out of the large room; they are well planned and well lighted and ventilated, but the hall seems unnecessarily and disproportionately long, and the laboratory, which is placed over it, is the same, although a room for which no definite use could be found has been taken off the end. The day-boys' entrance has to be reached by going all round the hall and class-rooms to the back, and part of the way up a very narrow court recessed into the back of the building. In most other respects the plans are decidedly good and of a practical working kind, but the elevations are very plain, and certainly not good or architectural enough for the kind of building.

The set of drawings signed with a monogram "E. R." in a circle, do not indicate much acquaintance with school-planning. Not that, taken altogether, the design is a bad one. The building is well placed on the site facing south; the assembly hall and class-rooms are both on the ground-floor, and connected by a corridor; but what is practically the main entrance is crowded up into a corner in an extremely undignified and rather inconvenient way, and the elevations are only remarkable for a rather ecclesiastical-looking turret on the hall roof.

"Lux" shows some well-grouped and picturesque elevations, with some good detail, but the drawings are badly coloured, and the plans not good.

"Straight and True" exhibits a strong coloured perspective. "Experientia's" design is of the Early Gothic type that might have found favour some years ago. The other sets of drawings do not call for special remark.

#### THE ARCHITECTURAL ASSOCIATION'S ANNUAL EXCURSION.

The twentieth annual excursion of the Architectural Association has during this week been made to the "Marshland" district, that peculiar tract of country in the north-west corner of Norfolk, extending also into the adjoining county of Cambridge, drained by the lower reaches of the Great Ouse, and the artificial feeders or "dykes" which form its tributaries and redeem the desolate waste of fen for the purpose of agriculture. Architecturally this district is rich, especially in ecclesiastical work, hence the programme for the year is notable for the large number of churches included. The headquarters of the party were stationed in the ancient town of King's Lynn, or, as it was called until the time of Henry VIII., Bishop's Lynn, from its former subjection to the see of Norwich. The members assembled on Saturday and Sunday last, the time, until the commencement of the official programme on Monday morning, being spent for the most part in the exploration of Lynn and its immediate vicinity.\*

##### Monday.

The first start of the excursion was made in most unfavourable weather, the day being for the greater part wet and cold. The first visit was made to three of the Wiggshall churches, St. Germain, St. Mary Magdalen, and St. Mary the Virgin. St. Germain is a Perpendicular church, with nave, north and south aisles, and aisles also to the chancel. The lower portion of the square tower is Early English, and so also is the tower-arch to the nave; the upper part is of Perpendicular date, with battlements and pinnacles. The great feature of interest in this church is the fine series of fifteenth-century seats, richly carved with figures and foliage, some of the poppy-heads being especially worthy of study. The pulpit is a good Jacobean example, while the lectern and prayer-desk have also been made up from fragments of seventeenth-century carved oak. The nave-roof is of the same date as the church, though plain in character. As in many of the churches of the district, a sanctus-bell cot exists here.

The Church of St. Mary the Virgin was next visited,—a large church with aisles to both the chancel and the nave, which latter is of five bays. The church exhibits the transition from Decorated to Perpendicular in the greater part of its detail; the lateral doorways, both north and south, being, however, very excellent and

interesting examples of Early English work. The south porch is of Decorated character, with pointed barrel-vault of stone, carried on moulded ribs. A notable detail of the porch is the somewhat curious treatment of the external angles, with canopied niches on the splay corbelled over to the square above. Like that of St. Germain, this church possesses some very fine, well-preserved carved seats, rich in detail and figures. In these the monogram V.R. (*virgo regina*) is repeatedly worked in. The old fifteenth-century rood-screen has been cut down to the transom, but still retains its figures and coloured decoration, while the stair to the loft also exists. In the chancel is a piscina, and, in lieu of sedilia, a window-seat for the clergy,—a feature found also at St. Germain and other churches in the district. The pulpit is of the seventeenth century, and so also the somewhat curious wooden font cover, dating 1625. The south chancel aisle is screened off as a chantry, with piscina, the existing screen being, however, reconstructed with fragments of old fifteenth-century pointed work. Here is a fine alabaster tomb of Jacobean date, with recumbent effigies, to the memory of Henry Kerville, and Winifred, his wife. Other objects of interest are the beautiful brass eagle lectern, dated 1518, and fragments of old painted glass and fifteenth-century carving. The tower is a good Perpendicular example, with staircase turrets at both the north-west and south-west angles,—another feature by no means uncommon in the district.

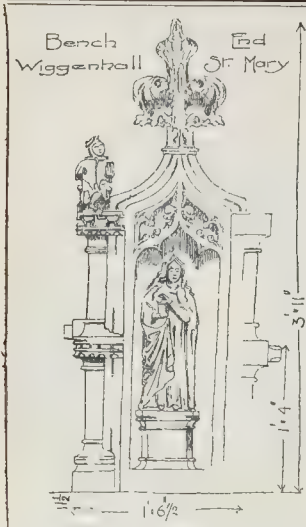
The Hall at Wiggshall St. Mary was also visited, but is of slight interest, being principally a modern structure based upon the old gateway illustrated by Cotman. The Church of St. Mary Magdalen is both large and, for its size, lofty, the nave arcade, of the Decorated period, being especially noticeable for its fine proportion. The clearstory and aisles are Perpendicular, the aisle windows being particularly good and of large size, thus giving great character to the design. The chancel has a marked deviation from the axial line of the nave, and, as is most general, the inclination is to the north. The nave roof has been reconstructed from the fragments of the old, and covered with oak boarding and lead, thus perpetuating a mistake of which no modern architect should be guilty, the result being that the lead, acted on by the tannic acid of the oak boarding, has been and is falling to the floor in white powder. The aisle roofs have not been restored, and at the time of the visit the water was pouring through in a most lamentable fashion. In the chancel are three sedilia, with piscina and ambury, the latter in an unusual position on the south side. The old stone altar slab still exists, and now forms part of the paving of the sanctuary, the five crosses clearly visible, and, curiously, the two at the north end are 11 in. from centre to centre, those at the south 12 in. Fragments of the old rood-screen remain, with painted emblems of the four Evangelists, and there is the unusual feature of two stairs to the loft, one at each side of the chancel arch, and with their door openings at different levels. These stairs are carried up externally above the roof, and the turrets with their pyramidal roof enhance the external effect. The south porch has the stair remaining which led to the parvise, though the floor of this is gone. There is some good screen-work at the west end of the aisles, some very fine fragments of old glass in the north aisle windows, and remains of a fresco of the Last Judgment or Doom over the chancel arch. The tower is large, and of good design.

The next place visited was West Walton, where a long stay was made for luncheon and the study of the church, well-known for the beauty of its Early English detail, and interesting archaeologically from the evidence of the work of the Decorated and Perpendicular builders in buttressing up the failing work of their predecessors,—as for example in the Decorated buttresses internally to some of the piers of the north arcade, and the immense external Perpendicular buttresses at the west end. The majority of the existing windows are Perpendicular, as is also the nave roof, which, in its total disregard of the lines of the older work, is very curious. Especial features are the Early English porch and the majestic bell-tower, the detached position of which in this instance affords a testimony to the most probable explanation of this not very uncommon arrangement. The weakness of the foundations, which have crippled the church, would have been doubly disastrous if so massive a tower had been erected in con-

\* Details from St. Margaret's, King's Lynn, will be found in the lithographs published in our last number.

**A Canal through France.**—The Paris Correspondent of the *Daily News* says that according to the *Estafette* a project is on foot to dig a maritime canal from Bordeaux to Certe, and by means of canals to unite the Rhone, the Saône, and the Seine. If carried out, vessels of heavy tonnage, as well as torpedo-boats and swift-cruisers, will be able to traverse France in safety from the English Channel to the Mediterranean.





nexion with the building. Still in the neighbourhood of the Roman sea wall, from which Walton also derives its name, Walsoken was the next objective point, the church of All Saint's being a remarkably interesting example of Late Norman work, with a nave arcade of seven bays. The Transitional character of the work is shown by the inverted "volute" and the pointed shape of the chancel arch. Especially noteworthy is the Norman piscina on the south side of the chancel. The clearstory has been added in Perpendicular times, when, too, the aisles appear to have been rebuilt, the roof of those to the chancel being especially richly treated, with bold carving. The nave roof is curious on account of the apparent dip of the hammer-beams, caused by the flatness of the pitch. The tower is Early English, with a good Late Decorated belfry and spire. Good screens remain to the aisles, the southern one being especially interesting. The old choir-stalls still remain in their original disposition, returned against the screen at the west end of the chancel. There are also some good nave seats, with figures and carving. There is an exquisite octagonal Perpendicular font, richly carved with the representations of the Seven Sacraments and the Crucifixion. The sanctus bell-cot of this church has the remains of a Calvary.

The next halt was made at the church of SS. Peter and Paul, Wisbech, the largest visited during the day, remarkable for its four-aisled plan, the ridge of the main roof being over the central arcade. The north arcade and part of the south of the original Transitional nave exist, and a curious treatment connects it with a wider chancel of Decorated date. The south arcade of the nave is of very Late Perpendicular, the south aisle Decorated, and the outermost aisles to the north and south Perpendicular. There is a good brass of Thomas de Braunstone, who died 1401, Constable of Wisbech Castle, built by William the Conqueror, but now no longer existing; and some fragments of old stained glass. The tower is at the north side, and remarkable for its size and fine design of Late Perpendicular work.

Leverington Church (see lithographic illustration) was the object of the last visit of the day. The church is interesting from its tower and spire, of excellent character, and the picturesque Late Decorated southern porch, with its vault and stone-roofed parvise. The church is mainly Perpendicular, with Early English chancel, in which is an example of sedilia in three steps, and of simple treatment.

#### Tuesday.

The first visit was to Middleton Towers, a moated house, of which the central block only is ancient (having formed the gatehouse of the castle built by Lord Scables). The whole having been very much neglected and ruined before the rebuilding of the house, there is not much



of interest beyond the example of fifteenth-century brickwork and a good oriel window.

East Winch church was next glanced at, a Perpendicular church which has replaced the Early English structure, of which some arches still remain in the chancel. There are good roofs to the chancel and aisles, some old benches, a chained bible, and some interesting monumental slabs of mediæval date, with floriated crosses, one bearing the emblems of the mason's gavel and square. The church has a good tower, on which the Union Jack was flying in honour of the visit.

West Bilney, the next church on the programme, proved the disappointment of the day, so a stay of two minutes only was made, the most enthusiastic sketchers of the party being unable to find more than the moulding of the North door to note.

Pentney, the next item, was omitted from the programme, and the party proceeded to Narborough, the Hall being first visited, for the sake of the good paneled room on the first floor, with its linen panels and Classic detail, the date, 1581, with the legend "Homo Bulla" and motto "Quand Dieu Voldra," showing that it was carried out during the time of John Spelman or his immediate successor. The church of All Saints has much interest, consisting of a nave of the transitional period from Decorated to Perpendicular, with aisles north and south, chancel, tower, and south porch. There are some fine brasses and other memorials of the Spelman family, some old benches with their arms, and a window seat for clergy in place of Sedilia.

Castle Acre was next visited, both for the Church and the Priory. The Church is large, with a good tower and of the Perpendicular period, some of the old Early English and Decorated pier-caps being re-used in the nave. Good examples of colour decoration remain on the screen, pulpit, and prayer-desk, this last being apparently constructed from fragments of a screen. There is a very fine Early English priest's door, and the remains of a double

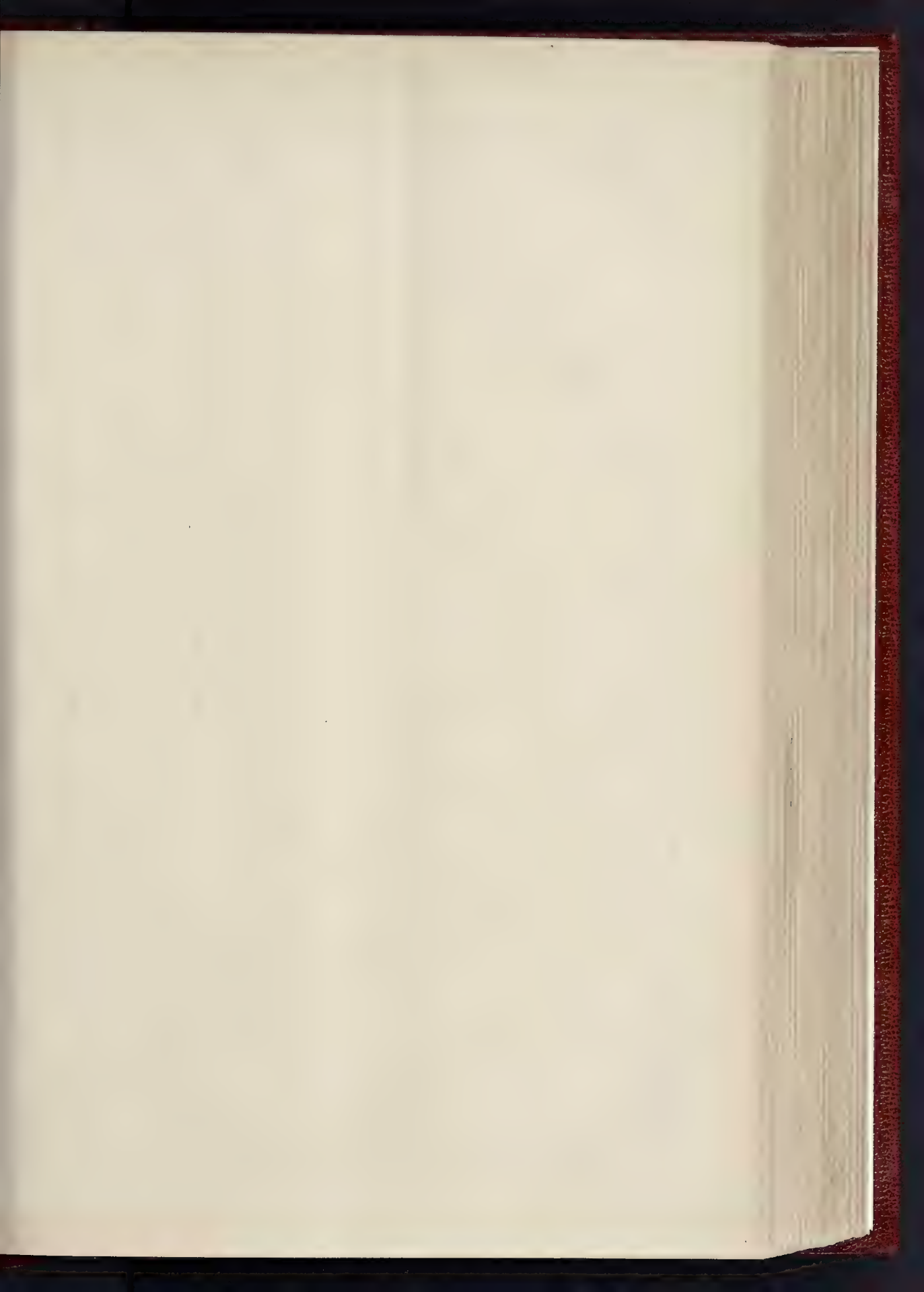
piscina. The Perpendicular font has a lofty and beautiful cover of elegant design, decorated with colour and gilding. There is here the somewhat curious feature of a hagioscope from the vestry to the chancel. The Priory, founded like that of Lewes, by William de Warenne, belonged to the Cluniacs, and is a remarkable example of Norman work. The plan can be easily made out, the position of the church, chapter-house, cloisters, refectory, &c., being readily discernable. The prior's lodging contains an oratory in which are several features of interest, added apparently by different priors, such as the Early English window with semi-circular rear-arch, the Decorated single sedilium, frescoes on the eaves of the windows and brick altarpiece, with the position of the altar marked. A fine oriel window was added to the prior's parlour in the fifteenth century, and here too is the lavatory sink for his private use. The arms of De Warenne are found here repeatedly.

Swaffham was next visited, and a short stay made at the large Perpendicular church, with its magnificent fifteenth century roof. This church has transepts to the chancel and a smaller transept to the second bay of the south side of nave. On the north side of the chancel is the founder's tomb, with effigy of John Botewright, chaplain to Henry VI., who built the chancel, and on the south side piscina, credence and sedilia.

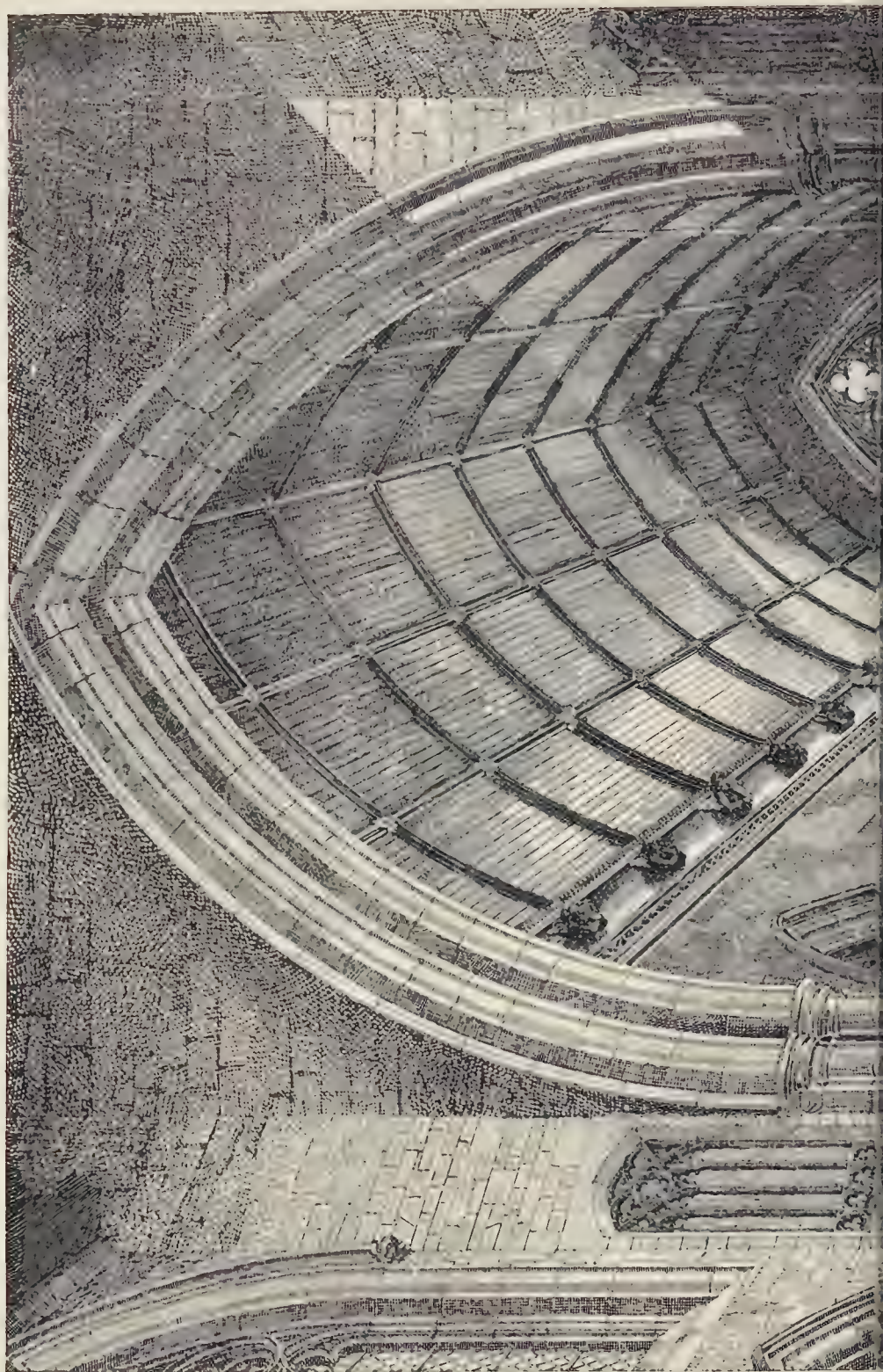
The last visit of the day was made to Oxburgh, where the two hours at disposal were all too short for full enjoyment of the hall and church. The hall, built 1482 by Sir Edmund Bedingfield, is an exceedingly good example of the moated fifteenth century house, with a wealth of pictures, carving, and furniture, the most interesting being in the King's room, hung with tapestry of the time of Henry VII., and containing the bed, with coverlet and curtains worked by Mary, Queen of Scots. The hall consists of a lofty gatehouse flanked by octagonal towers, and from this the living rooms extend round three sides of a quadrangle, completed by a corridor on the remaining side.

\* Measured drawings of this church will be found in the *Builder* for June 6, 1889.





THE BUILDER, AUGUST 17, 1889.











The church is interesting especially for its very beautiful and well-proportioned tower and spire, and the excellent examples of the Early Renaissance work in terra-cotta for which Wymondham and Layer Marney are noted. The sedilia, of Perpendicular design, are also remarkably beautiful.

We will continue our notes of the Excursion next week.

#### THE ROYAL ARCHÆOLOGICAL INSTITUTE AT NORWICH.\*

PASSING from the Cathedral into the beautiful grounds of the Bishop's Palace, the party was shown the place where a sermon was preached *sub Dio* occasionally in the summer, and especially on St. John's day. They then inspected the fine old vaulted apartment which now serves as the kitchen of the Palace, and which probably dates from the fourteenth or fifteenth century. They also visited the entrance tower and the remains of the chapel attributed to Bishop Salmon.

The last visit during the afternoon was paid to the Hospital of St. Giles', now more commonly called St. Helen's, but which originally was styled "God's house in Holm-street." Here Dr. Benly, acting as the guide of the party, read a paper on its early history and arrangement, at the same time pointing out to his hearers the beautiful roof of the Eagle Ward and the tomb of the celebrated Norfolk antiquary, John Kirkpatrick. According to the *Eastern Daily Press*, from which we abridge our account of the paper, Dr. Benly said that in the reign of Henry III., Bishop Suffield, otherwise Calthorp, founded and endowed in 1249 the Hospital of St. Giles' to maintain four chaplains daily celebrating service for his soul for ever, and "all the poor and decrepit chaplains in Norwich diocese who had not wherewith to maintain themselves," and also to support thirteen poor people, to be lodged there and to have one meal per day. Hamond de Calthorp, who was probably the bishop's brother, was the first master. After the death of Bishop Suffield the endowments of the Hospital were considerably increased by bishops and other benefactors, and it became one of the wealthiest and most richly endowed of all the religious establishments of the city. In 1535, upon the exchange of the endowments of the bishopric with King Henry VIII. for those of St. Bennet's Abbey, the advowson of the Hospital came to the King. Henry VIII. designed to dissolve the Hospital and to grant it to the city, it being a philanthropic establishment rather than a religious house, but he died before this change was carried into effect. However, in pursuance of his will that all promises which he had made should be punctually performed, the bishop, master, and brethren, having surrendered the Hospital and its possessions into the hands of King Edward VI., that King, by his letters patent granted the same to the Mayor, Sheriffs, citizens, and commonalty of the city of Norwich to be held as a place for relief of poor people, to be called "the House of God or the House of the Poor in Holme Street," of the foundation of King Edward VI. and King Henry VIII., the church there to be the parish church of St. Helen. In 1571, Queen Elizabeth augmented the charity with the forfeited lands of Robert Redman, to provide an exhibition of 4*l.* per annum for a Norwich scholar at Cambridge, and to increase the maintenance of the poor. Over the south porch of the church is a tablet recording the endowments by Henry VIII., Edward VI., and "Good Queen Eliza." Other benefactions were subsequently made by Robert Jannys and other charitably disposed persons; but, though carefully administered by the Corporation, the income of the hospital from its landed estates has fallen off considerably of late. The house, however, still stands.

At the evening meeting, held in the Lecture Room of the Young Men's Church of England Society, the Rev. C. R. Manning opened the section over which he presided with a paper of some length, in which he reviewed the progress made in the various departments of archaeological research since the former meeting of the Institute at Norwich, at which he had himself been present. By the discovery of so many prehistoric remains in this and in other countries by Dr. Guest, Sir John Lubbock, General Pitt-Rivers, and others, a great step forward had been made in that branch of science, but in

other branches the advance had not been equal. Still, he said, some remarkable contributions to this branch of antiquities had been contributed by Norfolk. Additional information had been obtained concerning the period of Roman occupation, while further light had been thrown on the character and purpose of earthworks. The mounds at Norwich and Thetford were probably of the time of Uffia. Considerable advance had, in fact, been made in the knowledge of this subject. There are several examples of church architecture prior to the Conquest of the date of 1020, built after the panic which led people to fear that the world would come to an end had subsided. He was of opinion that the round towers of the county were formerly more numerous than at present, and that they had in many instances been superseded by square towers. Many old mistakes, Mr. Manning pointed out, had been corrected by recent investigation. Numerous discoveries had been made in the churches of the county that threw light on the religious sentiments of the people in the Middle Ages. These were being preserved. Truer principles were now guiding the architect, sculptor, and carver than formerly. Numerous and valuable contributions had been made to the literature of the antiquities and history of the county, most of which he enumerated. Archaeological societies had, moreover, prevented the destruction of many ancient monuments that were threatened with demolition, and this was in itself no small gain.

Following Mr. Manning's opening address, Mr. G. E. Fox, F.S.A., read a very interesting and exhaustive paper on the "Traces of the Romans in Norfolk," traces which are somewhat difficult to discover owing to the fact that the absence of stone forced the Roman conquerors to use earthworks and wooden buildings, which time and man have conspired to demolish. Nevertheless he was able to point out several walled Roman stations, even on the northern coast of the county; and that they had home-steads in the more inland parts is shown by the finding of coins of the Cæsars and of Roman pottery, tiles, cinerary urns, &c., and of at least one Roman pavement. The chief places at which traces of Roman occupation are to be found were enumerated by Mr. Fox; among them being Brancaster, near Lynn; Caistor, near Great Yarmouth; Felmingham, Brampton, Threxton, Ditchingham, Feltwell, Brandon, Baconsthorpe, Beeston, and Burgh Castle, near Great Yarmouth; the last-named place was the *Garlanorum* of antiquity, and must be reckoned, he said, as in Norfolk, though it stands just outside the present boundary of the county. Mr. Fox also showed historically how and by what means the territory of the Northern Iceni was gained by the Romans; and he concluded by adducing strong proofs of the theory that Norwich was really the true *Venta Icenorum* of Roman era; and by bringing forward several arguments to show that the country round about Norwich and Yarmouth is not much changed in its level or in its general features since the days when the Roman eagles waved over it, and that, although the mouth of the rivers Waveney and Wensum, and that of the Breydon Broads, has shifted in the last fifteen or sixteen hundred years, there is little or no reason for supposing that a salt-water estuary ever reached up to Norwich, as tradition asserts.

On the second day, Wednesday, Aug. 7, the members of the Congress, to the number of over 120, went immediately after breakfast by special train to Swaffham, the Mayor and Deputy-Mayor and the Sheriff of Norwich accompanying them. The President, the Duke of Norfolk, also took part in the day's proceedings. Passing by Wymondham—or, as it is generally pronounced, Wyndham—they gained from the railway a passing glimpse of the double-towered church, formerly a priory and a cell subject to the great Benedictine Abbey of St. Alban's, but afterwards made parochial, the choir, transepts, and presbytery being reserved to the monks, while the nave was assigned to the parishioners, who, not being allowed free use of the bells in the original tower, built a second one for themselves. Swaffham was reached about eleven o'clock; but the inexorable bugle of the director for the day was sounded, so an inspection of

\* It does not seem to have occurred to Mr. Manning that the reason for many of these towers of small Norfolk churches being built on a circular plan was to avoid the cost of labour of making quoin dressings at the angles, in walls mainly built of flint rubble. Any architect would (or ought to) see this at a glance.—Ed.

the fabric was impossible, and the party had to drive on to

#### Castle Acre,

the high mound of which was well in sight for some two miles before it was reached. On reaching Castle Acre their attention was divided between the huge mound and earthworks on the one side and the ruins of the Priory on the other. The party left their carriages about half-way up Bailey-street, and passed down a narrow lane to the outer yard of the Castle, from which it was easy for them to climb the grassy slopes of the ancient keep, which, it is needless to say, commands a fine view all round. Here Mr. Hartsborne read the following paper:—I have brought you to this rather perilous eminence because from this point we get the best general view of these very large earthworks. From here we can plainly distinguish the work of three periods and three people—the Roman, the Saxon, and the Norman. When we came through the ford at the foot of the hill, a few yards more brought us into the precincts of the Roman Camp; we then passed into the Saxon Burgh; and we now stand within the Norman keep. Now, first as to the Roman Camp. A camp of this size at once suggests a situation upon a great Roman road; and we accordingly find, leading straight from the north coast and impinging on the centre of this Roman camp, an ancient route called "Peddar's Way." The subject of Roman roads in Norfolk is at present obscure, and absolute proof is wanted; but I see no reason why the way should not be of the age of the camp and the name medieval. You will have noticed before we came up the hill that we crossed some level ground skirting the river, and that the whole camp lay before us upon the rising ground. In its integrity the camp consisted of a parallelogram of about 380 by 280 yards, enclosed by a bank and a more or less deep ditch, with an entrance on the north and south sides. As we shall see presently, about one-fourth of the whole of this ancient defence has been quite removed,—that is to say, three-fifths of the north side and one-fifth of the south. This leaves the whole of the west side and two-fifths of the southern one in its integrity. There remain, therefore, the whole of the eastern portion, two-fifths of the north side, and the remaining two-fifths of the southern side to be accounted for. Before we do this let us analyse these Roman defences. Taking advantage of the natural resources of the site, the Roman engineer found that the rising ground was supported on the south side by a broad morass moistened by "the pale waves of Nar," and now level meadow-land. On this side he only required a slight bank, with a causeway leading to the ford, or a bridge, over the river. At the south-west angle the bank at once rose, and the ditch deepened. Along the north front, where he came upon level ground, both bank and ditch ran on, and so continued round the north-east angle, and down the slope to the south front on the morass. Such was the Roman camp. Now as to the Saxon burgh which succeeded to it. When the Saxon came—I will say in the ninth century—he found the works of the Roman both out of agreement with his mode of warfare and too large for his wants. Yet it behoved him so to deal with it that he could have sole control. He accordingly threw up a mound in the north-east corner, which he surrounded with a profound ditch, out of which, in fact, the mound was formed, and he utilised as much of the material of the eastern side of the Roman bank as he required for a court at this point. The court, or enclosure, thus formed is irregularly broken by some earthworks about half way across it, which seem to indicate the remains of the original Roman defence. The Saxon further formed a second and a larger court in front of the mound by utilising and adapting the south-east corner of the Roman camp, and striking a bank with a deep external ditch from the south side running northward and resting upon the mound. Thus was formed a *burgh*, namely the mound, the hill of the burgh, with two appended courts. Upon the mound was planted the timber dwelling and offices of the chief, surrounded by a timber palisade,—a real wooden wall,—the courts being further protected by lines of the same defence on the comprising banks. It is improbable that the remaining and larger portion of the Roman camp would have been abandoned to the chance, or rather likelihood, of being converted by an enemy into a sort of *mal voisin*, so this portion would also be taken possession of, and perhaps also palisaded or hedged about, as a refuge for cattle, for the inhabitants of the



place, or for men seeking the shelter of the burh from an advancing force. This, then, was the stronghold which Earl Warren found at the *caput* of his 140 lordships in Norfolk at the time of the great survey.

Passing on to the Norman castle, Mr. Harts-horne continued: Earl Warren had his castle at Lewes in the days of the Conqueror, and I see nothing here to show that he built a fortress of stone at Castle Acre. He died in 1088, and was succeeded by his son William, who died in 1138, to whom succeeded his son, another William, who died in 1148. The history of Castle Acre Castle has not been prejudiced by much speculation as to its date, nor is there much architectural detail remaining that enables us to fix its precise period. We know that upon such a site as this the shell keep of stone was the usual form of fortress that replaced the earlier structure of timber; but very few remain for comparison of their details, and fewer still of which we know the date. The shell keep of Berkeley fortunately exists, and more fortunately still, we know the date of it, from a charter. It was begun in 1155. On comparing the only remaining ashlar details of Castle Acre Castle with those serving the same purpose at Berkeley,—namely, the six pilaster buttresses on the outside of the shell,—we find that those at Berkeley have a set-off half-way up, while those at Castle Acre are of the earlier form,—namely, simple strips with only a slight break on their faces. Persons who have studied the growth of buttresses from narrow Saxon strips to the panelled and pinnacled structures of Perpendicular architecture will appreciate the value of the slight distinction I have just alluded to; and in a case like this we must make the best we can of the evidence we have got, without trying to extract more out of it than it properly gives. I think, therefore, we are justified in considering that this keep is at least earlier than 1155, and the evidence of a charter of the second Earl Warren, who died in 1138, in which he speaks of *meum castellum*, seems to imply that this actual stone castle was then existing, inasmuch as the Saxon structure is hardly likely to have endured so late, or to have had such a term applied to it. I put the date at about 1125. I admit that the actual evidence here for it is slight, but the general history of castle-building in the first half of the twelfth century supports it. And it will be remembered that the successor of this William de Warren was in possession for only ten years, and that he died in 1148. We may take it, therefore, that the second Earl Warren set up the shell keep on the mound, and inclosed the greater court with a curtain wall of masonry. But the mound was not so old, or so firm in its nature, that the Norman builder could be heedless in his work; and we accordingly find that, for greater solidity, the shell was built against the upper part of the mound, the wall showing, consequently, much higher without than within, and being further strengthened outside, in the north-west quarter only—its weakest point—by the six pilaster buttresses before mentioned.

When my grandfather, Mr. Kerrieh, was here, just 107 years ago, he made careful notes and plans of the castle, which were bequeathed to the British Museum in 1828. Great changes have taken place in the last hundred years; but on applying Mr. Kerrieh's plans to the existing remains, we are enabled not only to identify the fragments, but to reconstruct a great deal that must otherwise have entirely perished out of knowledge. His plans show four walls, or, as he rightly calls them "traverses," crossing the ditch, and abutting upon the keep. Of these, two were the continuation of the curtain of the large inclosure. That on the south-east still remains in part; that on the south-west connected the gateway with the keep, and may yet just be traced up the mound. That on the north-west may still be seen in the bottom of the ditch, and where it joined the second pilaster buttress, and the traverse on the north-east has entirely vanished. A wall remains, crossing the ditch of the great court on the east side, and there is another crossing the ditch at the south-west corner, of which more presently. The use and value of these walls in checking the progress round the ditches of an enemy who might possess the great court, is obvious, and no doubt at an earlier period timber defences were similarly employed. It is probable that there was also a wall on the counter-scarp of the ditch of the mound. Mr. Kerrieh speaks of foundations on the west side, and gives a sketch of the gateway as it was standing

in his day. It consisted of two half-drum towers flanking a round-headed entrance, which ran through like a tunnel for a distance of 18 ft., divided midway by a portallia—a defence not common in Norman times. The towers abut right and left against the curtain wall, and are supported on the inside by the walls of the tunnel entrance, 18 ft. long and 7 ft. thick. The whole was solid, and the plan can still be made out, though it has fallen down. It was approached by a drawbridge across the outer ditch, and covered by a bastion on the south side. As to the curtain wall of the lower ward, in Mr. Kerrieh's time a great part of it was still standing, and he mentions foundations of a tower at each corner, of which the lower part remained at the north-east angle. There was apparently a way through it to the smaller inclosure, but no appearance of any wall round that space. Mr. Harrod saw none, but Mr. Hope has just found a piece of foundation on one side, and some years ago Mr. Vere Irvine found another portion on the other; so this wall may be taken as proved. More particularly with regard to the keep—the inner ward. It is planted upon the top of the mound, which slopes to the south, and we have a good deal of the wall of its original height, with its flint-work parapet and allure. It is very rude work, as these shell-keeps usually were, and they had not yet learnt to square the flints; but the surface is hard and imperishable, particularly outside, but the ivy has seized it in its deadly grasp. It is evident that the walls of the keep were of two heights, about one-third, the upper portion being ten or twelve feet higher than the lower, the two being no doubt connected by flights of steps from the upper to the lower allures. As to the details of the inside of the keep, they are rude, but something is to be made out of them. The wall has been much broken down on the east and south sides. First, then, we have at the broken end of the wall, due north, some masonry starting out diagonally, and containing in the angle the end of an arched passage. This is locally known as "Dolly Handle's Hole," and is, of course, only the remnant of something much bigger, perhaps a low watch-tower, *due north*. Working westward, we find indications of putlog holes, implying either the requirements of the original construction, or wooden erections planted against the wall, perhaps both. The wall is here of its full height, and the allure quite practicable for hardy climbers. Continuing, we come to the broken end of the wall on the west side. Here we find the remains of a postern entrance, approached, as I take it, by a flight of steps running up the outer side of the curtain wall that connected the keep with the gateway. In the keep wall we have the springing of the vaulted passage in its thickness, and indications of the arched entrance direct into it. The evidences are slight, but it is desirable to seize upon and not pass over such an interesting bit of detail, which perhaps a little clearing out might render more intelligible. We next meet with a fine bit of masonry, broken midway by the end of a wall projecting from it. A few feet above the grass are marks of a low barrel vaulting along the face of the wall, which here is of its full height, and exhibits two original crenelles or openings in the parapet. I think this vault sustained a stone platform and shelter for the guard or watch, the common room being below. They would keep aloof out through the crenelles. Now a very important part of the edifice is missing. It is inconceivable that a shell-keep of this size was merely entered by a doorway, a hole in the wall, and had no strong ingress. The mass of masonry in the wall at this point, as well as the amount of material that has fallen into the ditch, forbids the supposition that the wall simply ran on, and it appears that the entrance was made, as at Lincoln, between two broad buttresses or masses of masonry, and that a flight of steps descended from the upper ward to a bridge over the ditch. With the ward was a strong tower, not, I think, necessarily of the same date as the keep. Mr. Kerrieh shows the south and east walls of it in his plans, and Mr. Harrod laid bare the other two, which were of great thickness, on account of their nearness to the earthen bank; the whole measured 50 ft. by 40 ft. In the middle of the outer ward both Mr. Kerrieh and Mr. Harrod indicate considerable foundations, of which the outline is perceptible at the present day. No doubt some digging would reveal the plans of a great hall, chapel, and kitchen, perhaps of a later date than the keep. A small portion of the wall at the lower end of the outer ward is quite

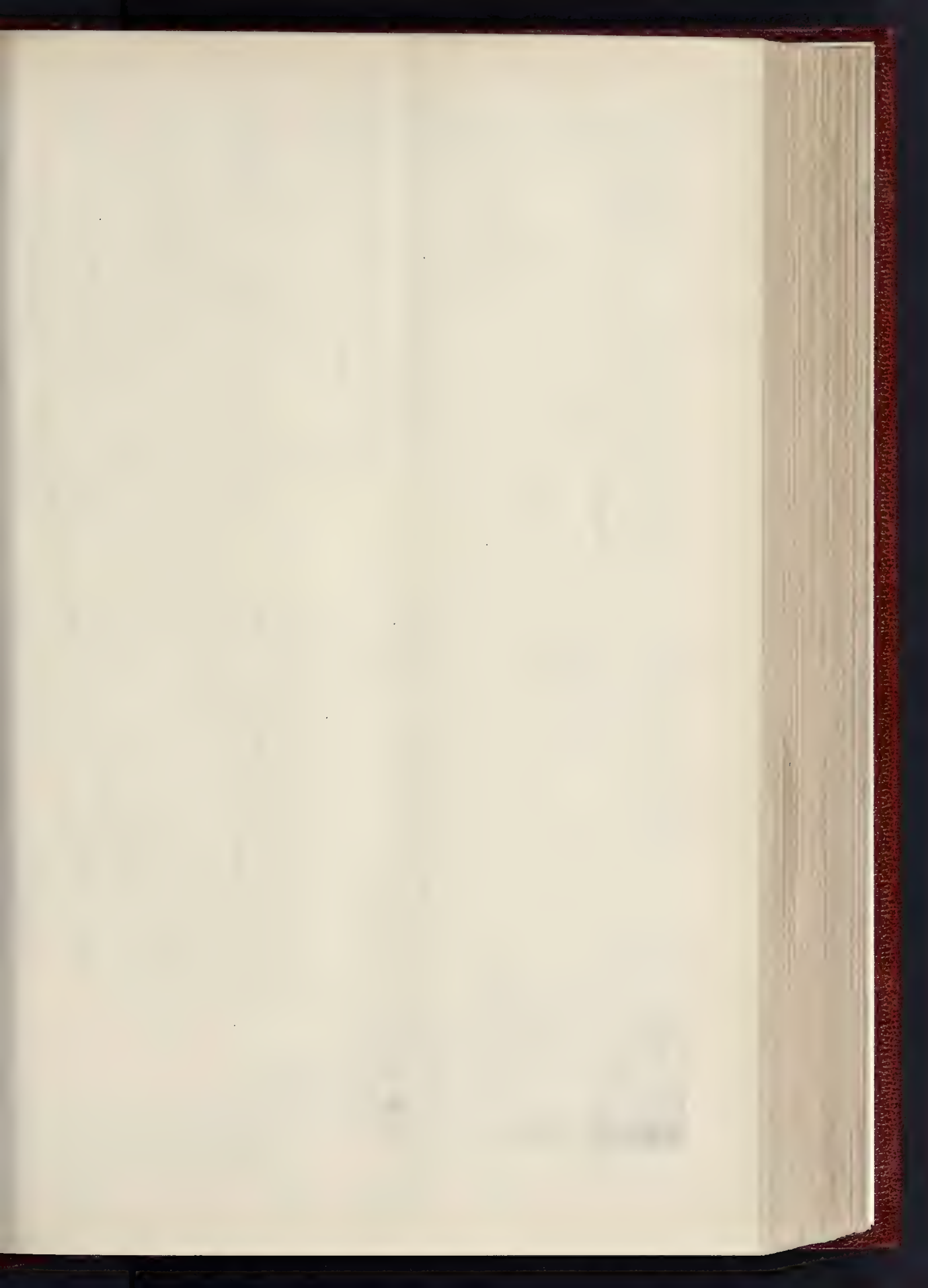
complete, and near it is a low postern, that has had on the inner side a lintel of wood, showing the scarcity of stone of any length. Mr. Kerrieh also mentions a gateway at the lower end of the town, in connexion with the wall crossing the ditch at the south-east corner. Mr. Bloom, in his notices of Castle Acre, says it was precisely like the upper gateway in the street, and that the remains of it were only removed in this century. Both would, therefore, be early English, and as they are placed upon the north and south lines of the Roman camp, they would have been in connexion with Norman or early English defences along those lines; and they further show that the later men were minded to make use of, or at least fortify, the whole of the earliest works, as I have supposed the Saxons did. There has been difference of opinion as to the date of the earliest earthworks at Castle Acre. Mr. Harrod, of whose labours here, and anywhere else in Norfolk, I should wish to speak with the greatest respect, was of opinion that the circular and horse-shoe works were pre-Roman. Many who were carried away with this idea have since abandoned it; and the change is creditable,—and I suppose inevitable,—for archaeology of this kind has made great strides in the last thirty years. The story at Mileham, a few miles off, is just the same; there we have the Roman, the Saxon, and the Norman works quite as distinct as here, and each, perhaps, individually co-eval with that at Castle Acre. The written history of the Castle is very slight; we know, indeed, the descent of the lordship; but we fortunately still have in mound and masonry these great witnesses of a long life, not silent, but more eloquent than the written record. But slight as the written history is, it is something to know that the great Edward was more than once at Castle Acre, and I am disposed to believe that he lodged here, and not at the Priory, in February, 1297. At any rate, he would have visited the castle—at that time in its prime, and with its Norman defences just then getting a little obsolete—and no doubt he came under the gateway that has fallen, and mounted the now vanished steps into the keep, which has nearly perished. And perchance it was on this very spot, where we are now standing, that he made answer to the deputation from the clergy in the Parliament at Bury, who had refused a subsidy to the King. "From the moment that you cease to bind yourselves by the homage and on the pledge to me for your baronies, I hold myself to be bound in no respect to you." This was a bold speech, but I think the King had to give way. Fifty years later the castle was in ruins.

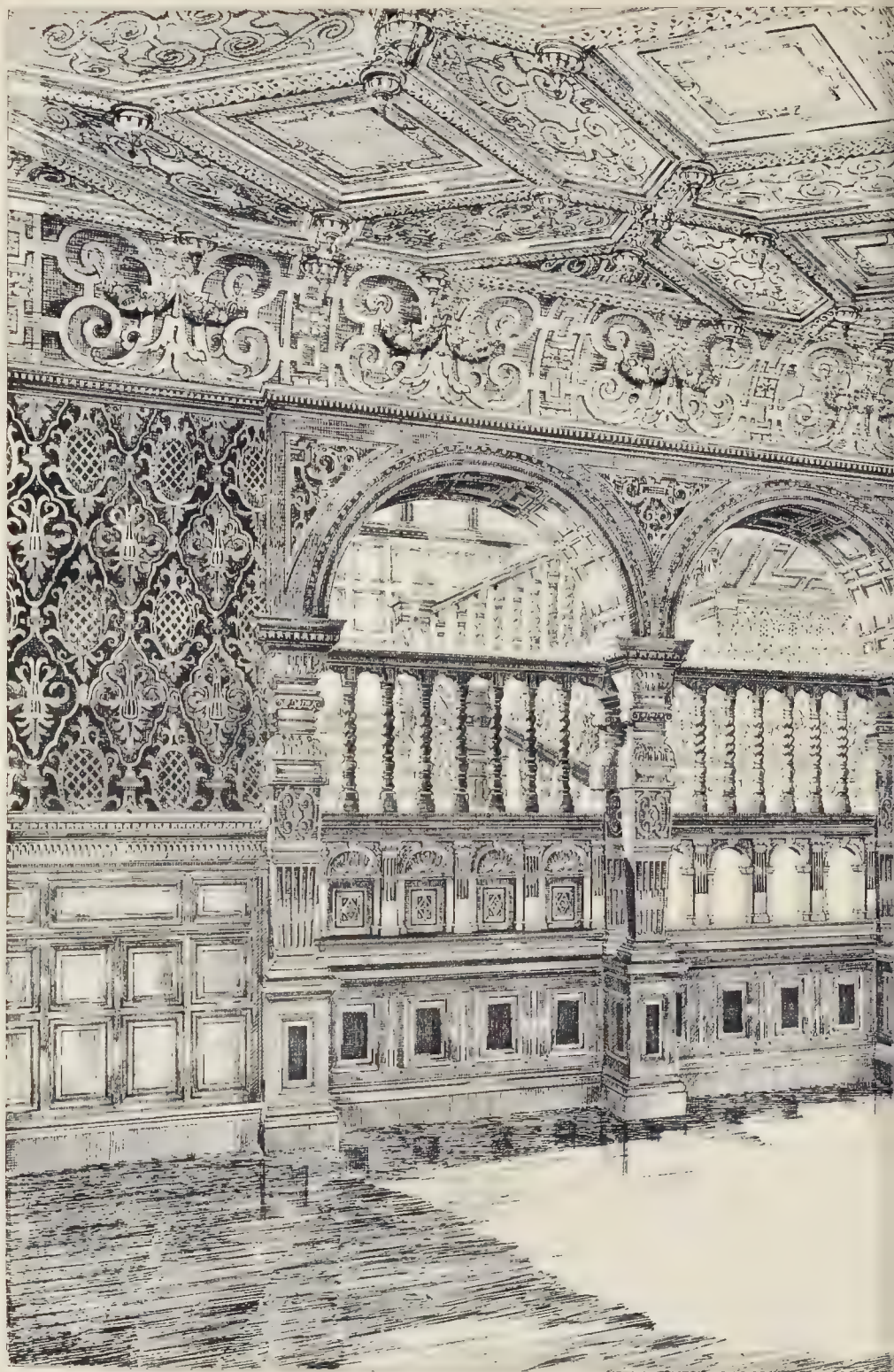
The reading of this paper was followed by a short discussion on the actual origin of the mound. Professor Clark suggested that the Romans would have scarcely made such a strategical blunder as to place their camp just below the mound, and yet Mr. Harrod stated that he had found in it some Roman remains at least. To this observation, however, Mr. Harts-horne replied that these Roman remains were mostly broken, and that the Saxons who threw up the mound may have derived them from the site occupied by their Roman predecessors. Mr. Harmer gave an opinion that the mound was not natural, but artificial, and Mr. G. E. Fox observed that the Roman cavalry would, of course, encamp outside the ditch which surrounded the place, while there would be room for between 800 and 900 foot soldiers inside the camp. Another member of the Congress reminded the party that Gundreda, wife of the founder, and daughter of William the Conqueror, died here.

The party next paid a visit to the parish church, which is dedicated to St. James, and presents, like so many churches in East Anglia, a mixture of the Decorated and Perpendicular styles. They much admired the elegant and lofty font-cover,—not very unlike that in Ewelme Church, Oxfordshire,—and the figures of saints still preserved on the lower panels of what once must have been a very fine rood-screen.

The next visit of the archaeologists was to the remains of the once celebrated Cluniac Priory, of which some very fine portions still remain, though in a condition which seems to forbid any hope of their ever being usefully restored. Here Mr. St. John Hope, F.S.A., acted as guide and interpreter, and gave *seriatim* a *visa voce* description of the leading features of the fabric. The gate-house, through which access to the Monastic buildings is gained, he stated to be clearly the work of the fifteenth century, and it







ENTRANCE HALL OF RESIDENCE  
MESSRS W. HARVEY, F.R.I.B.S.



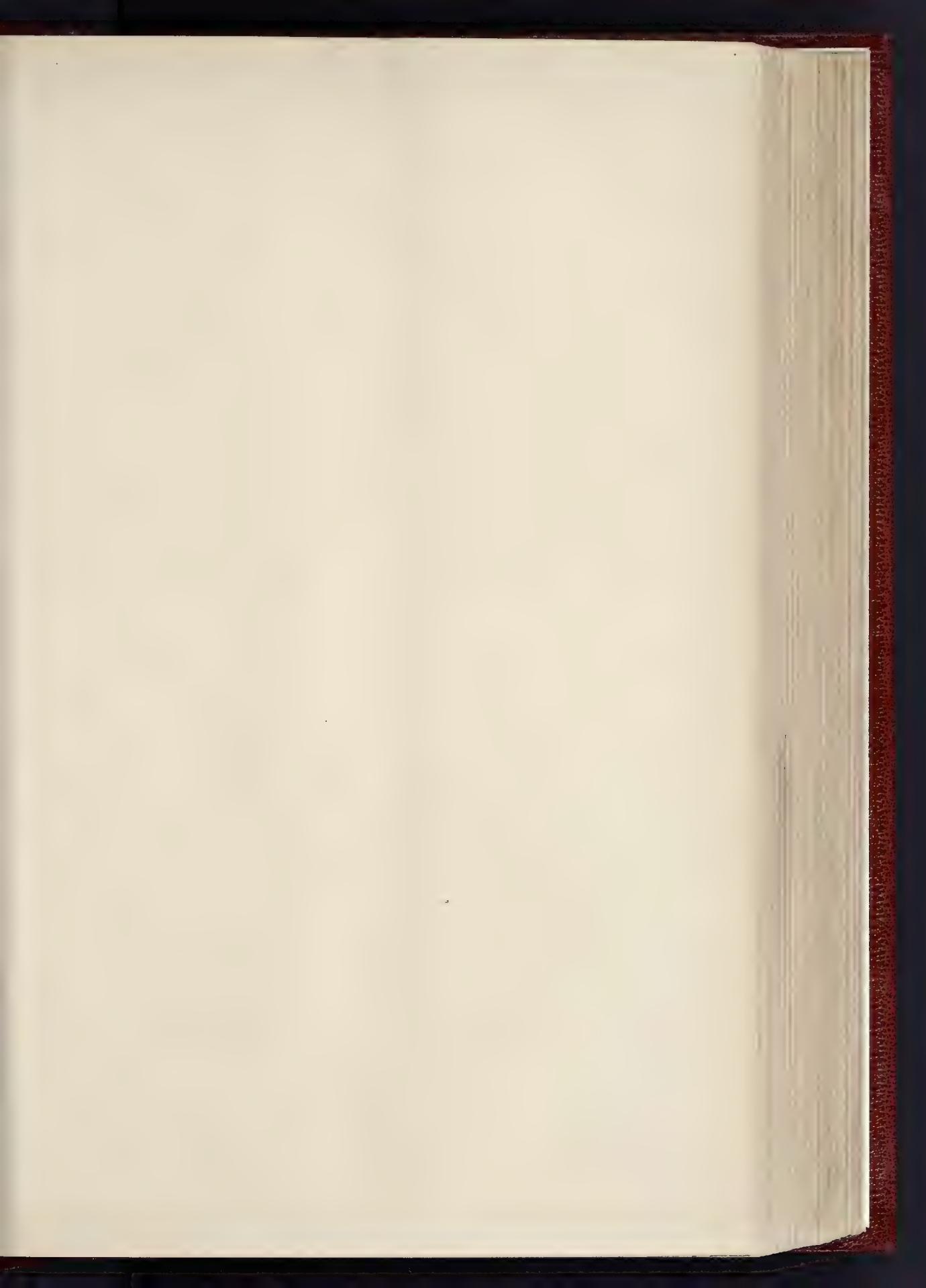


Bernard Smith del.  
March 1889

FACE COURT, KENSINGTON.  
BERNARD SMITH, ARCHITECTS.









SNETTISHAM CHURCH, NORFOLK.

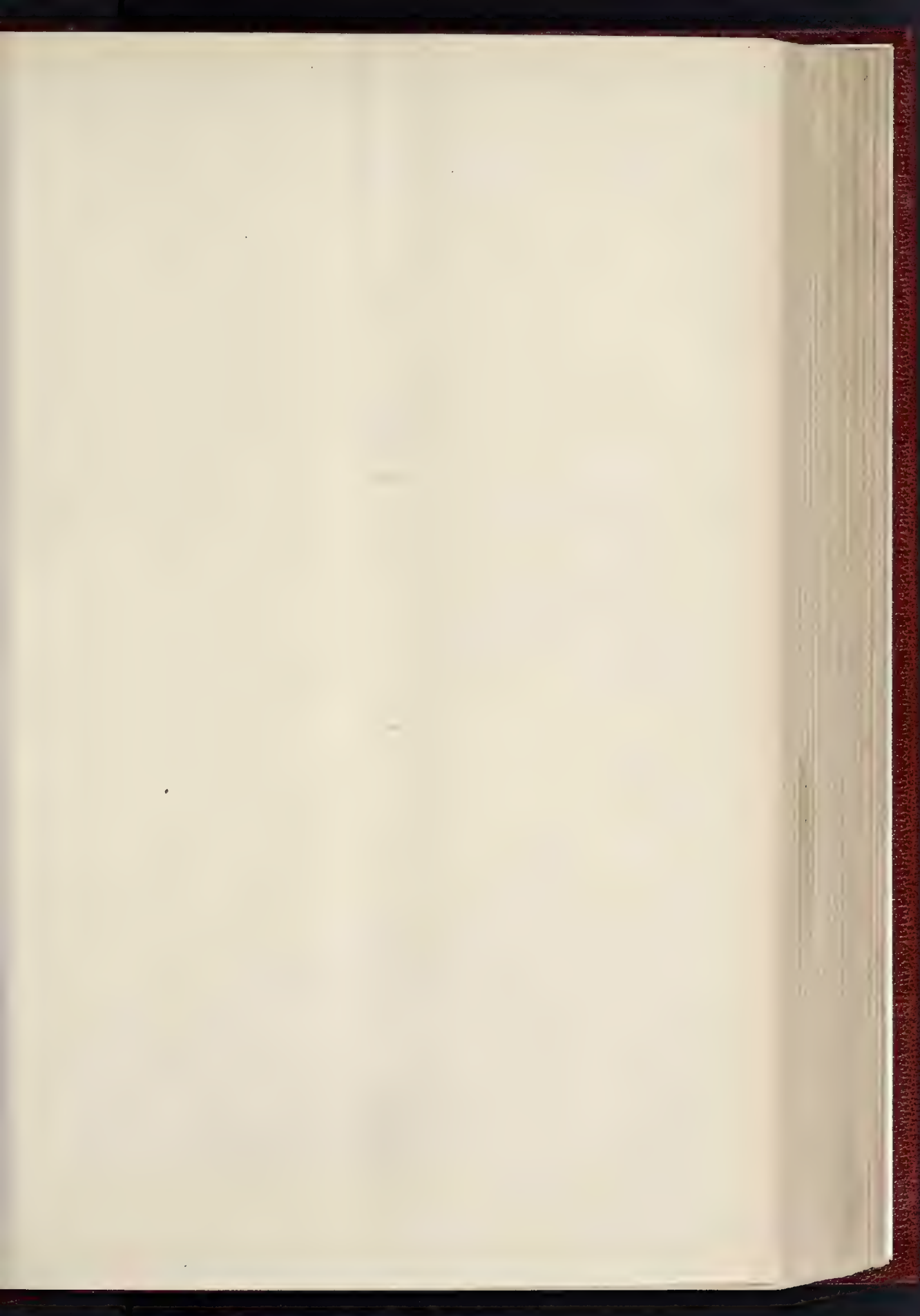




LEVERINGTON CHURCH, NORFOLK







St Michael's, Waterloo Ville, Hunt.  
Sketch Design—Leonard Stokes, Architect.



Rhinefield, Hampshire  
For Lieut. L. Walker, M.D., R.N.  
W.H. Romaine-Walker & Turner, Arch.





1. PH. PHOTO. SHAGLE & CO. 22 MARTIN LANE, LONDON E.





is built mainly of red brick. Its front is adorned with shields, representing the coats of the Warrens, Maltrevors, and Warren, along with the Royal arms. The story of the Priory was told briefly by Mr. Hope, as follows:—In a charter granted to the Great Abbey of Lewes in 1088, mention is made of Castle Acre by the founder, William de Warren, who stated that he gave to the Church at Acre two carucates of land, where he and Gundreda proposed to make a monastery. But there is no evidence of a monastic place in the castle at Castle Acre. The second William de Warren confirmed to the priory founded by his father various lands and tenements, and gave the monks two orchards and all the cultivated lands between them and his castle, in which they had founded their church, because the place in which they then were was too small and narrow for the habitation of monks. The earliest buildings at Lewes were erected about 1097, and the sister house at Thetford was begun in 1107. By 1140 this priory had become very rich. It owned twenty-seven churches in Norfolk alone. Blomefield says the new church was consecrated by Bishop Turpin, in 1146. In 1275 there were thirty-two monks here, and subsequently the number was increased to thirty-five. In 1283 the Priory held 490 acres of land, of which 460 were arable, besides five water-mills and other property. In 1373, after many efforts to free itself from the mother house of Lewes, the Priory became independent. The monks had here a profitable relic in the form of the arm of St. Philip, which brought them much gain. In 1537, the priory was surrendered by the prior and monks, by compulsion, to Henry VIII.

So far as has been at present ascertained the plan of a Cluniac Priory does not differ materially from the well-known Benedictine type. Here the cloisters lay to the north of the church, while to their east was the chapter-house. Near it again was the dormitory, built over a substructure, which was divided by walls into five compartments, some of which probably were used as workshops. On the south were the "fratery" and "refectory," and on the west of the square ran a range of buildings which probably belonged to the cook and the "cellarer." To the east, again, stood another block of buildings which, no doubt, formed the infirmary, while further off again to the south are to be seen the remains of the stabling, bakehouse, brewhouse, and other buildings. The entire site, of about thirty acres, was enclosed by a stone wall, and it may be mentioned that all the various fragments that are dug up from time to time are of the same Norman pattern with the portion still standing. The west front, a very great part of which is still standing, was adorned with rows of Norman arches interlaced, and was flanked by two towers, one at the end of each aisle. The nave was originally lighted by three Norman windows, for which, according to Mr. Hope, one large window was substituted in the fifteenth century. Passing into the interior of the Church, Mr. Hope drew the attention of his audience to a variety of lesser details. For instance, he pointed out to them that, except in the bays at the western end, the aisles were separated from the nave by screens. Each transept evidently had an apsidal chapel on the east, and the nave was floored with a paving of black and red stones. Around the church was a Norman triforium, with a wall-passage all along, and above was a clearstory. The eastern end of the choir was lengthened, most probably in the thirteenth century, but for what reason can only be guessed now. The original walls of the presbytery were three bays in length, and it probably ended in an apse, but this has long since been destroyed. The aisles on the north side of the church were rebuilt in the fourteenth century, when their apses were made square, to suit the fashion or taste of the day. It is quite possible, added Mr. Hope, that the foundation of some buildings, which are now being uncovered to the eastward of the north transept, are those of a sacristy. As to the decoration of the church, in all probability it was very rich and costly, for while the Cistercians liked plain and simple grandeur, the Cluniac monks loved nothing so much as the adornment and enrichment of their churches. The cloister court, continued Mr. Hope, was 100 feet square, and had covered alleys round it. It was reconstructed in the fifteenth century. The roof was of wood. On the east side of the cloister was the dormitory, on the south the fratery, and on the west the cellarer's range of

buildings. The chapter-house, beautifully arched in three tiers, had a great barrel vault, and terminated in an apse. There is no passage between it and the transept. Behind the chapter-house and dormitory stood the infirmary. This was not simply a hospital for sick monks, but also the place in which monks over sixty years of age, exempted from the routine of the rule of the order, were allowed to live. Monks who, on being blooded, were allowed a relaxation of the rule, likewise lived here for a time. This infirmary had its chapel. It was also suggested that some of the monks who could not abstain came here to have their allowance of meat; and, doubtless, in the course of time a great relaxation of the rules of the order crept in.

The Priory must have been a cold place to live in during the winter months, for it would seem to have included no other warming apparatus beyond a small fireplace in an apartment below the dormitory and the refectory. This was the calefactory, or warming-place, to which the monks came not only to warm their hands but to chat and talk when the rule of silence was relaxed, for the silent system was the rule throughout the rest of the buildings.

The round of inspection was brought to an end at the Prior's Lodgings, which extended to the westward of the cellarer's buildings. Descending some stone steps which had been made out of a new staircase that entered the building in the rear, the visitors entered the chapel of the prior, where there are vestiges of gorgeous painting on the splayed wall of the east window, and on the rafters. There is also here a Decorated sedile, and the capitals of shafting near the ascent to the site of the altar are enriched, the one with the arms of Warren and the other with those of England. Adjoining this chapel is the chamber of the prior, which has beautiful oriel windows.

Mr. Davey, Lord Leicester's agent at Castle Acre, stated that it is the intention of the owner to encourage the discovery of "finds" at the Priory, and to store them in a museum within the buildings; and, on the motion of the Rev. Dr. Jessopp, 14l. was collected on the spot in order to help forward the proposed work.

The party next paid a hasty visit to Great Dunham Church, which is said to be pre-Norman, and which has a triangular-headed doorway at its west end, blocked up. The quoin-work here is singular. The central tower has a double-light window, the lights being divided by a plain pillar with a cushion cap, which supports a single long stone. It has also several singular apertures made probably for acoustic purposes, over each arch in the eastern and western sides.

Driving to Fransham station, the party caught the return train to Norwich, and at the evening meeting Dr. Raven read a carefully elaborated paper on "The ix Iter of Antoninus," which he traced from London to Colonia (Colchester), and thence to the neighbourhood of Sitomagus (Dunwich), and then crossing the Waveney by a ford near Bungay to "Venta Icenorum," which he had no hesitation in assuming to mean Norwich, or its immediate vicinity. He argued very strongly, from internal evidence, and from the mileage mentioned by Antoninus, that no other interpretation could be given to the vexed question raised in this chapter. The reading of this paper was followed by a discussion, in which Mr. Fox, Dr. Jessopp, and other members of the Institute took place, and by a vote of thanks to its author. Mr. J. L. André, of Horsham, Sussex, followed with a short paper on the "Peculiarities of East Anglian Church Architecture." Among these he reckoned one point of considerable interest, namely, the large admixture of geometrical tracery with the tracery of large windows of Perpendicular date and character, instancing examples from St. Nicholas' Church at Lynn, and from very many of the Norwich churches. He also mentioned the constant recurrence of one type of construction; this is marked by lofty internal proportions, the absence of chancel arches, and the continuation consequently of nave roofs over the chancels, and the lofty arches by which the lower parts of the western towers were made to open into the nave. He also drew attention to sundry sections of mouldings on the bases of columns, where Perpendicular and Decorated details were found intermixed. Another point which he specified was the constant use of elaborate wood-carving in the interior of churches in East Anglia, while the exterior was left comparatively plain, or else decorated by light and dark flint work in diaper patterns.

He concluded his paper with a few remarks on the small churches with round towers to be seen in the neighbourhood of Yarmouth and Lowestoft.

(To be continued.)

## Illustrations.

### ENTRANCE OF HOUSE, PALACE COURT, KENSINGTON.

THE view shows the interior of the hall of a residence, the exterior of which was illustrated in our pages, Nov. 5, 1887.

The large mantelpiece is in polished Hopton wood, and the wainscoting, screen, &c., are in fumigated oak, the space above the wainscoting being hung with tapestry. The architects were Messrs. W. Harvey and Bernard Smith. The drawing from which the illustration is taken was exhibited at the Royal Academy this year.

### ST. MICHAEL'S, WATERLOO VILLE, HANTS.

A PORTION of this building is now being erected at Waterloo Ville, near Portsmouth. It is to be used as a home for girls, and a large washhouse, &c.,—not shown in our illustration, —is being erected at the back of the building. The materials used are local bricks, with red brick plinths, bands, &c. Our illustration is taken from the drawing exhibited at the Royal Academy. Mr. Leonard Stokes is the architect, and the builder is Mr. J. Edwards, of Waterloo Ville.

### RHINEFIELD, HANTS.

THIS house, the country seat of Mr. Lionel Walker Munro, is situated in the heart of the New Forest, and takes its name from the inclosure in which it stands, and which for centuries has borne the name of Rhinefield. To make way for the house, which is entirely new, the old keeper's lodge had to be pulled down, but the materials have been re-used in erecting the new lodge at the entrance to the estate. The ground story is built of the old bricks, which are of the small size much used in the locality in days gone by, and many bear dates cut into them of the first half of the eighteenth century. The upper storey is of hung tiles, and the roof of the same material. Great care was taken not to disturb the moss and lichen which clung to both bricks and tiles, the result being that the lodge has every appearance of an old building. This lodge, with kitchen-garden walls which surround an acre and a quarter of land, and four pairs of elaborate wrought-iron park-gates, formed the first contract.

The second contract was for the well, which has been sunk to a depth of 87 ft. 6 in., and the cellarer under the house, which is very extensive. The wine-cellar has been a special care, and have been so planned that an even temperature can be maintained both in summer and winter. An air-space of 2 ft. 6 in. is carried round between them and the outer walls of the house. This is connected, not only with the outer air, but with the heating-chamber, and both inlets are under control. The principal cellar has a capacity of 1,000 dozen. There are also cellars for various wines requiring different temperatures. The butler's cellar is provided with a small, smooth-running lift, direct into the serving-room.

The third contract, which has just been accepted, includes the carcass of the superstructure, exclusive of the stable court. The view taken in our illustration is from the drawing which was exhibited in this year's Royal Academy, and represents the entrance or north front. The rooms to the right of porch are the library and business rooms, and to the left the lavatory, smoking, and billiard rooms. All the principal rooms are on the opposite side of the house; the state drawing-room faces south and west, the withdrawing-rooms west, the morning room south and east, and the dining-room east and south. This room, which is 36 ft. by 24 ft. and 18 ft. 6 in. high, has a great bay-window facing east at the extreme end of one side of the room, from which a magnificent view is obtained. There is also a gallery at one end over the serving passage. One of the principal features of the house is the Great Hall, which measures 67 ft. by 25 ft. by 35 ft. 6 in. high. The roof is of hammer-beam construction, with Late Gothic tracing in the two upper stages, and carved pendants from the ends of the



hammer-beams. Over the entrance vestibule there is a minstrel's gallery, extending the full width of the hall. The principal staircase, which will come in the panelling contract, has treads 9 ft. wide, and a massive arched balustrade supporting the handrail. There is a waggon-roof over the staircase, with moulded ribs. The whole of the above work is of oak, as will also be the panelling of the hall (which will be 13 ft. high) and the panelling of dining-room, library, &c.

The portion of the building advancing at right angles to the main front is devoted to the offices on the ground, and the suite of bachelor rooms on the first floor. This bachelor wing can be reached from the billiard and smoking-room by a special staircase. The entrance to the kitchen court is under the great tower. An important feature of the planning of this house is that no servant's room or office, with the exception of the attic dormers, can overlook the grounds at any point.

The tower will contain the machinery for the electric lighting, pumping, and the air compressors for the fire service. In the upper staging will be the clock and peal of bells, and above this the water tanks. From the top of this tower a fine view may be obtained of the Solent and the Isle of Wight, over a splendid stretch of forest.

On the first floor, directly off the principal staircase, is the house suite, consisting of bedrooms, dressing-rooms, bath-room, and boudoir. This latter has two oriel windows overlooking the great hall, besides one window facing south and overlooking the terraces and lawns.

From the boudoir there is a private turret-staircase communicating direct with the drawing-rooms and great hall. Above the house suite, and communicating by another private staircase, is the maids' rooms, serving-room, and dress-room. The whole of the first-floor is given up to bed and dressing rooms, of which there are a large number, and each is connected by an electric bell to a maid or valet's room in addition to the usual bells.

Advantage has been taken of the fall in the land, which is 20 ft. between the east and west extremities of the building, and which adds much to the picturesqueness of both house and grounds. The terraces are being thrown up, and some will be surmounted by stone balustrades.

The material employed for the walling is Purbeck, hammer-dressed and laid in sand in courses with Monk's Park stone dressings. All the exterior walls are built with a 2 in. cavity. The filling in of the elaborate Late Gothic groining to porch is of chalk. The chimneys, every one of which is different in design, are of carved brick. The majority of the floors and panelling are of oak. Glazed tiles are largely used throughout the kitchen offices and larders, the shelves of which are of white marble.

The general contractors for the house are Messrs. McWilliam & Son, of Bournemouth; Messrs. Easton & Anderson for the well and water-service; Messrs. Clark & Mannoch for the sanitary plumbing; and Mr. J. Burford for the wrought metal-work and casements. The lodge was built by Messrs. Holloway Bros.; the clerk of works is Mr. W. Cowley; and the architects for the whole are Messrs. Romayne-Walker & Tanner, of London.

#### CHURCH OF ST. ANDREW, HECKINGTON.

This church is so well known to all students in architecture that any account of it would seem superfluous. We would, however, draw attention to the chancel, which, for a country parish, is perhaps one of the finest in the kingdom, being 56 ft. long, 24 ft. broad, and nearly 40 ft. high in the wall. It is three bays in length; on the south side there is a fine three-light window in each, with a priests' doorway in the central one, and two similar windows on the north side, the eastern bay being taken up with the sacristy; the bays are marked by boldly-projecting double-canopied buttresses, and at the angles are finished with handsome pinnacles. The east window is 37 ft. high, has seven lights, and ranks as one of the finest flowing Decorated windows in the kingdom. The walls and windows have been restored. The latter re-glazed, the east gable raised to its original pitch and garmented with a fine cross, the total height being about 60 ft. The roofing is new, and of framed rafters, arched to suit the shape of the east window, while it also fits more closely the shape of the chancel arch, and panelled, with larger ribs to mark the bays,

all the intersections have carved bosses. The stone cornice of the walls is continued with a moulded and coved one of wood, in the cove are carved figures of angels with extended wings. The fittings are entirely of English oak. In the floor the old memorial slabs have been relaid with a main avenue of tiling laid up the centre. The groining of the undercroft has been restored, the old access to the same has been made good, and a doorway opened out on the west side of the vestry in lieu of the mutilated window at the east; the vestry is over this and has a tile floor. On the removal of the old roof a stone gutter was found, all the joints of which are made with lead; this is formed in the plain course of stone between the cornice and the flowing tracery of the parapet, the latter being an after-thought, as the old weather-mould shows the roof to have finished on the cornice in the same way as that of the sacristy now does. The restoration has been carried out under the direction of Mr. James Fowler, of Louth, architect. Messrs. Pattinson, of Ruskington, were the builders. J. F.

#### SNETTISHAM AND LEVERINGTON CHURCHES, NORFOLK.

THESE two churches, of which we give illustrations, are among the churches which were visited by the Architectural Association in their annual excursion this week.

Leverington Church is referred to in the account of the earlier part of the excursion given in another column. Snettisham was visited on a later day, of which we are not able to publish an account this week.

Snettisham is by far the finer and more characteristic building. Leverington spire takes of the thin and rather steepled character frequently to be noticed in the spires of the adjoining county of Lincoln, such as that of Billingborough. Instead of the thin, cast-iron-looking, flying buttresses of Billingborough, however, the later builders have fortified this spire with solid battlemented turrets at the angles, which, though they give a marked character to the building, do not fall in very well with the general composition, and appear rather too obviously as after-thoughts.

#### SOMERSET ARCHÆOLOGICAL SOCIETY.

THE forty-first annual meeting of the Somerset Archaeological and Natural History Society commenced on the 30th ult. at Minehead, under the presidency of Mr. G. F. Luttrell, of Dunster Castle. There was a large gathering of members, and the day was beautifully fine.

The annual general meeting was held in the morning in the Town-hall. A local museum was formed under a committee of which the Rev. Walter Hook (Porlock) was the hon. sec. It included many objects of archaeological interest, specimens of natural history, &c., and was under the direction of Mr. Bidgood, the curator of Taunton Museum.

Mr. Chisholm Batten announced that the president of last year, the Bishop of Bath and Wells, was prevented from attending, as that was his golden wedding-day.

Mr. Luttrell having taken the chair,

The Rev. J. A. Bennett read the annual report, which stated that the number of members had increased to 550, and new members were continually being added. The funds of the Society were also in a satisfactory state, the balance in hand on the general fund being 811. 17s. 6d., and the balance on the Castle purchase fund debt had been reduced from 4311. 17s. 6d. last year to 3294. 19s. 3d. "The library has been greatly enriched during the year, especially by the

munificent gift of the late Mr. Surtees' library, presented to the Society by the kindness of his widow, Lady Chapman. This library amounts to about 3,000 volumes, and is the most extensive and valuable present the Society has ever received. The manuscript collections of the late Rev. F. Brown, consisting of more than 100 volumes of abstracts of Somerset wills, have been presented to the Society by his son, Mr. F. Latham Brown. A very valuable illuminated MS. copy of Higden Polychronicon, written by the Monks at Keynsham about 1377, has been presented by Mr. Kerslake. The Council have also to report the presentation to the museum of the magnificent collection of red deer heads, belonging to the late Mr. Fenwick Bisset, killed on Exmoor, and given to the Society by the kindness of Mrs. Fenwick Bisset. It has been remarked by persons capable of

judging that there is no such collection of horns in any local museum in the country." The Council had to report the acquisition of a valuable piece of land adjoining the Castle wall, and including ground formerly a bastion attached to the Castle. It had just been purchased by the kindness of Colonel Pinney, and at his expense conveyed to the trustees as part of Taunton Castle property. The Council submitted the name of Lord Carlingford to be patron of the Society, in the place of Viscount Portman, deceased. Among contributions to Somerset history recently published, mention should be made of the Rev. F. Weaver's "Incumbents of Somerset;" a third volume of Somerset wills, printed from the Rev. F. Brown's collections; a volume by Mr. E. Green, on "The Preparations in Somerset against the Spanish Armada"; and Bishop Fox's register, by Mr. Chisholm Batten. The catalogue of the library was printed, and would shortly be ready for issue. It was proposed to prepare and print a catalogue of the Surtees library as a supplement. The Council begged to call attention to the meeting of the Society of Antiquaries, to which they sent delegates last year. It would be the duty of the Society to say if they accepted the terms of union, and approved the programme agreed upon by the delegates, so far as it applied to that country.

Mr. H. J. Badcock read the balance-sheet for the year ending December 31st, 1888. The members' subscriptions amounted to 2621. 9s., and the balance on the former account was 571. 0s. 8d., the total receipts being 4021. 2s. 5d. After paying all expenses there was a balance of 911. 12s. 2d. The balance-sheet of the Taunton Castle purchase fund showed that 3294. 19s. 3d. was now owing.

The Rev. J. A. Bennett, referring to the Somerset Record Society, said: Again in this, the third year of its existence, I have the pleasure of being able to give a good report of the state and prospects of our Society. The number of its members has increased from 121 to 134, and the finances are in a satisfactory state. It may be as well, however, to note that it will probably be necessary, as time goes on, to spend more money for transcriptions than has been the case hitherto. Through the generosity of our editors, who have given not only their time and labour to the usual work of an editor, but have also provided the texts, the Society has been saved very heavy expenses, but it can hardly be expected that this will always be so. Our next volume will be a set of churchwardens' accounts from several parishes, chiefly between the years 1450 and 1570. It is already in progress, under the editorship of Bishop Hobhouse, and promises to be a volume of peculiar interest in the vivid picture it will give of the actual life of our country parishes in past times.

On the motion of Mr. Hobhouse, M.P., seconded by Mr. Foxcroft, the report was adopted.

A vote of thanks was passed to Lady Chapman and Colonel Pinney for gifts mentioned in the report.

The President did not deliver the usual formal address, but he gave the society a very cordial welcome to the West, which, while not, perhaps, possessing a great number of specimens of archaeological interest, had the great natural beauty of its scenery as a compensating balance.

In the afternoon there were excursions to places of interest in the locality, and in the evening there was a meeting.—(Slightly abridged from the Bath Chronicle.)

#### DEATH OF MR. J. G. CRACE.

WE regret to hear of the death, on the 13th inst., at his residence, Springfield, Dulwich, of Mr. John Gregory Crace, in his 81st year. As the principal of the well-known firm of J. G. Crace & Son, he may be said to have been a pioneer in the revived use of colour-decoration; and his work at the Houses of Parliament, and at the buildings of the Art Treasures Exhibition, and of the 1862 Exhibition in London, may be cited as favourable instances of his efforts. One of his most recent and successful works is the oak staircase at Mercers' Hall, which he designed and carried out in his 72nd year. This work was fully described and illustrated in the Builder for July 9, 1881. John Gregory Crace was one of a line of "decorative painters." From a magazine article, published a few years ago, we learn that Edward Crace, the first in this direct succession



of artistic decorators, was born in 1725. He was the son of Thomas Crace, "Citizen and Coachmaker," of Westminster, and his mother was a daughter of the Surveyor of Westminster Abbey. In 1748 he was admitted to the freedom of the "Painter-Stainers" Company, and to the livery in 1752, by which date he may be considered to have made his start in business; and the following year he married a Miss Nunn, an artist's daughter. He was certainly occupying premises in Long-acre, conjointly with his next brother Charles, in the year 1756, and carried on business at 40, Long-acre, from 1764 till his death in 1799. Among other works, he decorated, in 1771, the Pantheon, which James Wyatt, R.A., had just built for dramatic performances. In 1780 Edward Crace was appointed by the Crown Curator of the pictures in the Royal Palaces (Windsor Castle, Hampton Court, Kensington Palace, and Buckingham House)—a post which he retained till his death. His son John Crace was born in 1754, and was in 1767 duly apprenticed to his father in the Painters' Company—in which, however, he did not take up his freedom till 1785. He then first started on his own account, and transacted his business at 153, Drury-lane, for many years. He was entrusted with important works by Sir Robert Taylor, Sir William Chambers, Sir John Soane, and James Stuart of "Athens" celebrity. He was also employed by the king, George III., and the Prince of Wales, for whom he decorated Carlton House. Among other public works he also decorated the Opera House, Drury-lane and Covent Garden Theatres. He died in 1819. His eldest son, Frederick Crace, born 1779, had then for many years assisted his father, to whom he had been formally apprenticed in 1793. He resided and had his office at 34, Curzon-street, from 1806 to 1812, after which he lived out of town, and carried on business until 1826 at 61, Great Queen-street. In partnership with his younger brother. During this period he was constantly engaged on decorative works for the Prince Regent at Carlton House, and the Pavilion, Brighton, in the great Dome of which his work still remains; and, later, for the same Prince, as King George IV., at Windsor Castle. The *Morning Herald* of July 2, 1827, mentions a special visit of the King to Windsor Castle to "inspect the progress of Mr. Crace's work." We are told that the incessant demands of Royalty on Mr. Crace's time began to trespass considerably on his general business; and, towards 1826, the assistance of his son, John Gregory Crace (whose death is now recorded), must have been very welcome. At the expiration of the lease of the Great Queen-street premises, they moved first to 230, Regent-street, then quite new; but in the following year (1827) they removed to the premises in which the business has ever since been carried on—No. 14 (now 35), Wigmore-street. Here father and son worked side by side for over thirty years, and here the firm of "Crace" developed the business on wider lines, and attained its highest reputation. It may be mentioned here that it was whilst engaged in avocations demanding such constant attention and industry that Frederick Crace found time to form the wonderful collection of Maps and Views of London which found its way into the British Museum as the "Crace Collection" a few years ago. Not only did he form the collection, but mounted every plan and every drawing with his own hands. His appointment as a Commissioner of Sewers interested him in the changes which the great metropolis had passed through; and for over forty years, rising early to make time, he devoted some hours each day to his hobby. This continued till within a few months of his death, which occurred in his eighty-first year, 1859. He had lived not only to see his son form a high reputation, but to see his grandson, Mr. John D. Crace, beginning earnestly in the same path. John Gregory Crace, the subject of our present notice, was born in 1809, and had already put his hand to the plough before the firm left Great Queen-street, and they had not long settled in Wigmore-street before his new energy and natural taste made themselves felt. He had, as a youth, visited Paris; and he felt that the English, so long out of step with the Continent, were far behind the French in all the decorative arts. In fact, English taste was almost at its lowest ebb. He repeated his visit, and engaged French artists; and in 1838 began the elaborate decoration of the room which is still the firm's principal show-room at Wigmore-street, and which had been added soon after the premises were taken.

In 1843 he determined to extend his knowledge of decorative works abroad, and made a tour in France, Germany, and North Italy with this object. His first works of importance were undertaken, on his return, for the late Duke of Devonshire, at Chatsworth, and at Devonshire House; and he was shortly afterwards called in by the Marquis of Breadalbane, who entrusted him with the decorative works at Taymouth in preparation for the Queen's visit, as well as with works in London. Meanwhile, the firm had been engaged from time to time on one or other of the theatres, and were preparing for the internal decoration of the St. James's Theatre, then beginning to be built, when the architect, Mr. Beazley, fell ill, and Messrs. Crace, to save delay, took up the matter, and designed and executed the interior decoration, which remained as they left it until it was remodelled some years ago. In 1846, Mr. Crace made another tour in France, devoting most of his time to the restored Sainte Chapelle in Paris, and the beautiful chateaux of the Touraine, Blois, Chambord, and Chenonceaux. Of these, Blois was then undergoing careful repair and restoration by the architect, M. Duban, who was paying special attention to the renewal of the coloured decorations, and who accorded to Mr. Crace full permission to take notes and sketches. The immediate results of this tour were summarised in two papers read in that and the following year before the Royal Institute of British Architects, of which body he had been made an honorary member, in recognition of previous contributions to the "Transactions." In 1848, John Gregory Crace was selected by the Government, on the advice of Sir Charles (then Mr.) Barry, the architect, to execute the coloured decoration of the Houses of Parliament. At this time (although his father continued for many years to take some less active part in the business) Mr. J. Gregory Crace was virtually the leading partner, and to him fell the management and direction of this important work. Here he made the acquaintance of Augustus Welby Pugin, and soon afterwards turned his attention specially to the production of fittings and furniture of a character suitable to Medieval decorations. Of the Exhibition of 1851 he was one of the earliest sympathisers and promoters. He was appointed a Special Commissioner, and was one of the jurors selected to adjudicate on works of decoration, furniture, and paperhangings. Besides his work at the Crystal Palace, he was engaged on numerous works in town and country, and the long journeys and incessant responsibility allowed of no repose. At the end of 1854 a severe illness threatened his life; but a holiday in Spain, the first he had known for many years, restored him to health. It was fortunate that just before this illness his eldest son and partner, John Dibble Crace (born 1838), had entered the business, bringing with him a love of art and architecture, and a ready pencil. Aided by his grandfather (Frederick Crace), who was now becoming infirm, he helped to tide over a critical time, and speedily acquired some knowledge of the business. In 1857 John Gregory Crace was called in to design and carry out the coloured decorations of the "Art Treasures Exhibition" at Manchester—a work which considerably increased his reputation. In 1861, he was invited to undertake the decoration of the "Waterloo Chamber," the great banquet-hall of Windsor Castle. In this work the Prince Consort took great interest: it was not quite complete at the time of his death. In 1862 came the second Great Exhibition held in London, and Mr. Crace was appointed to design and supervise the decoration, of which the execution was included in the general contract. To give a list of Mr. Crace's numerous works would require a great deal of space. We can only say, in conclusion, that he took a keen interest in all that promoted the improvement or well-being of the employes of the firm.

#### ST. JULIEN LE PAUVRE, PARIS.

SIR,—It will interest your readers to know that the Church of St. Julien le Pauvre, in Paris, is not to be destroyed. It is under the protection of the Ministry of Fine Arts, and is to be restored by the Diocesan Architect as soon as funds are obtained. Amidst the distractions of the Exhibition I had but scanty time to discover and examine this building, probably the most ancient in the Cité. The west end is approached through a timber-yard, and close by

lives the very intelligent custodian. Separated from this approach is a large open space on the north side of the church, also giving access. As far as I could see, the building is in excellent repair both inside and out, and full of interest. I would urge the young members of the profession who have time and opportunity to make careful sketches before the restorer begins his work. The nave has been reduced in length, and a pedimented front stuck in, but the north aisle exists and fragments of the entrance remain.

I bought of the custodian what seems a careful description and historical account of the church which I shall be glad to lend you if desired. I have not yet been able to study it myself, but observe it contains sketches and no plan except one of the district, which I imagine is well worthy of study.

J. W. WALTON-WILSON.

Shotley Hall, Northumberland,  
August 10, 1889.

#### CONCRETE FLOORS.

SIR,—The articles by Mr. Frank Caws on the above subject (published in your issues of July 27 and August 3, and also the letter by Mr. Hyatt in your issue of last week) have been read by me with a peculiar interest.

It is now some years since I first began to make a special study of fireproof construction. Some three or four years ago (having collected all the data I could on the subject) I began experimenting with slabs of concrete. These slabs were 3 in. thick, and when two months old were tested with dead loads, and also for resistance to impact. The results proved conclusively that they would serve all weight-carrying purposes. The same slabs, after being subject to a severe fire for upwards of two hours, broke with very slight impact. The cement in all cases appeared to have lost its virtue, and became perished by the severe heat. These results led to the conclusion that no concrete having Portland cement as a matrix would retain its strength after a severe fire. I therefore determined to retain the Portland cement concrete as the load-carrying material, and to introduce, in place of the ordinary removable wood centering, a permanent centering made of freelay or terra-cotta, which would protect the bottom (or tensional) side of the concrete, as well as the tensional flange of the joists from the action of fire.

Further experiments showed an advantage in keeping the protecting material from actual contact with the tensional flange of the joist and introducing an air current between the two,—i.e., the heat having penetrated the protecting material as soon as given off was met by the cold air current, and so prevented from materially affecting the iron. I therefore decided to let the centering drop down well clear of the joist, and, by putting two air bricks in the external wall of each room, was able to introduce cold air into the hollow centering and distribute it over the entire ceiling between the joist and the protecting material; with this arrangement, the greater the heat the greater will be the rush of cold air to it, and it will require a very severe fire indeed to materially affect the iron.

I have read Mr. Hyatt's book (published in 1877), and find he mentions a new Portland cement of his own invention; the results of his experiments with the ordinary cement appear to coincide very much with my own, and his description of the exhaustive tests he has made are both interesting and valuable.

In spite of the long advocacy of the use of concrete in large thin slabs, we find very few architects caring to use it for floors that are subject to sudden impact; the same reason which has caused cast-iron girders to go out of use as a load-carrying material in floors, prevents the use of concrete in large slabs,—i.e., its liability to collapse without giving a moment's warning. Not long ago I read a newspaper account which stated that the floor of a mill had fallen out, and knocked out every other floor down to the basement. Surely it is better to retain the joist (with all its evils) and protect it from fire in the best way we can, than run such risks as this.

MARK FAWCETT.

SIR,—In the papers by Mr. Caws, he states that the strength of concrete slabs is inversely as the linear dimensions, and directly as the square of the thickness, and he takes as the unit 1 ft. by 1 ft. by 1 in. thick, with a safe distributed load of 400 lb. Then he gives as an instance a slab 10 ft. by 10 ft. by 1 in. thick, and he makes the safe load on this 40 lb. per square foot.

Are we to understand that while 1 ft. by 1 ft. by 1 in. will carry safely 400 lb., 10 ft. by 10 ft. by 1 in. will carry safely 4,000 lb.?

ARCHITECT.

#### SCAFFOLDING.

SIR,—In your last issue you give some description of a method of attachment in scaffolding. I beg to say that some ten years ago I devised a very similar contrivance (a sketch of which I enclose), but in practice I found it, taking everything into



consideration, to have no advantage over good scaffold cord, and I therefore discarded it. The chief objections are:—(1) Weight in transport. (2) Non-adaptability in sizes. (3) Expense of manufacture. (4) Insecurity on account of flaws in material, which would give way without any warning. (5) It does not entirely dispense with cords. (6) Danger from them falling below by their awkward shape in handling. (7) No advantage in time worth mentioning over tying a cord, and the scaffold is not so rigid.

\* Mr. Baldwin's bolder, of which he encloses a sketch, differs in detail from the one we illustrated, and does not look quite so strong, though the principle of grip is the same. The objections named, as resulting from a builder's practical experience, are important: at the same time we cannot help thinking that tying up with rope is a somewhat clumsy method for these scientific days.

## The Student's Column.

### WATER-SUPPLY.—VII.

#### PERCOLATION AND UNDERGROUND WATER.

THE value of a stratum for water-supply purposes does not altogether depend on the amount of moisture it absorbs. Clay, for example, contains enormous quantities of water, to which, in fact, it owes its plasticity, as can be easily ascertained by baking it, when the water is driven off. But this water is not available, as the clay retains it, and will not permit its free passage to any other rock, or into a well-boring, except in very small quantities. A stratum from which water is to be drawn must not only be absorbent, but capable of transmitting the fluid. This transmission is termed *percolation*, and the rocks permitting the action are known as *permeable*, *porous*, or *pervious*. Such rocks as clay, which do not allow water to freely pass through them, are known as *impermeable*, *non-porous*, or *impervious*. There is every gradation between pervious and impervious rocks, and it is of considerable importance in some instances to ascertain, if possible, the degree of permeability of an aquiferous deposit. Experiments have been made on different kinds of rocks with a view to finding this out, and, although they certainly give some idea of the method of percolation, yet we venture to think they have little or no practical value in enabling one to judge of the rate of yield. Laboratory experiments made on compact unfissured samples, or patches of ground constructed in imitation of nature, cannot possibly give reliable data of what happens on a very much grander, and very different scale, in nature. When *in situ*, rocks are usually traversed by innumerable joints and fissures, which both hold and transmit water freely in enormous quantities,—in fact their comparative frequency and size form a most important element in any underground water inquiry. The fissures act as conduits, and the success or failure of a well-boring may almost entirely depend on the intersection of some of these underground waterways by the boring, or headers driven out from it. Who can imitate these joints and cracks in making experiments?

Tables concerning percolation as deduced from experiment will be found, amongst other publications, in the "Minutes of Proceedings of the Institution of Civil Engineers," vol. xx. (1861), pp. 220-224; vol. xiv. (1876), pp. 28, 33-47; and in Professor Prestwich's new work on "Geology," vol. I., Chemical and Physical, and the student is referred to these for further information on the subject.

Professor Prestwich says that the value of beds as water-bearing strata is in direct ratio to their capacity of saturation, and in inverse ratio to their power of imbibition. Thus, although solid chalk and loose sands may hold the same quantity of water, the resistance to the free passage of it in the former is to the latter in the proportion of about 600 to 1.

As we have previously mentioned, the lithological character of a stratum, when traced over any considerable area or on going to any great depth in it, is liable to material change. It is truly astonishing how small a matter will seriously interfere with the free circulation of underground water. A sand bed, say 100 ft. in thickness, may develop a wide-spread parting of clay in the middle, a few inches thick, which holds up all the water above it, almost entirely depriving the lower half of the bed of moisture. Conversely, the clay parting may keep all the water in the lower half, depending on the circumstances of its outcrop or point of derivation of the supply. Again, a thick clay

bed which had never been known to yield a drop of water throughout its entire thickness, may suddenly become an excellent source for small supplies, through the discovery of a sandy parting locally developed in it. Minute vertical and other cracks in a sandstone may for a few miles be filled with clay, the result of which, in hindering free percolation, or circulation of water, is only too apparent. Such a formation as chalk is exceedingly variable in structure, and here, apart from the consideration of fissures, we have an excellent illustration of the futility of experiments in arriving at the rate of percolation. We make an especial example of chalk, because its character as a water-bearing formation in N.W. Europe is well-known, and because a large proportion of experiments directly refer to it.

Chalk is a limestone largely made of the broken shells of very lowly organisms known as foraminifera. It varies in thickness, according to position, from a few feet up to as much as 1,152 ft. (under Norwich). In its upper half it contains lines of flints a few feet apart from each other, which, as a rule, are missing from the lower portion. It is fissured in every direction, but vertical and horizontal jointing are most prevalent. Sometimes the rock is very soft, and at others it is hard enough for building purposes,—the Tottenhoe stone. The continual percolation of water, amongst other things, has very considerably modified its structure, in that its contained acids have attacked the lime of the chalk, and removed a considerable bulk of the rock. Of the material so removed more anon. The general effect of the removal, so far as the deposit is concerned, is to enlarge joints and fissures, and to leave beds or streaks of insoluble matter, almost impervious to water, behind. The lower portions of the great chalk formation contain so much marly matter, and the rock altogether is so much more compact, that it frequently acts as an impervious barrier, more or less holding up the water in the upper half of the deposit. The practical result of all this alteration is that nothing short of actual experience in a district, in the first instance, can be of much assistance,—experiments at home are of no use.

Speaking generally, it may be said that sandstones absorb more water than limestones, but the latter is more available as a water-bearing rock, it being far more cracked and fissured.

Many rocks which are described as impermeable,—such, for instance, as hard slate, schist, &c.,—are not in reality proof against absorption. It is true their substance is practically impervious, but a considerable quantity of water soaks into the cracks and joints invariably found in them, and although this may not, for pecuniary reasons, be available for supply, yet the fact should by no means be overlooked in considering the quantity of water liable to be wasted in a gathering-ground. Let us endeavour to put the case more clearly.

Suppose we have two gathering-grounds of equal area, equal rainfall, the rocks in each being impervious from an experimental point of view, and similar in every other respect, only that in the one area we have clay, and in the other slate or schist. In measuring the quantity of water flowing from the two basins (apart from evaporation), it would be found that the clay ground yielded the greater amount, because it acts as a sort of puddling, whilst the jointing in the slates or schists, on the contrary, causes leakage, as already stated. We give this as an illustration of the term "impermeability," which, as we see, has only a relative and not an absolute meaning. The substance of a small sample of the rock may be impermeable, but as a stratum it may hold and freely transmit large quantities of water.

In the majority of places, rocks are permeated with water below a certain limit, which latter is termed the *water-level*. The level may be near the surface of the ground, or at some depth, and may be liable to variation in different parts of the year, owing to dry and wet seasons, &c. Variation from this cause is not usually so apparent when dealing with a thick aquiferous deposit at considerable depth, and distance from its supply immediately from rain, as with a small supply comparatively nearer and in direct communication with the surface. Neither is the water-level usually horizontal at any time; inequalities in the surface of the ground have their effect upon it, as well as the character of the deposits concerned. For example, suppose we have a plain with a large dome-shaped hill rising out of it, all the rocks concerned being

slightly porous, it is often found that the water-level in the hill roughly follows the dome-shaped outline, and although continuous with, it is sometimes nearly as much above the general water-level under the plain, as the hill is above the level of the surrounding country. In an undulating country the water-level is also undulatory. It sometimes happens, however, that owing to abstraction of water by artificial means, this rule does not hold good: we shall have occasion to refer again to this subject when treating of wells.

### VARIORUM.

"Transactions of the St. Paul's Ecclesiological Society," Vol. II., Part IV. (London: Albaster, Passmore, & Sons.)—This publication, which is an illustrated record of the proceedings of a young and vigorous society, contains several papers of interest, including, "Metal Grilles," by Mr. Starkie Gardner; "The Ecclesiology of Gottland," and "The Churches of Bornholm," both by Major Heales, F.S.A.; "The Orientation of Churches," by Mr. E. P. Loftus Brock, F.S.A.; and "The English Liturgical Colours," by Mr. W. H. St. John Hope, M.A. In this record of their proceedings, the members certainly get very good value for their annual subscription, which is only 7s. 6d.—"South Africa," and how to reach it by the "Castle Line," by Edward P. Mathers, F.R.G.S. (London: Waterlow & Sons), is obviously a booklet with a special purpose, — that of informing the public all about Sir Donald Currie & Co.'s well-known line of Royal mail steamers to Cape Colony and Natal; but it contains a great deal of interesting and useful information about the South African colonies,—their people, climate, mineralogical and other resources, commerce, &c., and as such it will be found to be a very useful work of reference altogether apart from its special purpose.—Bemrose's "Guide to Paris" (London: Bemrose & Sons; Paris: Galgani), contains a good deal of information for a shilling, and is conveniently and systematically arranged for reference. It must not be trusted as an authoritative guide about the ancient buildings, but it will probably meet the needs of "the average tourist," for whom it is written.—From Mr. Elliot Stock, the publisher, we have received Part I. of the "Index to the First Volume of the Parish Registers of Gainsford, in the county of Durham." This part includes the baptisms between 1560 and 1784.—"The County Councilors' Directory" (London: Contract Journal Office, Salisbury-court, Fleet-street), is a useful compilation, though not so useful or complete as it might be made. It purports to contain lists of the aldermen and councillors, with addresses, for all counties and county boroughs under the Act of 1888. While it is not free from such accidental errors and omissions as are inevitable in the production of such a work for the first time, there are some omissions which are evidently the result of design rather than accident. For instance, in some cases, the lists of chief officers of the Council are not as complete as they ought to be. Take the case of the London County Council, in connexion with which the only officials named are the Clerk of the Council and the Chief Engineer; but surely the Architect, the Solicitor, the Chemist, and the Accountant (or, as he is now styled, the "Comptroller") are officials of sufficient importance to merit the record of their names. By the filling-up of such omissions as these, and by the provision of an appendix containing at least a *résumé* of the Local Government Act, 1888, this directory might, we think be made increasingly useful in future editions.

**Acock's Green.**—A stained-glass window has just been presented to the parish church, Acock's Green, by Miss Hodgkins, of Olton. It consists of three lights and tracery, the former illustrating Agur's prayer, "Give me neither poverty nor riches," and also the verses "She opened her mouth with wisdom, and in her tongue was the law of kindness," and "Whoso walketh uprightly shall be saved," and in the latter is a figure representing Charity with lilies in the cusps of the cinquefoil. The inscription is as follows:—"This window was erected by Sara Hodgkins to the glory of God and in memory of Henry Jutson, Mary Jutson her mother, and Joseph and John Hodgkins her brothers, July 1889. The window has been carried out by Messrs. Winfield, Limited, of Birmingham and London."



RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

12,470, Framing Doors, Windows, &c. G. L. Falconer.

According to this invention, window-jambas are constructed of brick or similar material, and are made hollow to provide spaces for the balance-weights which work the sashes, and so obviate the use of wooden boxing in the frame. Metallic slides, treated so as to be non-oxidisable, replace the slips and parting-heads usually of wood. Metallic finishings and window-boards are added, and, lapped over a narrow weathered and throated slipping on the freestone is a metallic covering for the sill. A metal head also covers the joint of the upper or outer sash. Another provision is for the sash-cords to be carried over graduated pulleys secured to wooden blocks on the under-side of lintel.

13,059, Wall Blocks. W. Jarvis.

Instead of driving wooden plugs into brick or stone walls, to which woodwork may be affixed, these blocks or plugs of a peculiar shape, are built into the wall when made, or afterwards inserted. They are made of various shapes of concrete, or preferably of Portland cement and breeze mixed in a liquid state and poured into moulds and then dried hard. The blocks have dovetailed projections on each side, which serve to keep the brick in place, binding it firmly in the wall. A longitudinal recess is undercut on one or both sides of the front face, and into this is inserted a piece of wood or blocking-piece fixed by means of a wooden strip or wedge. Other provisions are made for fixing wood-blocks into the concrete sockets. Holes are made in the wooden blocks, which are filled up by concrete, or small holes are made in the concrete to allow of the wooden blocks being fixed by nails.

13,170, Opening and Closing Fanlights. J. Kaye.

This invention is intended to obviate the use of strings in actuating fanlights, &c. Instead of a worm-wheel and quadrant, or such-like gearing, a rod and tube is affixed, which is both effective and easily in use.

18,771, Fire-proof Building Construction. W. Millar and others.

The invention relates to the use of materials suited to the fireproof construction of edifices, and is particularly applicable to the walls, partitions, and floorings of fire-proof buildings. Hollow blocks, slabs, or bricks of concrete are made of special composition. These are cast in moulds, pressed (a movable core being used for hollow blocks), and are used in building for walls, partitions, roofs, &c. Every part of the building is thus protected by refractory materials from the action of the flame, the hollow spaces also tending to prevent over-heating.

235, Smoke-preventing Appliance. C. H. Johns.

According to this invention, an iron plate or pipe is used in which is an opening closed by an iron door on hinges. This plate is inserted in the side of the chimney above the fire-place. The door of the opening holds a gas-burner on the inside, the pipe of which, passing through the door, can be connected by a piece of gutta-percha tubing to the nearest gas-supply. The action of the light and heat of this gas-jet is to cause an up-draught and prevent smoke being blown back into the room.

12,713, Construction of and Fixing Windows. T. Sharples and G. Graham.

The bottom rail of each sash, made in accordance with this invention, is hinged or pivoted to the frame, and stays are attached at one end to the sash stile, being fixed at the other end to the frame. These steady the window in any position when open. A spring is sometimes used instead of the stay, and a ratchet and catch are attached to the frame, by which it may be kept open to any extent desired. When closed, the sash is secured by a catch or ordinary fastener, or by an oblong strip hinged to the frame, which, closing up against the sash-stile, prevents it from being opened from the outside. Ventilation is provided even when the window is closed, by apertures in the sash-stiles, rails, or framing. These apertures when not in use are closed by means of slides or hinged lids.

NEW APPLICATIONS FOR PATENTS.

July 29.—11,985, De Pennefether, Ventilating Rooms, &c.

July 30.—12,053, F. Abbey, Fire Ranges or Grates.

July 31.—12,126, J. & A. Duckett, Water-closets.—12,147, C. Darrah, Pedestal Water-closets.—2,179, J. Willocks and J. Harrison, Bolt Fasteners or Stakes, Casements, &c.—12,180, J. Willocks and J. Harrison, Sash Fasteners.

Aug. 1.—12,199, W. Shillingford and G. Timberlake, Automatic Stop for Heavy Gates and Doors,

the stop falling out of sight when the gate is open.—12,213, J. Haskins, Wooden Revolving Shutters, &c.—12,232, E. Olander, Floor Plates and Floors for Bridges, Buildings, &c.

Aug. 2.—12,257, A. Illidge, Sash Fasteners.—12,263, Barnett & Co., Sash Fasteners.—12,269, J. Tobin, Window Fastenings.—12,292, R. Condy, Compound to be Used in Paint or Pigment.—12,306, R. Swales, Flushing Apparatus for Water-closets.

Aug. 3.—12,333, E. Kerry, Heating Green-houses, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

2,469, L. Schlenheim, Artificial Stone and Stonework.—6,418, J. Harris, Waste Fittings for Closets, &c.—8,513, T. Hughes, Construction and Decoration of Buildings.—9,593, J. Lord and W. Heyes, Water-closets.—9,666, E. Nunan, Base or Foundation for Plastering.—10,120, S. Wormald, Rising and Felling Hinges for Doors, &c.—10,134, E. Shaylor, Window-sash Fastenings.—10,369, H. Girdwood, Ventilating Appliances.—10,771, J. Marston, Spinning and Closing Fanlights, &c.—10,824, J. Brunton and L. Griffiths, Apparatus for Mixing Materials for Artificial Stone, &c.—11,244, J. Kaye, Securing Casement Windows, &c.—11,462, J. Gilligan and A. Tilney, Preventing Smoke in House Grates, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

12,540, J. Mason, Skylights, Ventilators, &c.—10,541, J. Cook, Water-closet Apparatus.—12,668, J. Taylor, Stench-trap for Sewers, &c.—14,368, W. Bishop, Slow Combustion Stoves.—4,554, R. Von Schmitz and G. Heymeier, Cutting Tool for Wood-working Machinery.—6,123, W. Ramsbottom, Flushing the Basins of Water-closets.—7,056, J. Preston, Window Lock.—7,790, A. Casard, Portable Water-closets, &c.—8,432, J. and A. Duckett, Water-closets, &c.—9,628, J. Holland, Apparatus for Water-closets, Lavatories, &c.—10,320, S. Perman and J. Heighston, Chimney Terminals and Ventilating Tops.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JULY 30.—By CHIMNECK, GALSWORDY, & Co. (at Leighton Buzzard). Part of the Liscombe-park Estate—Numerous cottages and small enclosures of land realised ..... £1,418

Aug. 6.—By DENNHAM, TOWNSON, & Co. Limehouse, Maroon-st.—F.g.r. of £15 p.a., reversion in 95 yrs ..... 300

Aug. 7.—By ALFRED SAVILL & SON. Oxford, Chalfont—"The Manor" and "Chalfont Farms," 1, containing 446a. 3r. 19p. .... 10,000

By Messrs. CHONE. Surrey, Tatsfield—Five plots of f. land ..... 60

By BAXTER, PAYNE, & LEPFER. Kent, Hayes—Enclosure of meadow land, 2a. 0r. 25p. .... 1,360

Aug. 8.—By NEWSON & HARDING. Clapton 24, Avenue-rd., u.t. 65 yrs., g.r. £5, r. £5 ..... 235

Canbury—19, Crange-rd., u.t. 47 yrs., g.r. £2, r. £27. 10s. p.a. .... 640

New Southgate—1, Melrose Villas, f., e.r. £23 p.a. Hammer-smith—23 and 30, Studland-st., u.t. 75 yrs., g.r. £3, r. £20 p.a. .... 245

St. Luke's—12 and 14, Central-st., f., r. £54. 12s. p.a. .... 675

Limehouse—1, St. Anne-st., and 146, Rensfield-st., u.t. 33 yrs., g.r. £4. 10s. p.a. .... 555

By DOWSETT & Co. Beckenham—Two residences in Lennard-rd., u.t. 88 yrs., g.r. £16. 10s. p.a. .... 745

By C. A. RICHARDS. Walworth—83, East-st., f., r. £53 p.a. .... 893

G.r. of £8 p.a., reversion in 5 yrs. to e.r. of £70 p.a. .... 400

Aug. 9.—By G. A. WILKINSON. Walworth—93 and 84, Olney-st., u.t. 26 yrs., g.r. £9 p.a. .... 305

8, Montpelier-street, u.t. 26 yrs., g.r. £5. 10s. p.a. .... 205

Battersea—36 and 37, Kennard-st., u.t. 79 yrs., g.r. £11, r. £28. 10s. p.a. .... 280

Streatham—1 and 2, Stockwell-rd., u.t. 94 yrs., g.r. £10, r. £72 p.a. .... 390

By A. RICHARDS. Tottenham—Cliffe Villa, u.t. 77 yrs., g.r. £13. 2s. 6d. e.r. £40 p.a. .... 280

By NEWSON & HARDING. Paddington—33, Hampden-rd., u.t. 65 years, g.r. £5, r. £32 p.a. .... 245

Holloway—634 and 636, Caledonian-rd., u.t. 62 yrs., g.r. £1, r. £18 p.a. .... 1,180

65, Clonon-rd., u.t. 52 yrs., g.r. £7, r. £40 p.a. .... 340

1, Penn-rd., u.t. 63 yrs., g.r. £3, r. £38 p.a. .... 290

154, Hornsey-rd., u.t. 63 yrs., g.r. £3, r. £35 p.a. .... 715

46, Hampden-rd., u.t. 70 yrs., g.r. £4, r. £36 p.a. .... 150

By L. FARMER. Kilburn—"The Residence" "Heathfield," u.t. 89 yrs., g.r. £15, e.r. £120 ..... 915

Brookbury—1, Dyke-rd., u.t. 98 yrs., g.r. £7. 10s. e.r. £50 p.a. .... 495

[Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; e. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

MEETINGS.

SATURDAY, AUGUST 17.  
Architectural Association.—Annual Excursion: King's Lynn (last day).  
Glasgow Architectural Association.—Visit to Rowallan House, near Kilmarnock.

TUESDAY, AUGUST 20.  
Glasgow Architectural Association.—Visit to the Municipal Buildings, George-square, 8.15 p.m.

WEDNESDAY, AUGUST 21.  
Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting. 8.30 p.m.

Miscellaneous.

**Progress of St. Louis, U.S.A.**—According to a recent report of the British Vice-Consul at St. Louis, "the assessed value of real estate in 1888 increased by 2,232,538l. over that of the preceding year. The most notable buildings constructed during 1888 were:—The Liggett and Myers Stores, of granite, costing 180,000l.; the Odd Fellows' Hall of Missouri, granite, 90,000l.; the Laclede Building, 80,000l.; the Mercantile Library, of brick and granite, 80,000l.; the Lionberger Building, 70,000l.; the Bank of Commerce, 60,000l.; the Fagin Building, 50,000l. The Merchants' Bridge and Terminal Company are building a new bridge in the northern portion of the city, about three miles north of the Eads Bridge. The new bridge will be a double-track steel structure, consisting of three spans of steel, each 518 ft. long, and two approaches, each 425 ft. long. There are to be two channel spans of 500 ft. in width, and one of 300 ft., with a height of not less than 50 ft. above high-water mark."

**Wages in La Rochelle.**—According to a recent report of the British Vice-Consul at La Rochelle, containing, *inter alia*, much interesting information as to the social conditions of that part of France, the rate of wages in La Rochelle is relatively high, being more than is paid in more important towns inland. The average rates are for—  
"Cabinetmakers..... 3s. 0d. per day.  
Carpenters ..... 3 0 "  
Masons..... 3 7 "  
Slaters..... 3 7 "

Almost all manufactured articles, such as boots and shoes, clothing, &c., are much dearer than in England, owing to protective duties. Every one who is not indigent pays a poll tax calculated at the value of three days' labour, also a tax in proportion to their rent. It is estimated that the direct and indirect taxes paid by the working classes amount to 10½ per cent. of their earnings."

**Proposed New Harbour Works at Copenhagen.**—A Danish engineer, Herr J. P. Nielsen, has prepared sketches, diagrams, &c., for the new harbour and warehouses to be constructed at Copenhagen, and has applied for the concession. The *entrepreneur* states that the capital required will be subscribed; but no decision can be arrived at until the next session of the Danish Parliament.

**The Swedish Granite Industry.**—The export of granite from Sweden last year for paving purposes is valued at 109,000l., as against 85,000l. in 1887. The largest quantities of stone come from the southern ports, the chief importer being Prussia, whence stone to the value of 70,000l. was shipped. The export to this country is valued at 7,500l.

**The Carpenters' Company's Examination for Foremen and Clerks of Works.**—On Tuesday, the 6th inst., at a meeting of the Court of the Carpenters' Company, the medals and certificates were distributed to the successful candidates by the Master, Lieut.-Colonel Banister Fletcher, J.P., F.R.I.B.A.

**Electric Lighting in Formosa.**—The acting British Consul at Tamsui, in a recent report on the trade of Tamsui and Kelung, mentions that "the new city of Tai-pei Fu, the capital of the island, is lighted by electricity, the apparatus being solely in charge of native officials."

**New Suburb in Stockholm.**—A syndicate has been formed in Stockholm which has purchased the well-known estate Djursboholm, just outside the city, for a sum of 30,000l., the intention being to build a villa suburb upon the site.

**Appointment of a Diocesan Surveyor.**—Mr. E. Lofthouse, architect, of Middlesbrough, has been appointed Diocesan Surveyor for the Archdeaconry of Cleveland, & the diocese of York.



**The S.S.C. Library Buildings, Edinburgh.**—The scheme for the erection of new library buildings for the above Society having now been satisfactorily financed, contracts have been signed and a commencement made by Messrs W. & D. McGregor, Grindlay-street, to the foundations. The site is on "what formed a part of the burial-ground of St. Giles," and, to get a good foundation, it has been found necessary to cover the entire area, to a depth of 2 ft. 6 in., with a solid mass of concrete, the foundations of the main walls being on an average 7 ft. 6 in. broad by 4 ft. 6 in. deep, the rest of the walls being brought up to the level of Cowgate with brickwork built in Arden lime, the expense of the foundations alone amounting to close on 1,000*l*. The estimated cost of the entire scheme is nearly 26,000*l*, made up as follows:—Cost of structure, including boundary and retaining walls, formation of street, work inside Parliament House, &c., 15,168*l*; professional fees, 1,300*l*; painting and fittings, 1,000*l*; heating and lighting, 220*l*; cost of site, 7,397*l*. 19*s*. The following are the successful contractors:—Mason work, Messrs. W. & D. McGregor, Grindlay-street, 7,716*l*; carpenter and joiner work, Messrs. Beattie & Son, Fountainbridge, 3,729*l*; plumber work, James McDonald, Dundas-street, 809*l*; plaster work, E. Condon, Rose-street-lane, 1,050*l*; slater work, Rob. Graham, Castle-street, 69*l*; steel and iron work, Messrs. Mather & Son, Fountainbridge, 1,000*l*. 10*s*; concrete work, Stuart & Co., Torphichen-street, 337*l*; glazier work, Messrs. Dickson & Walker, Frederick-street, 412*l*. Mr. Frank Bell will act as resident clerk of works. The schedules of quantities were prepared by Messrs. Brown & Walker, ordained surveyors, 30, Frederick-street, Edinburgh. Mr. James B. Dunn, 94, George-street, Edinburgh, is the architect.—*Scotsman*.

**The City Surveyorship of Carlisle.**—On Tuesday the Town Council of Carlisle, at their ordinary monthly meeting, proceeded to elect a City Surveyor, in succession to Mr. H. U. McKie, resigned. There had been seven candidates, from whom the following three had been selected for final submission to the Council:—Mr. W. Howard Smith, Assistant to the Borough Engineer, Leeds; Mr. Middleton, Assistant Engineer, Birkenhead; and Mr. Wynne-Edwards, Assistant Engineer, Carlisle. The Council voted by ballot. On the first count it appeared that there had voted for Mr. Smith, 15; for Mr. Wynne-Edwards, 15; and for Mr. Middleton, 4. On a second ballot there voted for Mr. Smith, 21; and for Mr. Wynne-Edwards, 13. Mr. Smith was then declared duly elected. Mr. Smith, who had been in the decision of the Council, the Mayor expressing a hope that the engagement would prove satisfactory to both parties. Mr. Smith expressed his gratitude to the Council for having appointed him, and added that he could only hope to devote the best of his abilities to the duties of the office in such a manner as to gain the approval of the Council and the citizens of Carlisle.—*Leeds Mercury*.

**Death of Mr. John Rhind, Architect, Inverness.**—The *Scotsman* announces the death, at Perth, whither he had gone for change of air and rest, of Mr. John Rhind, architect, Inverness. Mr. Rhind, who had been in practice in Inverness for more than thirty years, designed and carried out the erection of Moyhall, the seat of Sir John Ramsden, and of the largest and most complete mansions in the Highlands, the latter mansion having cost over 32,000*l*. Many public buildings in Inverness, Forres, and throughout the North were also designed and carried out by him. For several years Mr. Rhind has been a member of the Inverness Town Council, and being a native of the town he took a deep interest in all that affected its progress and prosperity. He was unmarried, and little over fifty years of age.

**Glasgow Architectural Association.**—The usual monthly meeting of this Association was held last week, the Vice-President, Mr. Wm. Jas. Anderson, in the chair, when a paper on "Mohammedan Architecture in India," by Mr. George Mackenzie, was read in his absence. A short discussion, opened by Mr. Charles E. Whitelaw, followed, and at its close a vote of thanks was passed to the author. The Chairman referred to the lamented death of a member, Mr. Robert S. Symington, architect, Paisley, out off at the very opening of what promised to be a successful professional career.

**The English Iron Trade.**—The English iron market shows a fairly large amount of activity, and a buoyancy which has been exceeded only in the most prosperous periods known, advances in nearly all departments being announced this week. The pig-iron market especially is very strong. A large business has been doing in the Glasgow warrant market, with quotations remarkably steady. Scotch makers have again put up their rates, the rise varying from 6*d*. to 2*s*. a ton, and they are easily obtaining the higher prices. Middlebrough iron has gone up from 1*s*. to 1*s*. 3*d*. a ton, and even at the advance makers are unwilling to commit themselves. Advances varying from 1*s*. to 2*s*. are reported from Lancashire and the midland districts. The largest jump this week has been made by hematites in the north-west, where the rise is 2*s*. 3*d*. while on the east coast from 1*s*. to 1*s*. 6*d*. a ton more is quoted for hematite iron. The improvement in the finished iron market, the general, higher rates having been declared varying from 5*s*. to 10*s*. a ton. The same tendency is observable in the steel market, the trade being most active, at an advance of not less than 5*s*. for rails and shipbuilding material. Fresh and important orders have been given out for ships, and the building of vessels is proceeding most briskly. Engineers are reaping an equally good trade.—*Iron*.

**Photographers in Convention.**—The Photographic Convention of the United Kingdom, which has in former years been successfully held in the principal provincial towns, will meet this year, from Aug. 19 to 24 inclusive, in St. James's Great Hall, Piccadilly. The programme includes an exhibition of pictures, lantern entertainments, papers on the science and art of photography, excursions, &c. The proceedings will be opened by a conversation on Monday, Aug. 19, at 6.30 p.m.

**Sale of Tiptree Hall Farm.**—On Sept. 17 will be offered for sale, at the Mart, the Tiptree Hall estate, extending over 250 acres, and situated about four miles distant from Kelvedon, Essex. This is the property, originally of 130 acres, which was acquired by the late Mr. J. J. Mechi, who, besides rebuilding the house, laid out several thousand pounds in converting it into his celebrated model farm.

**The Savoy Hotel.**—We are asked to mention that "Ben Turner's patent regulating adjustable door-springs," made and supplied by Messrs. Smith & Turner, are used at the new Savoy Hotel, recently described in our columns.

#### PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....	7	0	0	7	15	0
Teak, E.I. ....	12	0	0	14	0	0
Sesuvium, U.S. ....	0	2	3	0	3	0
Ash, Canada, ....	3	10	0	5	0	0
Birch " " " " " " " "	3	10	0	6	0	0
Elm " " " " " " " "	2	0	0	3	10	0
Mr. Dainton, &c. ....	2	10	0	4	10	0
Oak " " " " " " " "	5	10	0	7	10	0
Canada " " " " " " " "	3	10	0	5	0	0
Pine, Canada red " " " "	3	10	0	5	0	0
" yellow " " " " " " " "	4	10	0	5	10	0
Lath, Dainton " " " " " " " "	5	0	0	6	10	0
St. Petersburg " " " " " " " "	2	15	0	4	6	0
Waincoat, Riga, &c. ....	10	0	0	11	0	0
Deals, Finland, 2nd and 1st, std. 100	7	0	0	8	15	0
" 4th and 3rd " " " " " " " "	11	0	0	15	0	0
Riga " " " " " " " " " "	10	0	0	11	0	0
" 2nd " " " " " " " " " "	7	0	0	10	0	0
" white " " " " " " " " " "	8	0	0	10	0	0
Swedish " " " " " " " " " "	9	0	0	17	0	0
White Sea " " " " " " " " " "	18	0	0	26	0	0
Canada, Pine, 1st " " " " " " " "	8	0	0	9	0	0
" 2nd " " " " " " " " " "	9	0	0	10	0	0
" 3rd " " " " " " " " " "	9	0	0	11	0	0
" Spruce, 1st " " " " " " " " " "	7	0	0	9	0	0
" 3rd and 2nd " " " " " " " " " "	6	0	0	18	0	0
New Brunswick, &c. ....	0	11	0	0	14	0
Battens, all kinds " " " " " " " "	0	8	0	0	10	0
Other qualities " " " " " " " " " "	0	6	0	0	7	0
Cedar, Cuba, ....	0	4	0	0	5	0
Honduras, &c. ....	0	4	0	0	6	0
Mahogany, Cuba " " " " " " " "	0	4	0	0	6	0
" " " " " " " " " " " "	0	4	0	0	6	0
St. Domingo, cargo average " " " "	0	4	0	0	6	0
Mexican " " " " " " " " " "	0	4	0	0	6	0
Tobacco " " " " " " " " " "	0	6	0	0	6	0
Honduras " " " " " " " " " "	4	0	0	13	0	0
Bor, Turkey " " " " " " " " " "	15	0	0	29	0	0
Rose, Rio " " " " " " " " " "	14	0	0	18	0	0
Bahia " " " " " " " " " " " "	0	8	0	0	1	0
Satin, St. Domingo " " " " " " " "	0	8	0	0	1	0
Porto Rico " " " " " " " " " "	0	8	0	0	1	0
Walnut, Italian " " " " " " " " " "	0	4	0	0	6	0

#### METALS.

Iron—	ton	45	11	0	0	0
Pig, in Scotland " " " "	ton	5	5	0	6	10
Bar, Welsh, in London " " " "	ton	4	15	0	6	0
" " " " " " " " " " " "	ton	5	10	0	6	10
" Staffordshire, in London " " " "	ton	5	10	0	6	10

METALS (continued).	£.	s.	d.	£.	s.	d.
Copper—						
British, cake and ingot " " " "	ton	47	10	0	0	0
Best selected " " " " " " " "	ton	48	10	0	0	0
Sheet, strong " " " " " " " "	ton	68	0	0	0	0
Chili, bars " " " " " " " "	ton	44	0	0	0	0
Yellow Metal " " " " " " " "	lb.	0	5	0	0	0
Lead—						
Fig, Spanish " " " " " " " "	ton	12	13	0	0	0
English, com. brands " " " " " "	ton	12	15	0	12	17
Tin—						
Straits " " " " " " " " " "	ton	90	10	0	0	0
Australian " " " " " " " " " "	ton	91	10	0	0	0
English Ingots " " " " " " " "	ton	94	10	0	0	0
Zinc—English sheet " " " " " " " "	ton	21	0	23	0	0

#### OILS.

Lined " " " " " " " " " "	ton	20	17	6	21	5
Cocunut, Coochin " " " " " " " "	ton	26	10	0	27	10
Ceylon " " " " " " " " " "	ton	23	10	0	0	0
Palm, Lagos " " " " " " " " " "	ton	25	0	0	0	0
" " " " " " " " " " " "	ton	31	5	0	31	10
" brown " " " " " " " " " "	ton	29	15	0	30	0
Cottonseed, refined " " " " " " " "	ton	26	15	0	28	0
Tallow and Oleine " " " " " " " "	ton	21	0	0	40	0
Lubricating, U.S. " " " " " " " "	ton	5	0	0	6	0
" refined " " " " " " " " " "	ton	7	0	0	12	0
Tar—Stockholm " " " " " " " "	barrel	1	4	0	8	0
Archangel " " " " " " " " " "	barrel	0	15	9	0	16

#### TENDERS.

[Communications for insertion under this heading must reach us not later than 12 Noon on Thursday.]

**ANGLISSEY (near Gosport).**—For the painting and decorating at Uxbridge House, for Mr. S. T. Blake. Mr. Wm. Yeardley, 30, High-street, Gosport, architect.—*£125* 0 0  
C. J. Lee & Co., Alverstoke, architect.—*103* 0 0  
H. Pink, Gosport (accepted).—*98* 15 0

**AUDENSHAW.**—For the erection of warehouse and offices for the Audenshaw Paint and Colour Company. Mr. J. H. Burton, architect, Warrington-street, Ashton-under-Lyne.—*£495* 0 0  
W. C. Gibson, Ashton-under-Lyne.—*487* 17 7  
Jabez Gibson, Dukinfield.—*445* 0 0  
Z. Pike, Hooley Hill.—*424* 0 0  
Underwood & Bro., Ashton-under-Lyne.—*424* 0 0  
R. H. Booth, Stalybridge.—*422* 0 0  
C. Wallworth, Gorton.—*400* 0 0  
Jos. Davison, Manchester.—*399* 0 0  
John Robinson, Ashton-under-Lyne.—*379* 0 0  
J. Thornley, Hooley Hill.—*370* 0 0  
Allen Holmes, Ashton-under-Lyne.—*358* 0 0  
H. Rowland, Ashton-under-Lyne.—*358* 0 0  
\* Accepted.

**BELLINGHAM (Surrey).**—For the erection of a bungalow, for Mr. George Wood. Mr. Walter Graves, architect, Winchester House, E.C.—*£1,050* 0 0  
J. Mansbridge, Bellingham (accepted).

**BIRKENHEAD.**—For renovations, &c., to the late Welsh Baptist Chapel, Price-street, Birkenhead, to form same into a Salvation Army Fortress, for General Booth. Mr. J. architect and surveyor, 101, Queen Victoria-street, London, E.C.—*£170* 0 0  
J. Downham, Tranmere.—*134* 6 0  
Messrs. Legge, Son, & Co., Birkenhead (accepted).

**BLAINE (Mon.).**—For the erection and completion of Salvation Army Barracks, Blaine (Mon.), for General Booth. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, London, E.C.—*£265* 0 0  
T. Morgan, Cardiff (accepted).

**CHATTERIS (Cambs).**—For the erection and completion of Salvation Army Fortresses in Chatteris, Cambs, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, London, E.C.—*£430* 4 3  
J. Frost, Chatteris.—*421* 13 6  
T. Clarke, Chatteris.—*405* 0 0  
F. J. Corhead, Leytonstone.—*340* 0 0  
B. Shanks, Chatteris (accepted).

**CREWE.**—For alterations and additions to Methodist Chapel, Market-terrace, Crewe, to form same into a Salvation Army Barracks, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.—*£275* 0 0  
F. J. Corhead, Leytonstone (accepted).—*650* 0 0  
T. Bereton, Crewe (too late).—*625* 5 0  
J. T. Grealy, Willaston (too late).—*525* 0 0

**DEPTFORD.**—For erecting coffee-tavern and hall at Deptford, to be given for public benefit by Mr. E. J. Prestons. Mr. Thomas Dinwiddie, architect. Quantities by Mr. W. E. Stoner.—*£2,470* 0 0  
Kilby & Gayford.—*2,250* 0 0  
Kirk & Randall.—*2,210* 0 0  
Mortimer.—*2,160* 0 0  
Rider & Son.—*2,115* 0 0  
Kennard Bros.—*1,960* 0 0  
Holloway.—*1,815* 0 0  
Long.—*1,745* 0 0

**DEPTFORD.**—For alterations and additions to Wesleyan Chapel, Deptford, to form same into a Salvation Army Citadel, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, London, E.C.—*£1,650* 0 0  
W. & H. Garner, Peckham.—*1,647* 0 0  
W. & H. Castle, Borough.—*1,387* 0 0  
A. Martin, Battersea.—*1,324* 0 0  
F. J. Corhead, Leytonstone.—*860* 0 0  
Edmund Green.—*780* 0 0  
Dowdley & Son, King'sland.—*780* 0 0  
\* Accepted.

**EALING.**—For making good part of damage caused by fire at 30, High-street, for Mr. S. Dyer. Mr. G. Ashby Lean, architect and surveyor, 41, Broadway, Ealing, W. J. Nye, Ealing.—*£190* 0 0  
H. & A. J. Jones, Ealing.—*149* 0 0  
T. H. Adamson & Sons, Ealing.—*140* 0 0  
A. Bailey, Ealing (accepted).—*140* 0 0



## COMPETITION, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Elevation of Front of New Post-Office	Hertford Poor's Est. Trust	£25 and 25	Sept. 9th	i.

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
York Stone	Folkestone Corporation	A. W. Conquest	Aug. 20th	x.
W.C.s and Re-roofing Corridors	Lambeth Guardians	Official	Aug. 21st	x.
Pipe Sewer	Clerkenwell Vestry	Wm. Iron	Aug. 22nd	ii.
Engines, &c., for Water Supply	Hants County Asylum	E. J. Hildred	do.	ii.
Erection of House	Gloucester County Asy.	Official	Aug. 24th	ii.
Roofing Works	Hornsey Local Board	T. de Courcy Meade	Aug. 28th	x.
Brick Storm-water Sewer, &c.	do.	do.	do.	x.
Sewerage Works	Margate U.S.A.	B. Latham	do.	x.
Painting Works	Croydon Union	F. West	do.	ii.
Carving and Channelling Works	Wandsworth Bd. of Works	Official	Aug. 27th	ii.
Public Library, St. Martin's Lane	Com. of Public Libraries	do.	do.	ii.
Painting and Repairs	City of London Union	Official	Sept. 2nd	ii.
Sewerage Works	Malden Town Council	R. B. Grantham & Son	do.	ii.
Well-Sinking	Cromer Waterworks Co., Limited	J. C. Mallis	Sept. 3rd	ii.
Stoneware Pipe Sewer, &c.	Ware R.S.A.	Russell Austin	Sept. 9th	x.
Library Building	Chelsea Public Library Commissioners	J. M. Brydon	do.	ii.
Sewerage Works	Teddington Local Board	H. York	Sept. 16th	x.
Superstructure of Lunatic Asylum	London County Council	G. T. Hine	Sept. 23th	x.
Enlargement of Lunatic Asylum, Coudon	do.	C. H. Howell	Sept. 30th	x.
Erection of Buildings, &c.	Salvation Army	J. Williams Dunford	Not stated	x.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Borough Surveyor	Walsall Corporation	350l.	Aug. 29th	xvi.
Valuer	London County Council	1,000l.	Sept. 14th	xvi.

**EASTBOURNE.**—For the erection of new casual wards, stables, &c., at the Eastbourne Workhouse, for the Guardians of the Eastbourne Union. Mr. F. G. Cooke, architect, 3, Hyde-gardens, Eastbourne. Quantities by Mr. A. T. Cooke, 8, Guildhall-chambers, London, E.C. 4.

Jas. Peckless ..... £2,190 0 0  
C. Tomkinson ..... 2,028 12 0  
W. Beckhurst ..... 1,350 0 0  
E. Cornwell & Son ..... 1,448 0 0  
Huggett & Patten ..... 1,935 0 0  
Stanbridge & Tupper ..... 1,919 0 0  
Rollason Bros. .... 1,887 0 0  
Jas. Coster (accepted) ..... 1,520 0 0

All of Eastbourne.  
[Architect's estimate, £1,930.]

**EAST DERHAM.**—For supplying and laying about 500 square yards super. of artificial stone pavement, with stone kerbing, granite channelling, &c., for the Local Board. Mr. F. W. Skipper, surveyor.

Blyth, Foulsham, Imperial Stone ..... £2,433 9 5  
Patent Paving and Construction Company, Metallic Paving ..... 2,489 4 3  
E. Homan, London, Granite Slabs ..... 2,169 4 3  
Stuart's Granolithic Company, Paving ..... 2,148 0 9  
G. Bell, Croft Admunt ..... 1,998 5 9  
Victoria Stone Company, Victoria Stone ..... 1,971 7 7  
J. Newell, Dereham, Silicated Concrete ..... 1,947 6 8  
Imperial Stone Company, Imperial Stone ..... 1,783 2 3  
R. Mayes, Dereham, Jones' An- nual Flag Paving ..... 1,731 6 10  
W. D. Hubbard, Dereham, Imperial Stone ..... 1,725 17 4  
Patent Indurated Stone Company's Paving ..... 1,617 7 11  
Lewis, Griffiths, & Co., London, Indurated Stone ..... 1,498 10 1

\* Accepted.

**FARNWORTH.**—For the erection and completion of model buildings in Farnworth, for General Booth. Mr. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, London, E.C. 4.

G. Haywood & Son, Bedford ..... £1,776 0 0  
F. J. Cornish, Leytonstone ..... 1,539 0 0  
Taylor Bros., Farnworth (accepted) ..... 1,300 0 0

**FREEMANTLE (Hants).**—For carrying out the Freeman's Main Sewerage, for the Shirley and Freemantle Local Board. Mr. H. J. Weston, Assoc. M. Inst. C.E.B., engineer to the Board. Quantities by Mr. J. H. Billard, Assoc. M. Inst. C.E.B., Lansdowne House, Southampton.

L. Bottoms, London ..... £21,750 0 0  
W. Gibson, Exeter ..... 17,650 0 0  
C. J. Blad, Leytonstone ..... 16,700 0 0  
J. MacKay, Hereford ..... 14,645 11 1  
J. W. & J. Neave, Leytonstone ..... 13,689 0 0  
Morgan, Isled, & Morgan, Southampton ..... 13,487 0 0  
J. T. Whetnam, Weymouth ..... 13,470 0 0  
W. R. & G. Light, Portsmouth ..... 13,298 0 0  
Pickhall & Son, Merthyr Tydvil ..... 12,941 0 0  
C. Oulton, Westham ..... 12,852 0 0  
R. G. Perkins, Lynton ..... 12,783 9 9  
W. Gunfille, Dorking ..... 12,223 0 0  
T. Hall, Portsmouth ..... 12,008 0 0  
J. Dickson, St. Albans ..... 12,009 7 2  
J. W. Roe & Co., Southampton ..... 11,760 0 0  
H. J. Sanders, Southampton ..... 10,980 0 0

\* Accepted.  
[Surveyor's protecting tender, £11,760.]

**GOSPORT.**—For exterior alterations to the Bank, High-street, Gosport, for Messrs. Grant, Meddison & Co., Limited. Mr. Wm. Yeardey, 30, High-street, Gosport, architect.

C. J. Crad, Gosport ..... £177 0 0  
H. Crad, Gosport ..... 169 10 0  
W. Lowe & Son, Gosport (accepted) ..... 121 0 0

**HOLLESLEY BAY (Suffolk).**—For additional wing to the Colonial College. Messrs. John Giles, Gough, & Treloar, architects.

Smyth Alderburgh (accepted) ..... £2,885 0 0

**LEEDS.**—For the erection and completion of Citadel Buildings, for the Salvation Army in New Wortley, Leeds. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, London, E.C. 4.

H. Creasey, Leeds ..... £1,146 0 0  
F. J. Coxhead, Leytonstone ..... 1,600 0 0

\* Accepted.

**LITTLEPORT (Camps).**—For the erection and completion of Salvation Army Fortness, at Littleport, Camps, for General Booth. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, London, E.C. 4.

Thos. Summerlee, Littleport (accepted) ..... £348 0 0

**LIVERPOOL.**—For alterations, &c., to the Skating-rink, Pembroke-place, Liverpool, for the Salvation Army. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, London, E.C. 4.

Morgan, Wood Green (accepted) ..... £350 0 0

**LONDON.**—For completion of residence, 39, Earl's-court-square, for Mr. J. Edmonds. Mr. W. Theobalds, architect, 25, Budge-row, E.C. Mr. E. Swinestad, surveyor, 25, Wellington-street, W.C.

Whitaker ..... £1,835 0 0  
Staines ..... 1,678 0 0  
G. Vials ..... 1,686 0 0  
Stimpson ..... 1,664 0 0  
Leslie ..... 1,636 0 0  
Howard ..... 1,590 0 0  
Footock, Wood-green (accepted) ..... 1,673 0 0

**LONDON.**—For repairs to be done at the Licensed Victuallers' Asylum, Asylum-road, Old Kent-road. Mr. W. F. Potter, architect.

S. Hayworth & Sons, Kingsland ..... £263 0 0  
G. Baber & Co., Milton-street, E.C. 4 ..... 228 7 0  
W. Wells, Paddington ..... 179 0 0  
B. Cook, Stonecut-street, E.C. 4 ..... 169 0 0  
W. Wythe, Dalston ..... 160 0 0  
J. Walker & Sons, Poplar (accepted) ..... 127 0 0

**LONDON.**—For alterations and additions to Brownswood Park Hotel, Green-lanes, N., for Mr. J. Moore. Mr. E. E. Niblett, architect.

Flaxman ..... £740 0 0  
J. Oldis ..... 704 0 0  
J. H. Thompson ..... 649 0 0  
S. Goodall ..... 648 0 0  
G. Vials ..... 635 0 0  
Draring & Son ..... 630 0 0  
W. H. Evans ..... 649 16 0  
J. Walker (accepted) ..... 638 0 0

**LONDON.**—For repairs to four houses, Underhill-road, Dalwich, or Mr. F. Boldo.

Durran ..... £119 0 0  
Dorrell Bros. .... 113 0 0  
T. Watson, Dulwich (accepted) ..... 91 17 0

**LONDON.**—For alterations and additions to 70, 72, and 74, Old Kent-road, for Messrs. H. J. Searle & Son, Limited. Mr. A. R. Mullins, architect.

W. Downs ..... £3,200 0 0  
J. & J. Greenwood ..... 3,200 0 0  
Gover & Son ..... 3,180 0 0  
Patman & Fotheringham ..... 3,173 0 0  
Rider & Son ..... 3,148 0 0  
Higgs & Hill ..... 3,069 0 0  
W. & F. Crocker ..... 3,053 0 0

**LONDON.**—For the erection of stabling for sixty-four horses, granary, harness-rooms, loose box, and man's rooms, for Messrs. Edward Cook & Co., East London Soap Works, Bow, E. Mr. Henry Poston, architect, 38, Lombard-street, E.C. Quantities by the architect.

Sykes & Son ..... £3,589 0 0  
W. Norton ..... 3,129 0 0  
A. Reed ..... 2,923 0 0  
J. Morter ..... 2,727 0 0  
Harris & Wardrop ..... 2,723 0 0  
J. Outhwaite & Son ..... 2,587 0 0

**LONDON.**—For rebuilding premises and otherwise reinstating damage done by fire at the Imperial Saw Mills, Bow, E. Mr. Henry Poston, architect, 38, Lombard-street, E.C. —

James Morter accepted on schedule of prices.

**LONDON.**—For sundry fittings at the International Headquarters of the Salvation Army, 101, Queen Victoria-street, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, London, E.C. —

**Scheme A.**  
Martin, Battersea (accepted) ..... £237 3 7

**Scheme B.**  
Coxhead, Leytonstone (accepted) ..... 93 0 0

**Scheme C.**  
Manning, Adam-street, W.C. .... 232 16  
Coxhead, Leytonstone ..... 202 0 0  
Martin, Battersea ..... 192 0 0  
Morgan, Wood Green ..... 175 0 0

**LONDON.**—For extensive alterations and additions to the Salvation Army Temple, The Priory, Exeter, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, London, E.C. —

J. Westcott, Exeter ..... £1,935 0 0  
F. J. Coxhead, Leytonstone ..... 1,880 0 0  
T. Morgan, Wood Green ..... 1,900 0 0

**LONDON.**—For alterations and renovations to late Methodist Chapel, Jubilee-street, Stepney, to form same into a Salvation Army Fortness, for General Booth. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, London, E.C. —

Wood, Tabley-road, N. .... £276 0 0  
Martin, Battersea ..... 252 0 0  
Coxhead, Leytonstone (accepted) ..... 203 0 0

**LONDON.**—For alterations to No. 4, The Bon Marché, Upper Tooting, for the Balham Boot Company.

T. Potterton, Balham (accepted) ..... £165 0 0

[Three estimates sent in.]

**LONDON.**—For building forcing-house at "Stone-leigh," Clapham-park.

T. Potterton (accepted) ..... £175 0 0

**LOWSMOOR (Worcester).**—For alterations and additions to Salvation Army Barracks, Lowmoor, Worcester, for General Booth. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, London, E.C. —

T. Morgan, Wood Green (accepted) ..... £388 0 0

**LYE (Worcestershire).**—For the erection and completion of Salvation Army Fort and Fortness, at Lye (Wor.), for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, London, E.C. —

Weale & Co., Ludlow (accepted) ..... £300 0 0

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A. Martin, Battersea ..... 369 0 0  
E. Jarvis, Banbury ..... 369 0 0  
G. West, Strood (withdrawn) ..... 343 0 0

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[No competition.]

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# The Builder.

Vol. LVII. No. 2425.

SATURDAY, AUGUST 24, 1899.

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### The "Encyclopédie d'Architecture." Vol. II.



THE second volume of M. Planat's great work\* is already complete, so that it seems to get on fast, and we hope will continue to do so, for nothing is more heartrending to readers and subscribers than a dictionary which drags its slow length along year after year, and seems destined never to reach its close. The latter half of the second volume, reaching from *Béton* to *Cuvet*, includes long essays on subjects so wide apart as "Cabinet d'aisance" and "Cathédrale," between which are found such suggestive subjects as "Bibliothèque," "Blois," "Byzantine," "Cannelures," "Capitole," and "Caryatide."

The article "Cathédrale," which has the signature of the editor, is one of the longest and most important in the volume. Pointing out in the first sentence the derivation of the word from the *cathedra* or chair of the bishop (a derivation, obvious as it is, habitually forgotten by the public at all events), M. Planat alludes in passing to that union between the clerical and the royal interests in the France of the twelfth century which, as already pointed out by Viollet-le-Duc, had been such an influence in promoting the development of ecclesiastical architecture in the country. Returning to the wider aspect of the subject, however, he gives in an interesting series of comparative plans a sketch of the development of the basilica form into the plan of the Early Mediæval period. The plans illustrating this development are those of Sta. Agnese without the walls, Sta. Maria Maggiore, Saint Paul without the walls, Cérisy-le-forest, Mans, the early Trèves Cathedral, the later one, Verdun, Cluny, Clairvaux, and Pontigny. Most of these are plans retaining more or less the basilica form, or at least in which that form is predominant, and the author suggests the grouping of the plans of cathedrals historically as (1) those that are directly derived from the basilica form; (2) those which are still basilican in idea but in which the transepts are more or less developed; then, among the completely transeptal plans, we distinguish between those in which the

apse is only the width of the centre aisle of the nave, and those in which the apse extends over the whole width of the nave and side-aisles: and lastly we have to distinguish between apses with radiating chapels and those that are without. This is a tolerably methodical classification, and is illustrated in detail by a considerable number of further plans, and by views and sections of various cathedrals. The illustrations include views drawn in line, somewhat hard in style, but precise and clear, and a certain number of sections, drawn to a small scale but carefully finished and giving a very good idea, even on this scale, of the bold "stone scaffolding" construction of many of the French Cathedrals, and the enormous masses of masonry piled up as counterforts which gave such marked character to the Early Gothic architecture of France. Of the cathedrals with the larger apse Rheims and Amiens are of course typical examples. That of the cathedral of Mans is adduced as a remarkable example of a case in which there is a very elaborate development of the apsidal choir and the radiating chapels (which in this case stand out further than usual from the main wall of the apse), while the transept retains the simpler and earlier form with a single aisle only. This no doubt gives a singular appearance to the plan, which is a curious illustration of the amount of artistic effect and expression which may be embodied in a mere plan, and it is certainly strange to think that there is only about thirty or forty years between the exceedingly simple Romanesque transept plan and the ambitious *tour de force* of the choir plan. M. Planat explains this by the very fact of the great elaboration of the choir structure, which necessitated leaving the old plain transept as a kind of buttress to it; but though it certainly has this effect both on plan and in the view, and contrasts most effectively with the choir architecture, we should very much question the existence of any deliberate intention of contrast of this kind on the part of the builders of the choir. Constructively they may have thought it more prudent to let the transept alone, with a piece of construction in the choir which must have given them quite enough to think of.

Among the square-ended cathedrals, which form yet another class, M. Planat compares Laon and York as presenting a great deal of analogy on plan; there certainly is a striking resemblance between the two in general arrangement and character. The writer adds

that among the cathedrals with the square east end on plan there seems for the most part to be a certain degree of repetition of the same squareness and angularity of line in the general design; a piece of criticism which has a good deal in it, and is in accordance with actual fact and with the probabilities of architectural conception of a building as a whole. The builder who devises a florid and complicated plan will be likely, by the very same impulse, to seek variety and elaboration in the general outline of his design.

The article by M. Planat, though illustrated by a number of views, is confined really to this analysis of cathedral plan, and affords a good *résumé* of this portion of the subject; other branches of it being treated under other headings. The article "Bourse" is of some interest, especially for the illustrations of the exterior and interior of the Bourse at Valence; the exterior illustration is, it is true, an unfortunately hard and wiry drawing of a building which demanded a much more picturesque treatment, but the interior, with its remarkable ranges of thin twisted columns from which the vaulting ribs spring with nothing but a small necking to mark the impost, is well drawn and makes one of the most interesting illustrations in the book. This is marred to some extent, unfortunately, by the hard ruled lines of "shading" on the floor, a treatment constantly repeated in the illustrations, the interior view of the Bourse of Antwerp having the floor completely covered with a network of lines ruled parallel across the picture one way, and to the vanishing-point the other way, apparently intended to represent the flooring slabs; a most puerile method of drawing, or we should think so in England. Our draughtsmen have recently taken to rather over-doing the "play of light-and-shade" business in ink-line drawings, so that in some cases it rather looks as if the object were to see how much of the drawing could be left to the imagination; but at least the effect is more artistic than this hard mechanical lining-up practised by French draughtsmen, who seem never to have arrived at anything like a picturesque or artistic use of ink-line drawing, though they are pre-eminent as colour draughtsmen. The view of the Bourse at Paris, with its square lines and formal Classic peristyle, seems a sad descent from the picturesqueness of Valence; but it may no doubt be argued that this design correctly expresses (though in sham-antique language) the idea of the modern Bourse, as laid

\* Encyclopédie d'Architecture et de la Construction, Directeur: E. Planat, Vol. II. Paris: Dujaudet et Cie.



down by M. Benouville, the author of the article, as being simply "une grande salle rectangulaire." We have here, says M. Benouville, "a problem always new; how to cover in a large area without a heavy or heavy-looking roof; and perhaps when the present taste for iron has a little cooled down, we may return to the employment of light timber constructions for the roof, in which the last word has perhaps not yet been said" in the language of architecture.

The article on the subject of "Cabinets d'aisance," by M. L. Masson, is well done and well illustrated, and the author shows himself acquainted with what has been done in England for the improvement of this class of sanitary apparatus, and does full justice to the superiority of England to any other European nation in these matters; he says, indeed, to "other nations" generally, from which it would appear that he is not acquainted with the condition of American sanitary science, which in its turn may be said to be ahead of us in some respects. M. Masson admits (a remarkable admission for a French writer) that England has left France far behind in sanitation, an admission which we saw made the other day in a very practical manner in the advertisement of a French hotel, which numbered among its attractions "English water-closets." An elaborate and detailed-illustrated article is devoted to "Bibliothèque." This subject is treated partly in a short historical sketch of the development of the library in ancient times; but in the main the tendency of the article is in accordance with the remark at the commencement, that the Bibliothèque is essentially the habitation or dwelling-place of books, and a good deal of attention is given to the practical question of the best and most preservative manner of housing books. In this respect the author, M. E. Camut, speaks well of the arrangements of the British Museum bookstores, which he has evidently examined carefully and of which he gives a tolerably detailed description, with diagrams. Plans are given of the British Museum Library, and of that at Washington, with its central octagon reading-room, which seems to be better planned for communication between the reading-room and the stores than our Museum, as there are connexions between the two departments on every side of the octagon, and not, as in our Museum, at one point only. Of course this does away with the benevolent arrangement of the Reference Library of books open to all without any preliminary formality, which is one of the great blessings of the British Museum Library, though one that is disgracefully abused by readers devoid of conscience or of respect for their fellow-men, who remove dictionaries from the shelves for a few minutes' reference and never replace them for the whole day; an abuse which cries for stringent action on the part of the authorities. The Stuttgart Library seems very badly planned for getting at the books, which are in an almost separate block of building. The plan of the Berlin Library is also given, and views of a good many library interiors, among which, of course, the Bibliothèque Nationale occupies by far the largest place; among others a view of the Birmingham Reading-room finds place. M. Camut, however, does not say anything as to the arrangement of light for reading, nor does he insist specially on the importance and difficulty of thorough ventilation of a library, both for the sake of readers and books. In this respect it would appear that the books at the British Museum are better cared for than the readers, —at least it is to be hoped so.

The subject of barracks, "Casernement," is ably treated in a long article with many illustrations, by MM. A. de Rochas and G. Epitalier. This is a subject that has not been much treated in architectural publications, and the article will be found of interest. The authors of this also seem to imply that in England and Germany the sanitary construction and arrangement of barracks is in a better condition than in France, which they account for partly because in England we have but a small number of troops to house

and can afford to arrange thoroughly for their sanitation (he possibly has not heard of Dublin), and in Germany "le trésor de guerre offrait des ressources considérables"; an apparently half cynical reflection. The article "Caryatides" is well written and finely illustrated in outline drawings very carefully executed, and that on "Cannelures," by M. Adrien Joigny, is an admirable one, going into the aesthetics of the subject, the effect of flutings on architectural expression, the best forms of profile &c., in that truly architectural spirit which sees importance in the proper perfecting of even the minor details of architectural design. The article on "Bronze," by M. Rümmler, is a good one both in a practical and artistic sense, and is illustrated by some fine examples, as also is the article "Candelabre," the illustrations to which include an engraving of that splendid foot of a candelabrum from Rheims which is at present in the Trocadéro Exhibition.

The Encyclopédie, when complete, will be a mine of information and illustration in regard to subjects connected with architecture; but there is, as is so often the case in dictionaries of this kind, a certain want of proportion in regard to the degree of elucidation and illustration bestowed on the different subjects; and, for a general Dictionary of architecture, it is not sufficiently cosmopolitan. This is a defect which unfortunately we must expect to find in any French publication of the kind. For a nation of very clever and gifted people, perhaps the most gifted of any at present, the French have a remarkable faculty for not going out of themselves; and the proportion of space given to French buildings and French architects, and the comparative neglect of other countries, in this work, is an instance of this. Short biographical sketches are given of various French architects beginning with B. and C., under their respective names, but the name of Burges, who certainly was a more important power in modern architecture than, for example, Calliat, does not appear at all. Of course if this were a French architectural Dictionary professedly, like Viollet-le-Duc's, this would be all right; but it professes to be a general work of reference. Four pages of writing, seven large plates, a reproduction of a view by Du Cerceau, and two plans, are devoted by M. Planat to the château of Blois; and of course Blois is a monument of exceptional interest. But if special buildings are to be included, we might have expected to find the palaces called "Barberin" and "Blenheim" and "Borghese" at least claiming a few lines; and we might have thought that so remarkable a building as Villa Caprarola would not have been passed over in silence. But then these buildings are not in France. In the biographical portion the name of Basevi certainly had a claim to a few words; and though we find (recurring to the first volume) that half a column is given to a short notice of Robert Adam, an honour which he probably owed to the fact that his book on Spalato was got up in conjunction with the French architect Clérissieu, there does not seem to be the slightest idea on the part of the writer of the important influence which Adam exercised on the form taken by Classical architecture in England in his own time, and now again in the present revival: any more than he suspects, we presume, the influence exercised on modern English Gothic by Burges, whom he quietly consigns to oblivion. If M. Planat wishes his book to be a real encyclopædia in the true sense of the word, he should endeavour to forget that he is a Frenchman, and look at buildings and architects from a more central point of view.

**The Strike of Bricklayers in Dublin** still continues, the men refusing to listen to propositions for arbitration. The *Freeman's Journal* states that since the beginning of the strike 280 Dublin bricklayers have been sent, at the expense of their society, to Belfast, Glasgow, and to the principal towns of England. Unfortunately, the bricklayers' labourers are suffering through the strike.

#### THE BAPTISTERY OF PISTOIA, TUSCANY.



THE Italian Government intends to repair, from public funds, the famous temple of St. John, or the Baptistery of Pistoia, some parts of which had been damaged by the weather and by the winter frosts. Prof. Francesco Bartolini, inspector of monuments at Pistoia, was ordered to study the monument, and to draw up proposals for the necessary repairs, and the Government has already received a learned and elaborate report from him, together with twenty-four drawings. It is well known that the Baptistery was built by Andrea Pisano, who employed Cellino di Nese da Siena to superintend and direct the works. It is proved, writes Signor Bartolini, that a more ancient Baptistery was built on the site now occupied by the present Baptistery, for in a document in the archives of St. Jacopo, signed by the notary, Amadio Guidaloste (1256), we read of "repairing the Baptistery of St. John in Corte, dilapidated through age." We learn from the manuscript and unprinted *historia* of Pandolfo Arferoli that in January, 1303, it was resolved to demolish all that remained of the ancient Baptistery, and to erect a finer one in its stead. We cannot be sure about the year in which Andrea Pisano commenced the work, but from Signor Bartolini's studies and researches, it results that they were commenced about the year 1333. We may say that the shell of the building was finished in 1339, as we read in the municipal archives of Pistoia that the workmen of San Giovanni e Zeno came to an agreement with Mastro Cellino di Nese about the covering of the walls with Carrara marble and *marmo verde di Prato*. It may be said that the building was entirely finished in 1361, for we read in the above-mentioned manuscript of Arferoli, that a ball of gilt bronze was made in that year to be placed on the top of the cupola. We cannot expatiate here on the important work of Prof. Bartolini, or on his studies concerning the monument. It is much to be wished that he should be induced to publish this work, together with the drawings. We may, however, point out the results which have been obtained by Prof. Bartolini's researches concerning the monument and the archives of Pistoia, researches which have been followed by very important discoveries. In the first place, it has been shown that the Baptistery has undergone repairs in the course of different centuries, very often to the prejudice of its original construction, as some of the principal architectural features were altered, and important decorations, which were an essential element in the original character of the edifice, were demolished.

1. Researches in the interior of the Baptistery led to the discovery of some ancient chapels of the mediæval period, and which had been covered with marble, and are mentioned in the archives of the city. The remains, or indications of these, were discovered in the sides of the octagon. During a series of faulty repairs the chapels had been walled up with brick masonry, perhaps for fear of the whole building coming down. Prof. Bartolini's discovery, therefore, was purely accidental.

2. The position and shape of the staircase was studied, by which access was obtained to the external Gothic pulpit on the right of the principal door.

3. But the most important result of Prof. Bartolini's researches is to have ascertained that, in the original building by Andrea Pisano, the cupola did not commence immediately above the story still in existence, but that spot was occupied by another story with an arcade, with windows in the Gothic style alternated with slender twisted shafts. This higher story was ornamented, as also the lower one, with marble pinnacles. At the present moment nothing remains of the second story and of the arcade, but some traces of foundations and two pinnacles corresponding to that part of



the church above the façade. Prof. Bartolini has drawn a plan of the edifice as it was originally built by Andrea Pisano, drawing the whole from the remains which he found in the course of his researches. This scheme, however, will not be carried out. The opinion of the Professor was fully confirmed by two ancient drawings of the Baptistery, discovered in the municipal archives, one of which bore the date of 1603, the other 1753, in which the base of the cupola is represented as being adorned with two stories with balustrades and shafts in the Gothic style, instead of one story, as we now see it, and as it was generally believed to have been since the erection of the building.

Prof. Bartolini has also presented to the Government a scheme for repairing the belfry of the cathedral of Pistoia, a simple mediæval tower, converted into a steeple in the year 1300 by Giovanni di Nicola Pisano. The higher part of the building is very much damaged, especially the top, upheld by four stout pillars, which is, indeed, in danger of collapsing. The tower is sixty metres high, and is ornamented with large Gothic windows, alternated by slender pillars. These windows were walled-up in the middle in the last century, when the building was repaired with barbarous taste. At the foot of the tower are sculptured many coats of arms, belonging to the consuls and podestàs of the ancient town of Pistoia.

L. B.

#### NOTES.

**W**E heard informally the other day that the Metropolitan Drinking Fountains Association had come in for a tolerably handsome bequest, to be expended in the work which they have been long carrying on. It is to be wished that the Association would make this an occasion for reconsidering their action with regard to the designs of the useful and durable but exceedingly ugly fountains which they erect in the streets of London. The Association rejoices, we believe, in the services of an honorary architect, who furnishes what he and they may be pleased to call "designs," but what we should call rather "patterns" for fountains, which have gradually collected into a kind of "pattern-book" from which those who wish for the assistance of the Association in erecting a fountain can make their choice. Were the "patterns" beautiful in themselves, still even then this would be a bad system, inasmuch as each site has its own character; besides which, the repetition of stock designs is a poor and artistic proceeding, in a case where each fountain has to be separately worked, and where there is therefore nothing to be saved in the working by repeating the same design in several places. The fountains set up by the Association are in general the most absolutely commonplace things that can be imagined; they do their work, but they are no ornament to the places in which they are set up, and are in many cases positively and offensively ugly. To impart some variety to them and to treat them with at least good taste and a little originality, would probably not cost a shilling more in the working of them, but it costs a little in brainwork first; and if the Association have any spare funds, they had better consider whether it would not be worth while, and whether it would not be a more proper fulfilment of their mission, to strive after a little beauty as well as usefulness in their fountains, and to go to a man who is an artist for a sketch for each new one, instead of repeating stock patterns evolved by a gratuitous official architect who seems at all events to estimate rightly the value of his own productions. We know there is a minority on the Committee of the Association who wish this, but they are a very small minority, and those who care for the beautifying of London should endeavour to strengthen the hands of those more enlightened members of the Drinking Fountains Association.

**T**HE specimen number of Schreiber's "Hellenistischen Relief Bilder," to the intended publication of which we some time ago drew attention, has just appeared. The plates are certainly masterpieces of vivid and exact illustration. New photographs have been in every case taken, and with a special precaution too often neglected, where the natural lighting of the monument was defective, reflected light has been brought to bear, and that under Dr. Schreiber's own immediate supervision, so that details, all-important to the archaeologist, but likely to escape the ordinary photographer, have been carefully thrown up. Where the marble was discoloured, and would in photographic reproduction produce a false effect, some process of retouching has been adopted, the particulars of which Dr. Schreiber does not divulge. The result is that the plates are by far the finest things in the way of archaeological illustration we have yet seen. To each plate an addition is made, the importance of which to the specialist it would be hard to over-estimate. On thin, transparent paper a second reproduction is given in outline, with shaded portions, showing precisely what is original marble and what is modern restoration. In the series of reliefs treated of in this, Dr. Schreiber's work, this is of the first importance; large numbers of the reliefs come from Roman museums and Roman palaces where the work of restoration has been ruthlessly carried on; plates and woodcuts give the restored version, with no hint of what is antique and what is modern, and the archaeologist has too often dealt with them as though the whole were genuine material. A glance at the well-known Eneide relief of the Palazzo Spada will show this. The specimen plates are chiefly taken from this palace, which is very rich in Hellenistic reliefs. No text has as yet appeared.

**L'ARCHITECTURE** for the 17th of this month gives a largely illustrated article by M. Hénard on the "Galerie des Machines" at the Paris Exhibition, under the heading of "Emploi décoratif du fer." Speaking of the architectural value of various sections of iron as employed in a design, M. Hénard observes:—

"Le fer à simple T donne une ligne saillante, ferme et fine tout à la fois, bordée sur ses deux côtés de points constitués par les têtes de rivets. La cornière donne un effet analogue, mais dissymétrique."

"Le fer à U est précieux en ce sens qu'il donne deux lignes parallèles pouvant enfermer soit une ligne de rivets, soit une tête de boulon plus importante à certains points de croisement."

"Le fer à double T, isolé, peut donner, selon son profil, des aspects massifs ou légers, puisque l'enveloppe de ce profil a la même perspective qu'un prisme rectangulaire dont il comporte toutes les proportions."

"Enfin le rivet et le boulon donnent des points d'importance variable, qu'il est très facile d'accuser avec des rondelles plus ou moins ornées ou découpées là où on juge nécessaire de les faire ressortir."

Tels sont les éléments que l'architecte doit accepter franchement et mettre en œuvre pour réaliser sa conception, sans les masquer par une ornementation étrangère, et surtout sans les forcer à rendre l'aspect traditionnel des motifs de pierre, tels que pilastres, corniches, &c., ce qui serait un non-sens."

**T**HE Leek Improvement Commissioners seem to have acted rather illogically in regard to a recent competition for extensions to their cemetery. They advertised for plans from architects for laying-out the new portion, and awarded a premium for the best design, and appear now to have resolved in committee, in the first place to deprive the cemetery of an avenue of trees which formed part of the design, and of some other embellishments, on the ground of economy, and in the second place to have it laid out by their own surveyor, merely paying the architects the premiums. The architects whose design was selected, Messrs. W. Sugden & Son, go a little too far in saying, in a letter to a local paper which has been forwarded to us, that this proceeding was "in effect a breach of faith with them," because the stipulation

was made in the conditions of competition that the Commissioners did not bind themselves to employ the successful competitor to superintend the work, and therefore the Commissioners are within their rights; but it is generally expected by a competitor in such a case that he would be allowed to carry out his own design, and if anything in the way of pleasing effect is to be made of the grounds it is not likely to be best done by putting it into the hands of a surveyor not accustomed, probably, to consider questions of effect. Indeed, it is rather difficult to understand why the Commissioners had a competition at all, as they appear to have abandoned the best points in the design as well as the superintendence of the architects who drew it out. One or two of the Commissioners seem to have expressed themselves against this course at the last meeting, but the economical majority carried the day. One of them said "he did not believe in land which cost 500l. an acre being laid out as pleasure-grounds." That is a very "Philistine" view to take of the matter. In all civilised countries there has been the feeling that it is fit and right that a cemetery should be made a place of some beauty, as far as possible, and not a mere space for as many graves as can be dug on it. Perhaps the Leek Commissioners have got rid of "sentiment," but it may be doubted whether they are doing the best for the town, or for themselves, in spoiling a design for which they have paid a premium, and neglecting an opportunity of making a garden instead of a utilitarian enclosure.

**W**E have before us the substance of a paper read to the Liverpool Engineering Society, by Mr. T. Mellard Reade, Assoc. M. Inst. C.E., &c., on the advantage to civil engineers of studying geology. The author points out the apparent indifference with which the majority of civil engineers regard the science, which apathy has in many instances led to failure of their work, more especially in respect of water-supply, reservoirs, canals, railway-cuttings, sub-aqueous tunnels, and foundations. To emphasise his remarks he gives many cases in point that have come within his own experience, and which are eminently instructive. We cordially endorse all the author says: the most elementary truths of the science, which could be learnt by any person of average intelligence in a few weeks, would quite suffice to teach the engineer either the utility of designing work in certain situations, or the necessity of calling in the assistance of a properly qualified practical geologist at the commencement. Under the present régime this latter course is generally adopted after the mischief is done.

**A** SERIES of experiments have been made in Germany by Herr Bohme with ten samples of cement in order to ascertain, firstly, their general properties; secondly, their tensile and compression strength; thirdly, their power of resisting wear on the surface. Tests were made of briquettes of pure cement, and of others consisting of one part by weight of cement to one, two, three, and four parts by weight of sand. They were alternately exposed to moist air, dried in air, plunged into water, air-dried again, and frozen at varying temperatures. They were afterwards placed in water at 64° Fahr., frozen again, thawed once more, and then left under water for the rest of their period of hardening. The chief effect of exposure to frost was to retard the setting of the cement, causing it to remain soft, and reducing its tensile strength and resistance to compression. This retardation, however, had little permanent effect, the cement becoming nearly equal to the unfrozen specimens after the lapse of a few days.

**O**UR French contemporary, the *Semaine des Constructeurs*, is translating and reprinting in full the articles on concrete by Mr. F. Caws, recently published in the *Builder*.

**T**HOSE who are interested in the history of dynamo machinery should on no account fail to see the very remarkable



plating-machine exhibited by the Corporation of Birmingham at the Birmingham Electrical and Industrial Exhibition. This machine is dated February 22, 1844, and was devised by Woolrich. It is a pity that copies of the original patent specifications are not also exhibited, as it would then be seen how much that has since been patented over and over again was known and invented by the early electrical engineers. We cannot give any detailed description of the machine here, but, on account of it, Birmingham claims to be the birthplace of the first dynamo-electric-machine ever used for commercial purposes.

WHILE we hear a good deal about the widening of the Strand, the unfortunate pedestrian bears in silence the troubles of the narrow pavement of Chancery-lane. But, in truth, no improvement is more urgently needed than the widening of that part of the footway which extends from the top of Chancery-lane wellnigh to Carey-street. Passing walkers jostle each other into the mud, and they are covered with splashes from passing vehicles. This widening would be easy work. At present there is a piece of waste ground between the railings and the buildings,—the property of Lincoln's-inn. The footway should extend from the roadway to the adjoining wall, and if this change were made foot-passengers would have nearly twice as much space as is now the case.

OWING to a subsidence of the foundations, it has been decided to entirely pull down the "condemned" Tottenham Court Chapel, or Whitefield's Tabernacle, which has been closed since June 16 last. Besides a new chapel, in the form of an amphitheatre, it is proposed, if the subscriptions reach to the estimated cost of 20,000*l.*, to erect new schools, together with a "Toplady Hall," and to set up within the latter certain memorial tablets, including that of Augustus Montague Toplady who wrote "Rock of Ages," in the present chapel. This chapel assumed its existing ungainly shape in 1860. We gave a brief account of the site and adjacent burial-ground in our columns of July 28 of last year. A story goes that in 1756 David Garrick, having learnt from his own stage-carpenter that the building was in danger of being suspended through want of ready funds, gave to George Whitefield 500*l.*; a big sum at that day, and certainly a large amount from Garrick. As we showed, the chapel, and, indeed, all its surroundings, are greatly changed from what they were on that memorable day when, close by its doors, George Warrington met Theo and Hetty Lambert as they were taking an airing in a coach to Hampstead.\* An appeal for funds, issued by the minister, the Rev. J. Jackson Wray, is illustrated with views of the fabric as it appeared at various stages of its history. In the cut of earliest date is seen, in the foreground, a piece of water which we take to be the "Little Sea," as it was called. The original chapel (1756) stands, about 70 ft. square on plan, with a pedimented front, and a high roof bearing a four-sided belfry. Within a few years an octagonal fore-chapel was added on to the eastern front; this was afterwards squared, and subsequently converted as we now see it. The remains of Whitefield's wife, of Toplady, and of John Bacon, R.A., sculptor, lie in the vaults beneath the organ. The rostrum of Whitefield's mahogany pulpit, which in his day stood on a pedestal, is preserved in the upper school-room (site of the former parsonage-house); his chair is kept in the vestry.

WE hear that the governing body of the London Homoeopathic Hospital propose to build new premises, at an estimated cost of 30,000*l.*, in place of their present hospital and medical school in Great Ormond-street, a building to which a certain degree of historical interest attaches. The eastern wing of the house at the corner of Powis-place (site of the first Powis House), was the residence of

Zachary Macaulay. His son was living there when he wrote some of his earliest literary essays in the *Edinburgh Review*. In the "Life and Letters" it is referred to,—but wrongly so,—as the reputed home of Lord Chancellor Thurlow when he was robbed of the Great Seal (1784), the thieves making away with their booty across the then fields to St. Pancras. In his diary for August, 1857, Lord Macaulay writes:—

"I sent the carriage home, and walked to the Museum. Passing through Great Ormond-street I saw a bill upon No. 50. I knocked, was let in, and went over the house with a strange mixture of feelings. It is more than twenty-six years since I was in it. The dining-room, and the adjoining room in which I once slept, are scarcely changed. The same colouring on the wall, but more dingy. My father's study much the same, the drawing-rooms, too, except the papering. My bedroom just what it was. My mother's bedroom—I had never been in since her death. I went away sad."

Within a few weeks of Lord Macaulay's visit the authorities of the Homoeopathic Hospital, who were at that time established in Golden-square, acquired the freehold of Nos. 50—2 in Great Ormond-street. The new hospital was publicly opened on May 12, 1859; in his address, Robert, Lord Ebury, mentioned that No. 50 had been, as the second Powis House, the home for twenty years of Philip, Lord Chancellor Hardwicke. Nearly all the postal numbers in that street have been changed of late, and no number is given to the hospital. When the Macaulays lived there, Lord Thurlow's house was numbered 45: it is now the Working Men's College.

WE have received from the patentee, Mr. J. H. Jones of Manchester, a sample of the "Stocks Sash-cord Holder," which appears an exceedingly useful device for allowing of the alteration of sash cords, or the attachment of new cords to windows, without cutting up the pulley stiles or taking out the beadings and sashes. The cord is fixed into a brass holder let into the sash, and covered ordinarily with a turn-lid like a keyhole cover; this can be turned back and the holder taken out, the cord wound into it, and the holder replaced in its pocket. The pulley-stile is also made with a separate piece screwed down, leaving an opening large enough, when it is taken off, to get at the weights and attach the cord; it is proposed to make a short length of the parting-slip as a fixture on the cover of this pulley stile piece, so that this portion of the parting-slip takes off with the cover and is fixed in its place again with it. As the patentee says, when parting-slips are removed for alterations in the hanging they are frequently broken or replaced in a wrong position; and this is here provided against. The invention appears an exceedingly useful and practical one.

#### THE ARCHITECTURAL ASSOCIATION'S ANNUAL EXCURSION.

WE now continue our account of this excursion, commenced last week.\*

##### Wednesday.

The third day of the excursion (Aug. 14), for which a long outing and much interesting work had been planned, was unfortunately marred by heavy rain, which considerably depressed the enthusiasm of the most ardent, and, in the opinion of some of the oldest *habitués* of the excursion, made the day, in point of weather, the worst ever experienced by the Association in their annual outings. The scene of the day's work was laid in Lincolnshire, the train being taken to Long Sutton, from which place the carriage excursion commenced. The Church of St. Mary, Long Sutton, is a striking example of Norman work in the nave, which remains practically perfect, the former clearstory windows being left open when the Perpendicular clearstory and aisles were added, so that the nave now has almost a cathedral effect with its massive and plain semicircular arches on the ground-story, its quasi-triforium, and its late large-windowed clearstory. The chancel is Perpendicular, and is remarkable for the width of the side arches, emphasised as it is by the narrow

Norman openings of the nave, and giving a peculiarly open effect with the very wide aisles. There are some remarkably good specimens of old glass, most of fifteenth-century date, especially one representing St. George, in a window of the south aisle. The south porch with parvise is interesting, with its rib-and-panel vaulting in the stage of transition to fan-vaulting, and without caps to the shafts. There is also a good Decorated doorway. The Early English tower, with its ancient lead-covered spire and angle pinnacles, and its double tracery plane in the belfry, naturally attracted much attention. This is apparently one of the examples of a detached tower open on the ground-floor, the lower arches having been filled in at a later date. Half-an-hour's drive brought the party to Gedney, the large Church of St. Mary Magdalen at which is supposed to have been founded by the Abbots of Croyland, who had large possessions in the parish. Throughout the day's excursion the visitors were constantly reminded of the influence of these famous ecclesiastics in this particular district. The existing church appears to have been built during the period of transition from Decorated to Perpendicular, the aisle windows being of a



Decorated type, those of the clearstory of a Perpendicular, while the nave arcade is distinctly transitional. There is a good fifteenth-century roof to the nave, a fine south porch with parvise, and some interesting fragments of old glass and of the old screens. The chancel has been restored, and the nave and aisles are in need of some slight amount of careful reparation, though restoration, as ordinarily understood, would doubtless reduce the interesting character which the visitors valued so highly. The steeple has an Early English tower with Decorated belfry-stage, and the stump of what might have been a fine spire. During the half-hour's stay at Gedney the rain fairly set in, and the remainder of the day was spoilt by the continued downpour. Holbeach was reached at mid-day, when attention was chiefly devoted to the interior, where again the period of transition seen at Gedney is exemplified in the very fine church of All Saints, the aisle windows being curvilinear in treatment, with a Perpendicular feeling in the nave arcade and clearstory. The old screen has gone, though the stair to the roof-loft remains. There are some sepulchral remains worth study, a Mediaeval stone coffin-lid with floriated cross,

\* "The Virginians," c. lxvii.

\* See p. 117, *cont.*

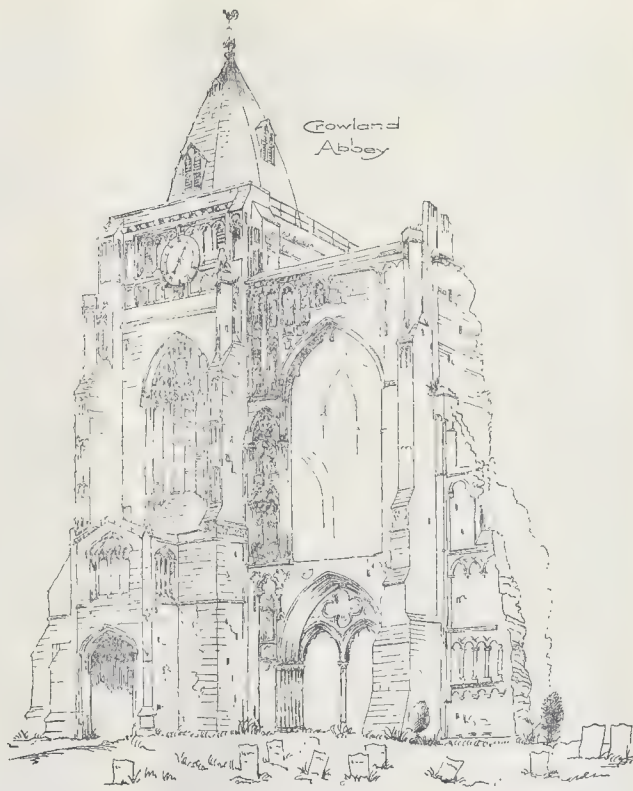
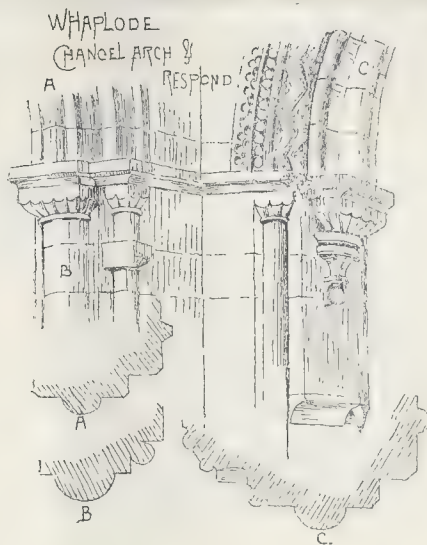


brasses, and a very excellent fourteenth-century tomb, with life-size recumbent effigy of Sir Humphrey Littlebury. There is also a plain arched recess in the wall of north-aisle for a founder's tomb.

Externally, the fine spire, with its lucarnes and late broaches, and the great tower, are of great interest, as are also the porches, north and south, the former of which has the stairs to the parvise chamber enclosed in two angle-turrets, circular in form, making a striking feature in the design. Leaving Holbeach, the party proceeded to Whaplode, where the continued down-pour again confined almost all within the church. This has an extremely interesting nave of seven bays, the four eastern ones Norman, the three western Early English, with semi-circular arches following the lines of the earlier. The stairs to the rood-loft have been added in the Decorated period, and cut into the Norman piers of the nave arcade and chancel arch. There is a good fifteenth-century hammer-beam roof to the nave, with excellent detail, and in fair preservation. At the west end of the south aisle is a sumptuous Jacobean monument to "Sir Anthoine Irby, Knight, and Alice, his wife," with recumbent effigies under a canopy supported on ten Corinthian columns, and surrounded by a wrought iron railing. On the wall close by hang Sir Anthoine's helm and surcoat. As in so many other churches in the district, there are here some fine examples of Mediaeval stone coffin lids, with floriated crosses. The old seventeenth-century pulpit and sounding-board have been re-used in forming a screen for the vestry. The tower stands in a peculiar position at the east end of the south aisle, with its north side only attached to the aisle wall. It appears to have been completed as a three-storied tower in early English times, and to have had a later belfry added. It was now decided, in consequence of the weather, to abandon the proposed visit to Croylund and Thorney, and to return to Lynn by the train from Spalding, calling at Moulton on the way. The Church of All Saints here had been visited by some of the members with the late Mr. Edmund Sharpe, on the Lincoln excursion, eighteen years before, under similar dampening influences, hence the Transitional nave was recognised as an old friend, as was also the remarkable tower arch of Early Perpendicular date, with its very prominent diminution of openings, there being a difference of no less than 17 in. in the width between the piers at base and cap. The fifteenth-century chancel-screen is interesting, having good tracery and peculiar flying buttresses to the main mullions. The chancel-arch above attracted many sketch-books from its simple and effective treatment, the moulding dying on to the wall without cap or corbel. The triple sedilia and piscina and credence in south aisle are worthy of notice. The last visit of the day was made to the Church of St. Mary and St. Nicholas, Spalding, completing a series of six churches, any one of which would suffice in fine weather for a day's study. Spalding being originally on the boundary-line of the estate of Croylund Abbey, a subordinate cell for a prior and five monks was founded there in 1051 by Thorold de Buckenale. At the Conquest, Ivo Talbois, Earl of Angiers, and nephew of the Conqueror, built a castle at Spalding, with the result that the monks of Croylund, finding the neighbourhood less pleasant, retired from their cell, and it was accordingly, in 1074, given with the Church of St. Mary and the manor to the Abbey of St. Nicholas, Angiers, who sent over a party of Benedictines, under whom the establishment became an alien priory to the Abbey at Angiers, and the church was dedicated to St. Mary and St. Nicholas. At the suppression of alien priories Spalding escaped the general fate, and was raised to the dignity of an abbey, which it continued to be till the general suppression of the monastic system. A church was erected here instead of the conventual church in 1284, and this was partly pulled down in 1446, and considerable additions made, including the beautiful north porch. The church as it exists is probably the largest of those visited during the day, and worthy of more attention than time allowed.

Thursday.

On Thursday, the 15th, a district north-east of Lynn was worked, the first halt being made for the study of Domestic work at Hillington Hall, the residence of Sir Wm. Folkes, Bart. This, however, proving an example of Strawberry



Hill Gothic, met with little appreciation from the bulk of the members, although the work is good of its kind, in spite of the large use of Roman cement for external dressings, while the plan is certainly admirable. Half-an-hour's ride brings us to Harpley, with its Church of St. Laurence, which quickly compensated for the earlier disappointment. The nave and aisles are of excellent Perpendicular work, with a square tower at the west end, the chancel is earlier, with triple sedilia and double piscina. There are also in the south aisle triple stepped sedilia and double piscina of Late Decorated

century chancel screen has been restored with its coloured decoration, and there are also a fine south door and porch, fragments of old glass, some with the insignia of the patron saint, and some excellent bench-ends and fragments of seat-backs, which have been re-used in the restoration. Altogether the church was voted eminently sketchable, many bits of detail, such as the priest's door, nave, parapets, &c., being transferred to the members' books, so that the time allowed was thought all too short, and considerable reluctance shown to make a start for Houghton Hall, which was the next objective point. This, the seat of the Marquess of



scholarly and thoughtful address, in which he reviewed the rapid progress of archaeology as a science since the previous Congress in Norwich in 1847. It was true that at that gathering there had been present many intellectual giants.—Dean Peacock, Dr. Whewell, Bishop Stanley, and his gifted son, Dean Stanley, Henry Hallam, and Dr. Adam Sedgwick, for example,—with whom the present members of the Institute could not for a moment compare; but, still, forty years ago there was little or no conception of the antiquity of man, and geologists started back, almost in horror, at their own discoveries, superstitiously afraid lest their science should be found to conflict with the Mosaic records. Turning to the subject of the ancient Britons, Dr. Jessop referred to the story told by more than one classical writer of antiquity, that Pytheas visited Britain 300 years before the Christian era. There can be no doubt that Pytheas was credulous, like our own early travellers; but, said Dr. Jessop, the question now was not what the Romans did in Britain, but what did the Romans find? The question which presses for answer may be said to be:—What was there in this Britain of ours which made it worth while for the Romans to invade it in the century before Christ, and compelled them to leave it unattacked for another 100 years, though again and again during that century they bragged of what they were going to do, which induced them to carry out their threats, and which led them afterwards to keep their hold on the island for 400 years? The wonderful discoveries announced by archaeologists from all parts twenty-five years ago led us to see that men had been fighting, toiling, making tools, and advancing in the arts far, far back, perhaps to the pre-Glacial period. These discoveries then dazzled us all. Everybody went groping about for flint implements, and everybody who groped long enough found them. Now we know almost as much about the life and habits of the men of that vastly remote past as we do about the civilisation of those later inhabitants of our island, who, in comparison with the others, are but as men of yesterday. But surely we ought by this time to know about those men of yesterday. Some points regarding our British progenitors are, however, now well enough established. We know well that they traded in copper and tin for centuries. They worked the ironstone of Sussex. The first cause of quarrel between them and the Romans was because they had allied themselves with the Veneti, who fought that famous sea-fight with Cæsar the year before he first invaded them, and amazed Cæsar by letting down their anchors with chain cables. Clearly, too, those Britons had a formidable mercantile marine. Twenty years after Cæsar the carrying trade of the Channel and the export and import duties which they paid constituted an appreciable item in the Roman revenue. The southern parts of the island were studded with buildings. Agriculture was carried on on a large scale, especially to the north of the Thames. They had a currency, even a coinage. They had an extensive network of roads. Before long Britain became a corn-growing country, and the epures of Rome appreciated highly, or pretended to, the oysters of Rutupie (Richborough). The sentiment of nationality was strong amongst them. Cassivelaunus ruled over a kingdom firmly consolidated with a splendidly organised army, and such a cavalry force as Rome had never encountered since the days when Hannibal's Numidian horsemen swept over the plains of Italy. Of the Druid hierarchy we know but little; but this we do know, that they were a highly educated class and the educators of the people. They had some knowledge of astronomy and geography, and an elaborate ritual. London was a great emporium long before Cæsar's landing, and it continued to be so without break in its prosperity down to the dreadful rebellion of the subject people, who had been driven to madness by the Roman tax-gatherers, money lenders, and ruffians of all sorts. Can it be so absolutely certain, as has been assumed, that all those villas, pavements, roads, baths, and vestiges of art are strictly what we understand by Roman—that is, work of exclusively Roman hands? Can these people have been so very barbarous, and so incapable of assimilating the new civilisation of their conquerors, that when the aliens left them to defend themselves the British became the prey of their invaders, not because they were mastered by overwhelming multitudes

from the outside, but because they were incapable of doing anything in their own defence, when once deprived of the guidance and command of those very Romans who themselves ran away from any further contest with the hordes of the irresistible invaders?

Next, turning to the subject of our ancient institutions, Dr. Jessop said: "No other county of England can furnish so many instances of strange and curious tenures and customs whose origin points to a distant past as Norfolk. Further, few parts of England are so rich in family papers which remain to be explored. Among the questions which arise out of such a condition of things are the following questions:—Did the manors spring out of the village community of freedmen, a co-operative society in fact, where all were equal in station and all were equal owners of a certain area which they tilled in common? or did they originate in a settlement planted by a chieftain with his dependents, who won the land and cultivated it for their lord? Are we to look upon the manor as an institution of Roman or of Teutonic origin? Again, with regard to jurisdiction and procedure and the authority of local courts—courts baron and courts leet, &c.—the accepted views of the great lawyers of the seventeenth century are in process of being very severely cross-examined. Only during the last few months have we been startled by an announcement made by Professor Maitland, of Cambridge, to the effect that he strongly suspects the word "leet" itself is of East Anglian origin, and the thing itself is to be found before the twelfth century in Norfolk and Suffolk exclusively.

Dr. Jessop concluded his address by remarking that the more we know about those who have gone before us, whether as builders, or as citizens, the better we shall be able to understand and appreciate the present and to shape our course in preparing for the future.

The address was followed by a short paper from the pen of Professor Browne, of Cambridge, upon an Incised Stone with a Runic inscription, which has been recently found at Upton, near Birkenhead, in the Wirral district of Cheshire. So far as can be deciphered, it is the record of the death of a private citizen, Uðelnoth, with a request for prayers on his behalf.

The members of the Institute and their friends next went to Norwich Castle, under the guidance of Mr. Hartshorne, F.S.A., who had promised to read within its walls a paper on its past history. The Castle, it should here be mentioned, since its disuse as a prison, has been purchased from the Government by the Mayor and Corporation of Norwich, who have laid out the slopes at the base of its keep as a public recreation-ground, and have emptied the outer shell of all those "fixings" by which its interior was fitted up for the reception of prisoners. Its four walls, therefore, are now roofless and open to the sky, and the debris has not yet been cleared out, so that its floor (so to call it) is about 6 ft. above the proper level. Standing on a large mound of stones in the centre of this open space, Mr. Hartshorne gave an interesting sketch of the Castle from its first inception, more than a thousand years ago, when an artificial mound was thrown up by Saxon hands, and the "Castle Fee" and "Castle Meadow" were marked out. It then became a moated structure, the "hill" of the "burgh," and was doubtless palisaded around, and utilised as a place of protection for cattle as well as a garrison. Once and again, or perhaps oftener, this "burgh" was burnt and thrown down, and it is said to have been destroyed by the Danes under Sweyn in 1004. Soon after the Conquest, King William is said to have built a castle at Norwich, but this need not mean anything more than that the Norman king strengthened the old earthworks, and set up a shell keep of masonry on the site. Over this castle he placed a constable, Ralph de Guarnsey, who revolted against him, when, after a siege of three months, the stronghold was retaken by the King. The same thing happened again in 1135, when Hugh Bigod, its then constable, was forced to surrender it to the new King. For political reasons, however, Hugh Bigod was reinstated by the sovereign, who created him Earl of Norfolk, and under him the present castle keep was erected about the same time with Hedingham Castle in Essex, Castle Rising in Norfolk, and Rochester Castle in Kent. In the next century Norwich Castle was held for Louis VIII. against King John, but

was surrendered to Henry III. in 1217. It played little or no part in the Barons' Wars, and, though kept in repair,—to a certain extent at least,—as a Royal castle, it seems to have become already a State prison before 1230; and when the city walls were commenced, just before the close of that century, its necessity as a means of defence was superseded, and thenceforth it was allowed to pass into a state of neglect, though not of positive decay. From the reign of Edward III. down to that of Queen Victoria, its walls had been put to the ignoble use of a county gaol for felons. In the reign of George III. all that was ancient in its interior was removed, and its area divided by red brick walls into partitions for the safe keeping of prisoners, and externally parts of it had been "restored" by Wilkins in 1825. Ten years later the keep was refaced externally, but the work then done, though solid and substantial, replaced much better work, and wrought by more skilful and tasteful hands. Mr. Hartshorne then went on to describe some of the parts of which more or less traces remain,—the main entrance gateway, covered by a fore-building; the old oratory in the south-eastern angle; the kitchen, with its curious newel staircase in the north-west angle; the principal staircase; and the garderobes. The basement, he added, is said to have been vaulted; but this, he thought, was very improbable, since, if such an arrangement was made, all the stores must have been carried through the fore-building up on to the first-floor, and then have been lowered down inside. One part of the interior must have been a well; but this cannot be found, though it is said to have been situated in a partition which ran across the shell-keep in the centre from east to west. The great hall occupied the whole of the space on the north side of this cross-wall, the foundations of which are now uncovered. In conclusion, he said that Norwich Castle has now for the first time been surrendered into the hands, not of a tyrannical king or of a turbulent noble, but into those of the people; and he trusted that the citizens of Norwich would speedily utilise it as a local museum,—a purpose for which it is all the better adapted since its interior has been cleared from all impedimenta, and there is nothing to prevent any well-considered design for its rearrangement from being carried out. To fit it up, not in sham Norman work, but in a plain, simple, unpretending style (as has already been done at Taunton and at Colchester), would preserve its grave, solid, and majestic character, and maintain the venerable walls of Hugh Bigod's keep for the contemplation and guidance of future generations of historical and archaeological students.

Mr. J. T. Micklethwaite, F.S.A., here remarked that he understood from persons resident in the city that there was and is no intention of erecting any sham Norman work, and that it would be better, from every point of view, to leave the walls untouched, so that they may tell their own story. It would be well, in his opinion, to throw over its interior a nineteenth-century roof of glass and iron, even at the risk of its being laughed at as a bad imitation of a railway station, and to use the ground-floor only as a museum.

Mr. Ferguson, Chancellor of Carlisle, proposed a resolution to the effect "that this meeting of the Archaeological Institute desires to impress on the Mayor and Corporation of Norwich, and on the local Architectural Society, the desirability of making systematic excavations within the keep of the Castle, with a view of clearing up questions as to its earlier history." This was seconded by Precentor Venables, of Lincoln, and on Dr. Jessop explaining that provision had already been made for this by the committee, it was felt inexpedient to press the motion, which, after a few remarks from Professor Clark, the Rev. C. R. Manning, and others, was withdrawn, a resolution to the effect that, "This Congress desires to express its cordial appreciation of the labours of the Mayor and Corporation with regard to the preservation and excavation of the keep," being substituted on the proposal of Mr. Batten, seconded by Mr. Baylis, Q.C., and carried unanimously.

Mr. E. Boardman said that designs for a rearrangement of the interior, very much after the plan suggested by Mr. Micklethwaite, had been prepared, but there was a strong local feeling against them. The evidences of a former roof still remained, and this the good people of Norwich wished to have renewed, if possible. Then again, the arcade running



across the keep will be executed in terra-cotta, so that it cannot be misunderstood. The new roof will indicate the height of the side walls, and hide nothing that is of archaeological interest. The gallery, carried round the level of the first-floor, would enable visitors to see the chapel and other portions of interest which would otherwise be difficult of access. This was confirmed by the Deputy-Mayor, who said that it was only after a great amount of careful discussion that certain plans for the rearrangement of the interior had been approved. The gallery would enable visitors to examine the Castle better than they could do from the ground-floor. The plans were approved a month ago, and though it had been decided to commence operations at once, yet it was felt to be desirable to delay the work till after the visit of the Institute, that advice might be obtained as to whether it was desirable to clear away all the made soil, which was something like 3 ft. or 10 ft. higher than the level of the mound outside, or to adopt the present floor line for museum purposes. If the soil were cleared out there would be all the more difficulty in getting light. Shafts had been sunk in various parts of the interior of the keep and nothing had been found.

Upon the question of the geological structure of the mound on which the castle stood, the Deputy-Mayor exhibited some admirable geological sections and plans, which showed that though its base was a rising hillock of sand, yet much of the upper portion was clearly "made earth." Indeed, it had been shown by actual experimental boring that the mound was, at one spot at least, artificial to a depth of 33 ft. He therefore pronounced the mound to be artificial at that point, and he had no doubt whatever it was so throughout. But the mound must be of great antiquity, and it must have required an enormous time for the made soil, of which it is composed, to have become sufficiently consolidated to permit of the erection upon it of a ponderous building like the Castle.

After luncheon the party visited several of the principal buildings of the city, beginning with the curious old church of St. Gregory, where the Rev. W. Hudson displayed two specimens of pre-Reformation embroidery, an elaborate hearse-pall of black velvet, richly embroidered with dolphins and other devices, and an *auto-pendium* or altar cloth, of red velvet, most delicately embroidered also with sacred devices. These were spread out on the benches in the nave, and attracted much attention, especially from the ladies. They had also pointed out to them the curious fresco painting of St. George on the western wall of the north aisle, and the brass knocker of a door once used by those who fled to the church for sanctuary and protection.

The next place visited was the Strangers' Hall, as it is somewhat absurdly called, in St. Gregory's Parish. It is clearly an old city mansion, probably of the fourteenth century, once beautifully carved both externally and internally. The large room standing is the dining hall, as shown by the oriel window and the buttery-hatch openings in the wall under the gallery. It would appear from a short paper read in this room by Mr. M. Knights, that the room had been used as a place of meeting by the members of the ancient Guild of St. George, the Patron Saint of England, whose festival used to be kept in Norwich with special solemnity. It was probably called the Strangers' House from having been lent to the Wallons or other Huguenot refugees at a far later date. This curious specimen of domestic architecture struck many of the archaeologists by its resemblance to houses of the same kind at Salisbury and in the parish of St. Mary Redcliffe at Bristol. It is needless to say that it was generally regarded as one of the most interesting objects in the city.

The next object of pilgrimage was the Guildhall, where the party were joined by their President, the Duke of Norfolk. As the regalia had been removed for exhibition at St. Andrew's Hall, the inspection was limited to the building itself, which is externally a fine and lofty specimen of flint-work arranged in diamond patterns, the cornices, window dressings, and battlements being of freestone. A few of the old Perpendicular windows remain, but most have been restored; in this Guildhall was formerly a chapel dedicated to St. Barbara, where the prisoners used to hear the service. The Mayor's Council Chamber still retains a good deal of the furniture of the time of King Henry VIII. The armorial panels in wood, the

painted glass,—much of it modern,—and the ancient carved desk before which the Mayor sits on State occasions were shown, as was also the sword of the Spanish Admiral Winthuisen, who was taken prisoner at the battle of St. Vincent, and died of his wounds. The portraits of "Old Crome," the Norwich painter, and of Lord Chief Justice Coke, were also much admired. There was no time even to attempt an inspection of the civic records.

Arriving at the noble and cathedral-sized church of St. Peter's, Mancroft, the party were shown over it by the Rev. Mr. Bagdallay, the Rector, but his explanatory remarks were much curtailed by the want of time. On the way near this church the Duke of Norfolk and several members of the party visited Mr. Back's beautiful mansion of sixteenth-century date, known as Curat's house.

The ramble about the streets of Norwich was brought to an end soon after four o'clock by the appearance of a long row of carriages and breaks, which had been engaged to take the visitors over to Carrow Abbey, between Norwich and the Prowse Railway-station, where Mr. J. J. Colman, M.P., and Mrs. Colman welcomed them. Precentor Venables, in the absence of Mr. St. John Hope, gave to the assembled party a brief account of the history of Carrow Abbey,—or rather Convent, for it was an abode of nuns under an abbess, and the sisterhood had in their hands the education of most of the young ladies of the upper classes in East Anglia previous to the Reformation, when the Convent was suppressed, most of its walls being thrown down and its inmates scattered. The outlines of the Convent Church are now traceable all round, thanks to the reverent care which Mr. and Mrs. Colman have bestowed upon it; the high altar, the sacristy, and what looks like a chapter-house (though that it could scarcely have been) to the north of the chancel are still to be seen *in situ*, and many of the columns have their bases perfect. Arriving at Mr. Colman's house, which was once the residence of the Lady Abbess or Prioress, the party were ushered into the Great Hall, which contains an excellent collection of books, tracts, and pamphlets on Norfolk and Norwich; and here Mr. Walter Rye was ready to read some brief notes on "The Unpublished Manuscripts available for a History of Norfolk." In the course of this paper he expressed an opinion that the parish clergy are not good custodians of the registers of their several parishes,—a statement which called up Dr. Jessopp to vindicate their character, and some lively "sparring" was just commencing, when the party were called to their carriages, which were waiting to convey them back to Norwich. It should be mentioned that before commencing his paper, Mr. Rye paid a kindly tribute to the memory of Mr. Walford Selby, of the Public Record Office, of whose death he had only just heard, and who was a very intimate friend of many members of the Congress.

In the evening a large and brilliant assembly was gathered together in St. Andrew's Hall in response to the Mayor's invitation to a *conversazione*. The hall was tastefully draped and decorated for the occasion, and there was an attractive programme of music and of singing. The Duke of Norfolk, President of the Congress, was present, together with the High Sheriff, and many officers of the Army, Navy, Militia, and Volunteer forces. The Mayors of Thetford, Yarmouth, Lynn, and Lowestoft also were present, and the corporation of the three first-named boroughs exhibited their maces, swords, plate, and all their regalia, which were arranged under glass cases on tables in the centre of the room. Mr. St. John Hope had kindly undertaken to comment upon them, and to compare and criticise them. The Norwich maces, it may be well to mention here, were the largest, and, in some senses, the best of all, and Mr. Hope dwelt especially on the crystal mace as a very grand specimen indeed, to be paralleled only, if at all, by the chief mace of the Lord Mayor of London. He also said that especial notice ought to be taken of the curious silver or sent over from Great Yarmouth, and of the cup of King John, exhibited by the Mayor and Corporation of Lynn. This, he said, was doubtless of the date of the reign of Edward III., and might very possibly have belonged to King John of France. But whether that was the case or not, it must certainly be pronounced a magnificent specimen of English workmanship, and one which showed that this country could produce as rich and good work in metal as

the Flemish craftsmen or the artificers of France.

On Friday morning, the 9th, immediately after breakfast, the party, a hundred strong, went off by railway to Great Yarmouth, where an inspection of its noble Parish Church, its curious Toll-house, and its even still more curious "Rows" formed a part of the programme of proceedings. Here they were met by the Mayor, Mr. F. Danby Palmer, who conducted them all through their visit to the town. On reaching their destination, the party walked along the Market-place to the southern entrance of the church of St. Nicholas, to whom, as the patron saint of fishermen, the fabric was dedicated by its founder, Herbert de Losinga, Bishop of Norwich, in 1123, and greatly enlarged within forty years afterwards. It consists of a nave and three side aisles (the latter wider than the original nave), and each somewhat differing in structural details, and making the interior very broad in comparison with its length. The armorial bosses of the panelled ceiling were the subject of comment. Its central tower is surmounted by a spire. The church, which a quarter of a century since was in a very neglected state, has been carefully restored to a very great extent,—bit by bit, and part by part,—under the superintendence of Mr. J. P. Seddon. The Purbeck marble font, the "prior's" tomb in the north aisle, with its fine crocketed canopies and foliated crosses, were much and deservedly admired, as was also the curious book-rest in the library in the northern transept. The absence of fine monuments and brasses in this church is noticeable; and it was explained that the circumstance was due to the vigour with which the doctrines of the Reformation were enforced by the people of the town. Mr. Walter Rye, in his "Guide to Norfolk," writes that "the destruction of them at the time of the Reformation seems to have been shameful. All the brasses were taken up and sent to London, to be cast into weights, and all the gravestones in the church and churchyard were sent by sea to Newcastle, to be made into 'grindstones'; and it is said that the 'holy stones' with which the decks of ships were scrubbed took their name from being pieces of sepulchral monuments."

Among the other places inspected by the party were the old Toll-house, or Tol-house, once used as a prison for offenders in the town; the Public Library, kept in a house once used by the congregation of the Dutch Protestants, who settled here in the reign of Queen Elizabeth; the "Star" Inn, a fine specimen of Elizabethan domestic architecture, and full inside of good old carving in oak; the "Town Hall" and its Record-room, containing "the Yarmouth Hute"—a Mediaeval iron safe, used formerly for keeping the plate and other valuables belonging to the Corporation; the fine old Mansion-house on the south quay, formerly occupied by the late Mr. C. J. Palmer, with its elaborately-carved front room on the first floor, which once belonged to the regicide Bradshaw, and in which it is said that a council of the leaders of the Commonwealth party was held when the execution of Charles I. was finally decided on. Friar's-lane and its old flint house, once occupied by the Drury family, were also pointed out, and visits were paid to one or two of the curious narrow "Rows," for which Yarmouth is so famous, and up which no carriage can be driven, except the Yarmouth carts, specially built for that purpose. St. George's Church, of Queen Anne's reign, and the old Charity-school were left unvisited for want of time.

After lunching at the Assembly-rooms, the party were in readiness for a drive in carriages to the old Roman Camp at Burgh Castle, across the railway and the river, and, in fact, locally situated in the county of Suffolk, at the confluence of the Yar or Yare, the Bure, and the Waveney. This was, or at all events it is now generally accepted as having been, the Gariannonum of the Roman period of occupation, and possibly served as the Hiberna Castra, or winter quarters of the Imperial soldiery, while Caister, on the opposite side of the estuary, served as their *Æstiva*, or summer quarters. The route to Burgh Castle lay through three or four miles of "green gates," as the roads across the fields hereabouts are styled. The Castrum itself, or rather three sides of it (for the western side has perished), stands in a commanding position overlooking the Breydon waters, and from its walls an extensive view is obtained over the neighbouring country. The walls include an



area of about five acres; they are about 370 ft. by 640 ft. in breadth and length, and mostly 9 ft. in thickness, with an average height of 14 ft. or 15 ft. They are built of that rough and solid Roman masonry which is so familiar to those who have visited Lincoln, or Colchester, or the old Verulamium close to St. Alban's. The solid flanking walls are interesting on account of some curious circular holes in their summits, about 2 ft. in depth and width. There have been all sorts of speculations as to the use of these apertures, but they have been thought to have been intended to hold timber watch-turrets, though many persons think that they were used for ballists.

On these fortifications Mr. Rye observes:—"The towers at Burgh have been so thoroughly demolished that its very existence has been doubted by many, who not seeing any traces of it have jumped to the conclusion that it once had a water front, from which the river has since subsided. Mr. Harrod, however, some years ago, demonstrated its existence by digging trenches, and coming across its foundations; but whether the wall he found was equal in importance to those on the other three sides remains doubtful; and it certainly seems strange that, while three walls are in such a fine state of preservation, some parts of them being literally as perfect as on the day when they were built, the fourth wall should have so thoroughly vanished, if it had been equally substantially built."

On reaching Burgh Castle a shower compelled the party to take refuge in the church, where Dr. Raven gave his address from the pulpit steps. The following is an epitome of what he said:—

The earliest notice of Gariannonum is found in the geography of Ptolemy, written in the time of Hadrian, where we read the record of the position of the Wash, the mouth of the Garienus or Yare (probably further out to the sea than Lowestoft Ness), the mouth of the Blackwater, &c. Ptolemy's calculation put the mouth of the Yare too far north for Burgh Castle, or even Yarmouth. But across the marsh, near the sea at Caister, was a Roman camp with dwellings, and till the days of the Conquest the North River ran into the sea just south of Caister. Caister was most probably the original Gariannonum or Yare camp. The camp at Burgh may have been nearly coeval with Caister. But there can be no doubt that it is the place called Gariannonum in the Great Survey of the Roman Empire, made A.D. 995. Dr. Raven gave an epitome of the account given by Harrod of his excavations for the west wall of the camp next to the water. The result of those excavations carried conviction that Burgh Castle, like Richborough, originally had four walls. As the rain had ceased the way was taken through the fields to the camp. Those who had not seen it before could not refrain from expressing their admiration at the long extent of solid grey masonry, streaked with regular lines of red tiles, and here and there covered with a green mantle of ivy. At the north-east angle stands a solid round bastion. Another stands close up to the wall in the mid-distance. A third, at the south-east angle, seems to have slid down from its original position against the wall.

The party having returned to the old walls, Mr. G. E. Fox said that this camp especially guarded the mouth of the Waveney. There might have been a boom across the river to stop the progress of any pirate vessel. From this point Reedham could be seen, the site of another Roman station, which guarded the mouth of the Wensum. To the east, within signal distance, was the great camp of Caister, near Yarmouth, to protect the mouth of the Bure and the passage from the northern ocean into the wide salt lake of Breydon. A signal-tower, chiefly of timber construction, was probably erected at this camp to enable its occupants to communicate with the other camps. Such towers may be seen represented in the *bas-relief* of Trajan's Column as rising above the walls of the camp, so as to command a view of a wide extent of country. During the Roman occupation of this camp the water could scarcely have been much higher than it is at present. There is little doubt that there were towers on the west wall, as there are towers on the other walls. On the towers are holes in which to place ballistæ or huge crossbows, which would sling out 6-ft. javelins, that would cause considerable impediment to the progress of any pirate vessel up the river by smashing its oars and damaging the crew. The towers, all of

which have these holes for ballistæ, are of peculiar shape. To about 6 ft. from the ground the towers are not bonded into the wall. The wall and towers are certainly of the same date. Of the ditch, a very important thing in a Roman fortification, there are traces on the south side. On the east side it has been filled up. It had been frequently said that there was a Roman cemetery at Burgh, but he had never seen a Roman urn from Burgh. Those he had seen figured as found at Gariannonum were Anglian. Pressure of time compelled Mr. Fox to cut short his remarks; but before concluding he expressed the hope that the interior of Burgh Castle would be properly explored, said that the work of Harrod, which was well done, was a monument of his fame, and advised those who sought for remains of the west wall of Burgh to look for them in Reedham Church, which was built out of a considerable portion of its materials. Whilst the party were at Burgh Castle the rain again came down heavily, but soon passed away again, and the party returned to Norwich, in good time for dinner and for the evening meeting. Here, under the presidency of Sir Talbot Baker, a very interesting paper was read in the architectural section by the Rev. Prebendary Scarth, of Bath, upon a newly-discovered Roman temple, dedicated to the Gallic Mercury, on the summit of *Puy de Dôme*, one of the highest mountains in Auvergne. From this paper it appeared that the summit is 4,200 feet high,—about equal to our Ben Nevis—that it has long been occupied by an observatory, and that about thirty years ago, in making some alterations near the top of the mountain, the workmen came upon some débris of work evidently Roman, of which due notice was taken by the public librarian of the neighbouring city of Clermont. It was not, however, till a year or two later that he obtained leave to carry out an investigation into these masses of stone; and, finally, in 1873 a commission was appointed by the Emperor of the French, when the work was commenced in earnest. It was then found that the stones were angular and well cut, and that many of them bore inscriptions, which were generally defaced. The masonry proved to be very good specimens of what is known as *opus quadratum*, and the researches being continued, brought to light parts of a flight of stone steps, the balustrades of a staircase, a hall, and an undercroft or crypt. At last the workmen came upon a mutilated statue, and near it was an inscription on a votive tablet, stating that it was dedicated to the Auvergnian Mercury, the god of business transactions (*negotiatori*). This character of Mercury tallies with the words of Ovid in his "Fasti," and it is worthy of note that the statue itself is mentioned by Pliny as being the work of a Roman sculptor, who afterwards designed the golden statue set up in honour of the Emperor Nero. If this be so, the temple and statue belong to the first century of the Christian era. The temple itself must have been very costly in its erection, as the materials had to be transported partly from the Carrara mountains and partly from Africa; the roof, too, would appear to have been covered with lead, and it is reckoned that the statue alone must have cost some 3,500*l*. This temple and its statue were both destroyed, in all probability in a fit of iconoclastic zeal, by the Vandals, in the reign of the Emperor Valerian; for the idea of its having been overthrown by an earthquake is negatived first by the fact that all traces of volcanic action in Auvergne are of an earlier date than Christianity, and secondly by the fact that the inscribed stones are those which are most severely mutilated, which could hardly have been accidental. The reading of this paper gave rise to a brief discussion, in which Sir Talbot Baker, Mr. James Hilton, and other members took part; and afterwards, in the same section, a paper was read by Dr. Raven upon some "Medieval Instructions in the art of Bell-founding," by Walter de Oddington, a monk of Evesham.

In the other, or Historical, section, the Rev. W. Hudson read a paper, chiefly of local interest, upon "The Traces of the Early Development of Municipal Organisation in the City of Norwich."

On Saturday, the 10th inst., the excursionists went far afield in the north of the county, arriving by train at Holt between 11 and 12 o'clock. On their arrival, after taking only a passing glance at its fine parish church, the party drove down the valley of the Glaver, past

Letheringsett Church, with its remarkable round tower, and past the ruins of Glandford Church to Cley-next-the-Sea, a quiet little town, once a port, but now choked up by sand, and, therefore, annexed to Wells, which they reached soon after noon. Here they inspected the fine Decorated parish church, under the guidance of Mr. St. John Hope. The church is said by Mr. Walter Rye to be a "very fine one, and well worth special notice, though partly in ruins"; it certainly has a very fine tower, and contains several interesting brasses. The room over the southern porch, or parvise, still contains the ancient wooden press or locker, of old oak, which was formerly used to contain the copes and other valuables belonging to the parish.

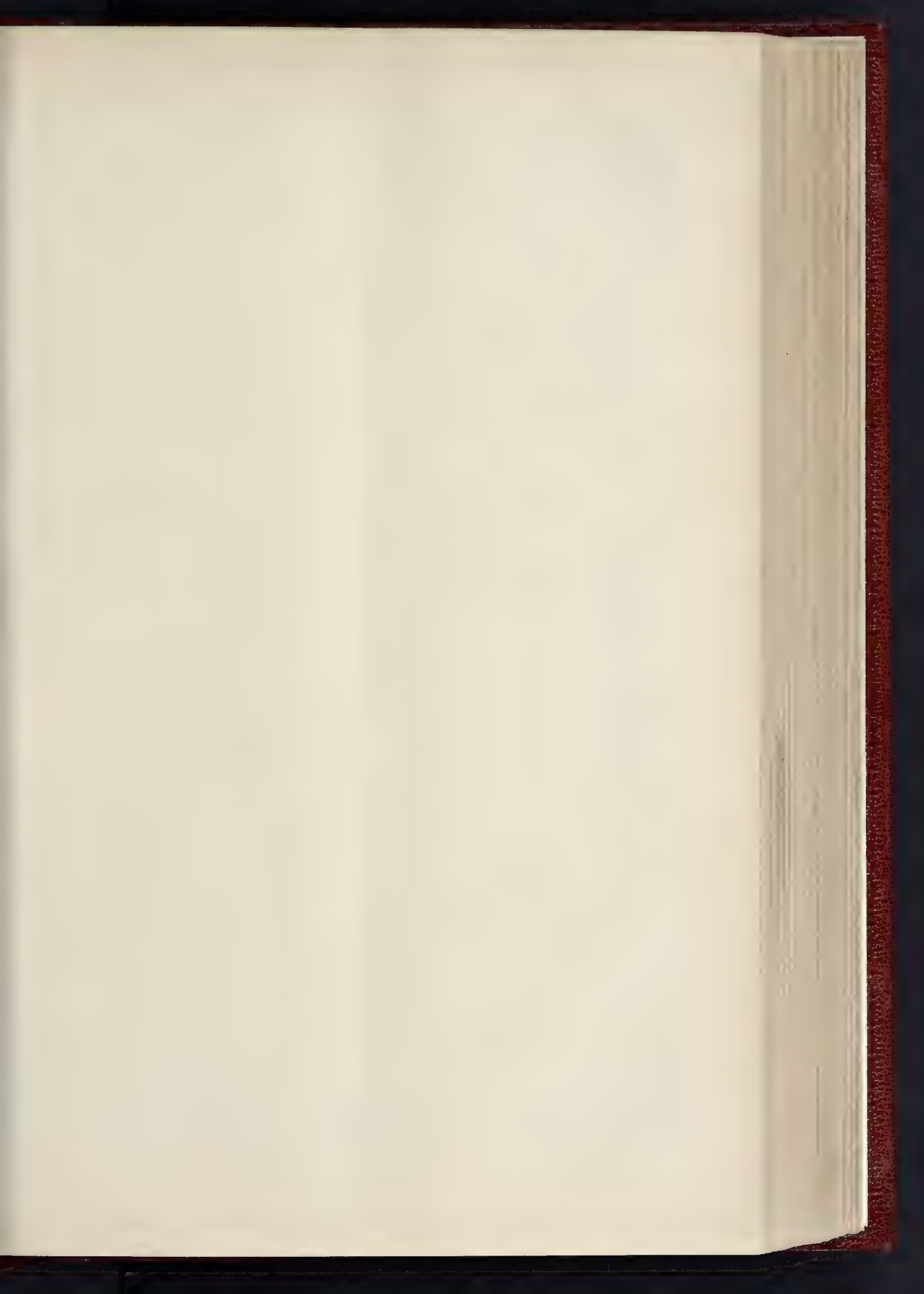
Leaving Cley, the party returned to their carriages, and passing Wiveton on their way without halting, reached Blakeney\* soon after one o'clock, and thence proceeded to Binham Priory, between Wells and Fakenham, which they inspected under the guidance of Mr. St. John Hope. The Priory was of the Benedictine order, and was formerly a cell, subordinate to the great Benedictine Abbey of St. Alban's. Very much of the old Norman work still remains as sound as when the Priory was first founded by Peter de Valognes, one of the nephews of the Conqueror, and his wife, Albreda de la Rye. The nave, which alone stands in a perfect, or, at all events, habitable condition, is used for the parish church. Mr. Rye tells us that, "owing to a dispute as to patronage of this Priory in the reign of King John, about the year 1213, the inmates had to stand a regular siege, and were reduced to drink rain-water and to eat bran bread, which seems to have greatly inconvenienced them; and they were so far successful that the siege was raised by John, who affected great indignation at the event." But the great beauty of Binham Priory, like Crowland Abbey, is to be seen in its west front, which exhibits the most beautiful Early English work, in rows of interlaced arches. This part Mr. St. John Hope attributed to a benefactor of the church about the year 1225. The interior elevation of the church shows three tiers of seven arches on each side; the two lowest are purely Norman, of semicircular shape, but some are of the highest tier are pointed. The font is fine, even for Norfolk. The remains of the Priory are more fully and technically described by Mr. Harrod in his well-known work on "The Churches and Convents of Norfolk," pp. 198 et seq. Mr. St. John Hope led the party round the remains of the other portions of the church and priory, which may still be detected by a practised eye as they lie under the ridges of the grassy turf, to the east and south.

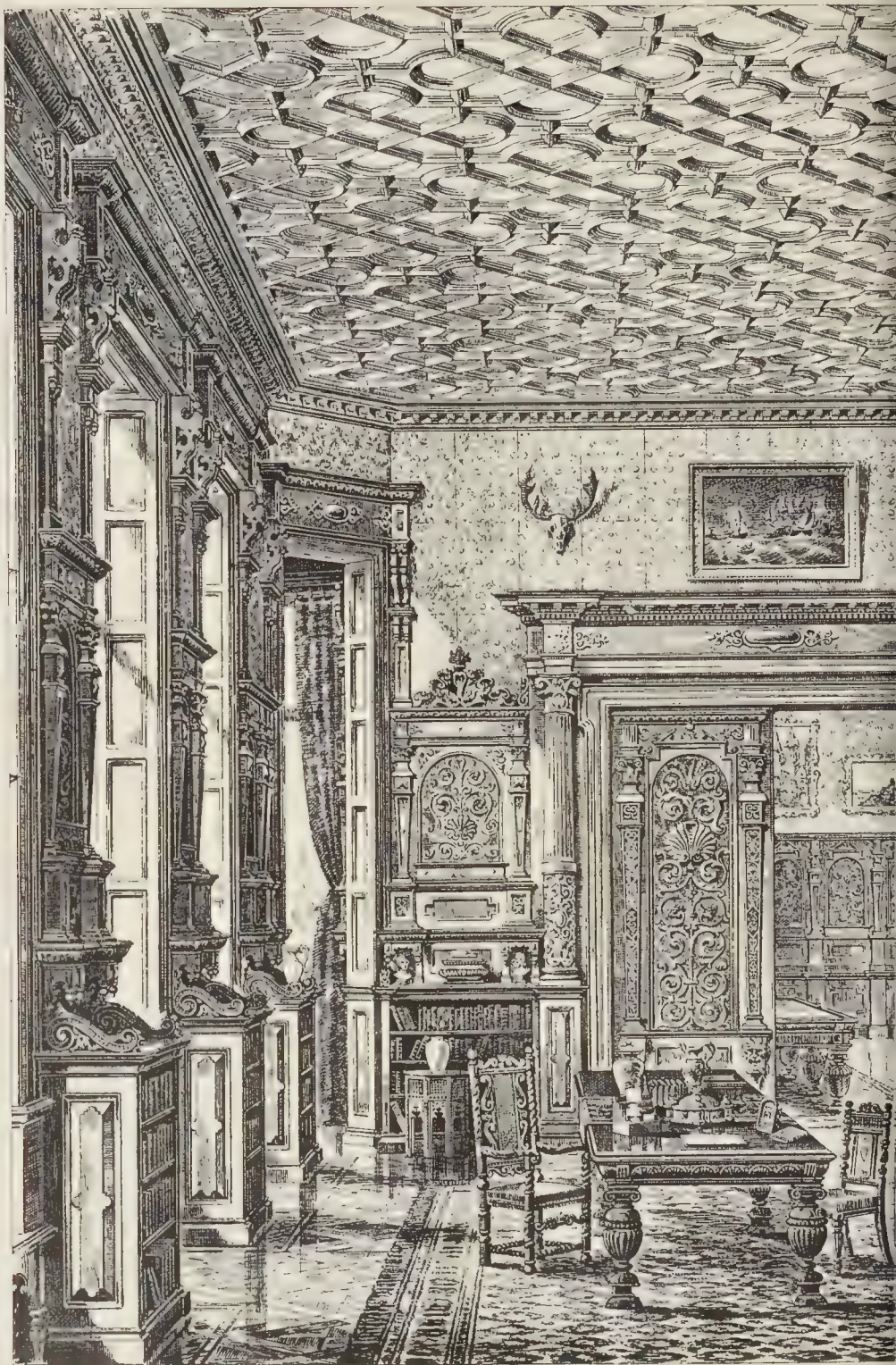
The party left Binham at four o'clock for the station at Melton Constable, returning thence to Norwich.

The papers read at the evening meeting (Mr. J. T. Micklethwaite, F.S.A., Vice-President, in the chair) were two—the printed programme being, *pro hac vice*, altered. The first was by Mr. G. E. Fox, on "The Painted Screens and Roofs of Norfolk;" and the second by Mr. Longden, on "Early Ironwork." The paper of Mr. Fox was beautifully illustrated by water-colour drawings and diagrams hung on the walls; and it showed the Congress that he is a master of many subjects, and knows them all thoroughly. He stated that elaborately-painted screens, though so frequently met with in Norfolk and Suffolk, are almost unknown in the other counties of England; and he attributed their execution and preservation to the existence of a native school of art in East Anglia, which possibly may have been largely influenced by the Flemish painters on the other side of the sea, whose works would naturally be imported into these parts by way of Yarmouth, Lynn, and other ports. As to the screens, he said that their especial feature was that each panel or compartment was occupied by a single figure. These figures were usually, but not universally, twelve, and most frequently represented the twelve Apostles. If the panels of the central gates, as well as the side compartments, were painted, the two extra figures were usually St. Helen and St. Agnes, or two of the chief local saints. If the panels were four in excess of twelve, they were generally filled with figures of the four great doctors of the Church. In any case, the colouring both of the figures and their drapery, and also of the background, was mostly bright and gay, the latter being generally

\* A sketch of the characteristic east end of Blakeney Church, and another of part of the arcade of Cley Church, will be found in the *Builder* for August 10.







SMOKING AND BILLIARD

MESSRS. ROMAINE-W



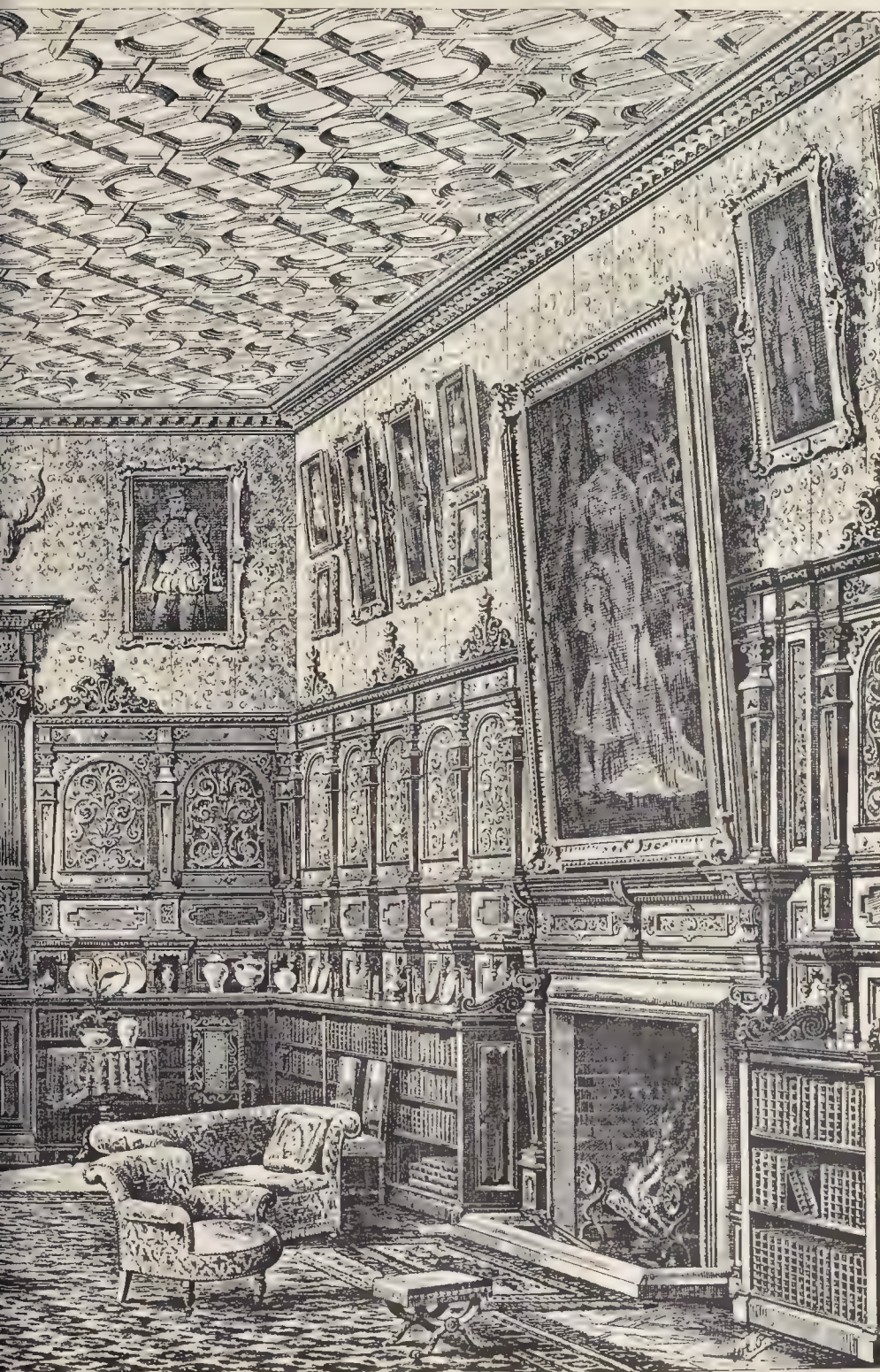
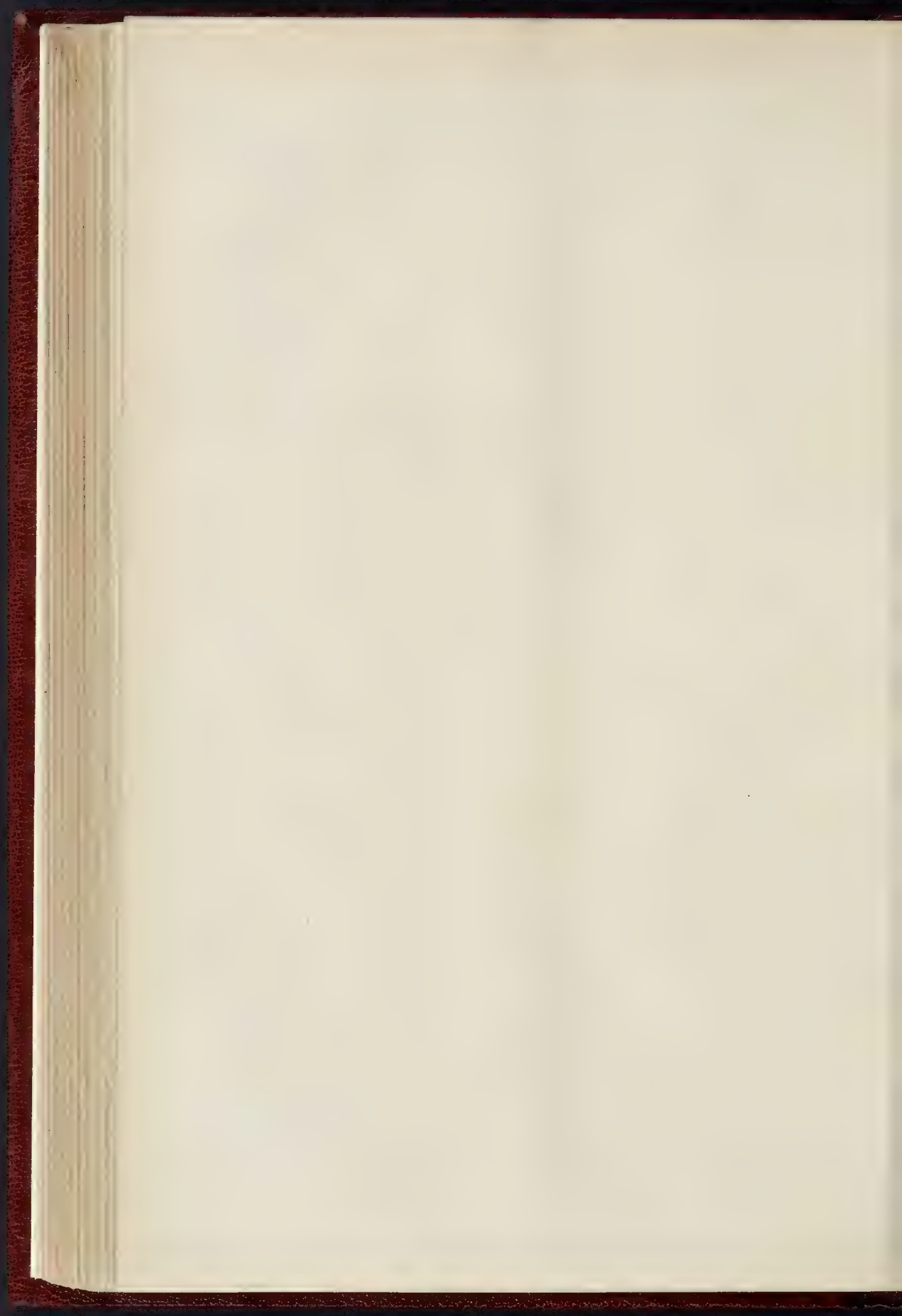


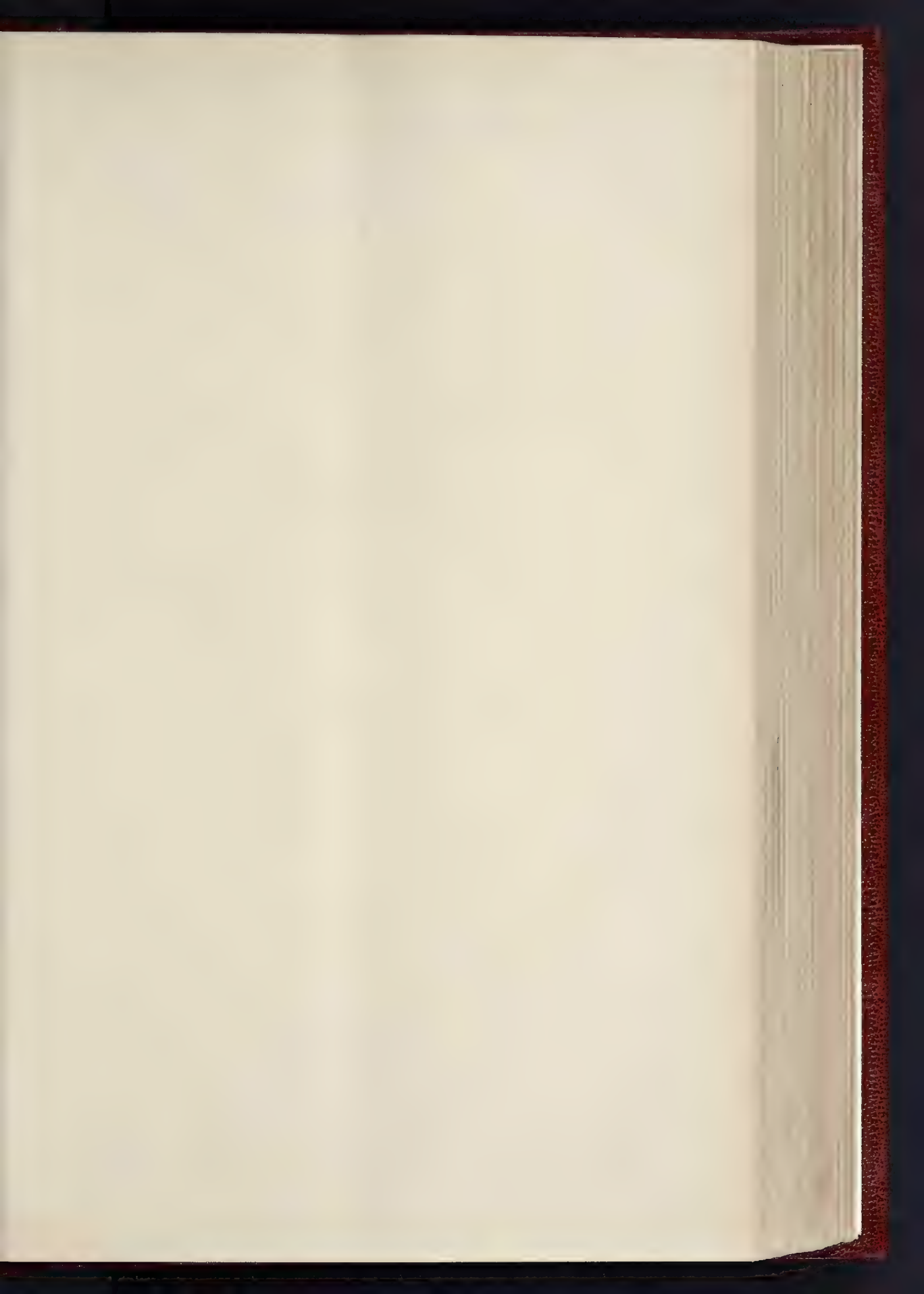
PHOTO BY TWO FRANKS & S. 22 MARTIN LANE AND ADRIAN B. J. J. J. J.

MELFORD MANOR, DORSET.

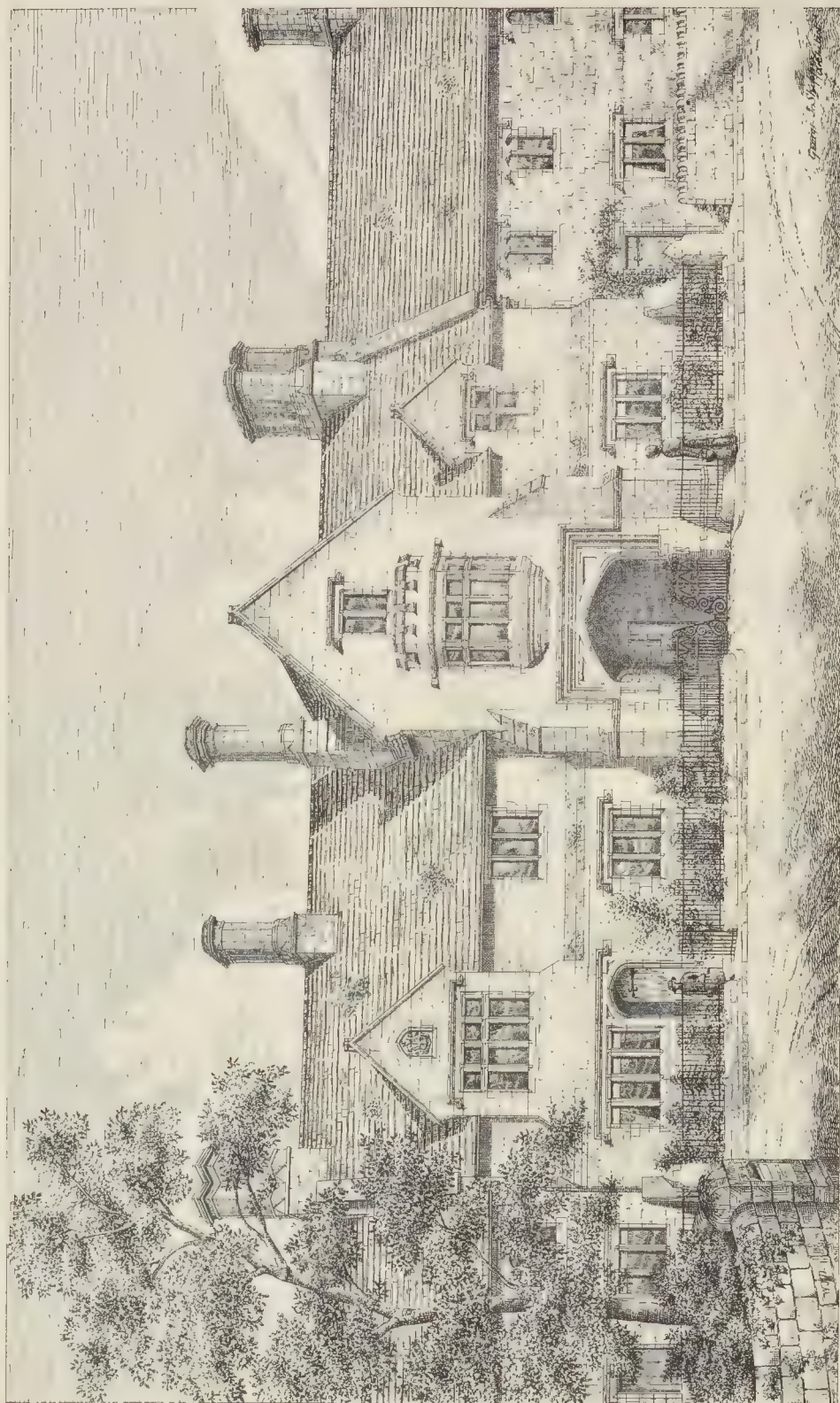
W. H. R. ARCHITECTS.





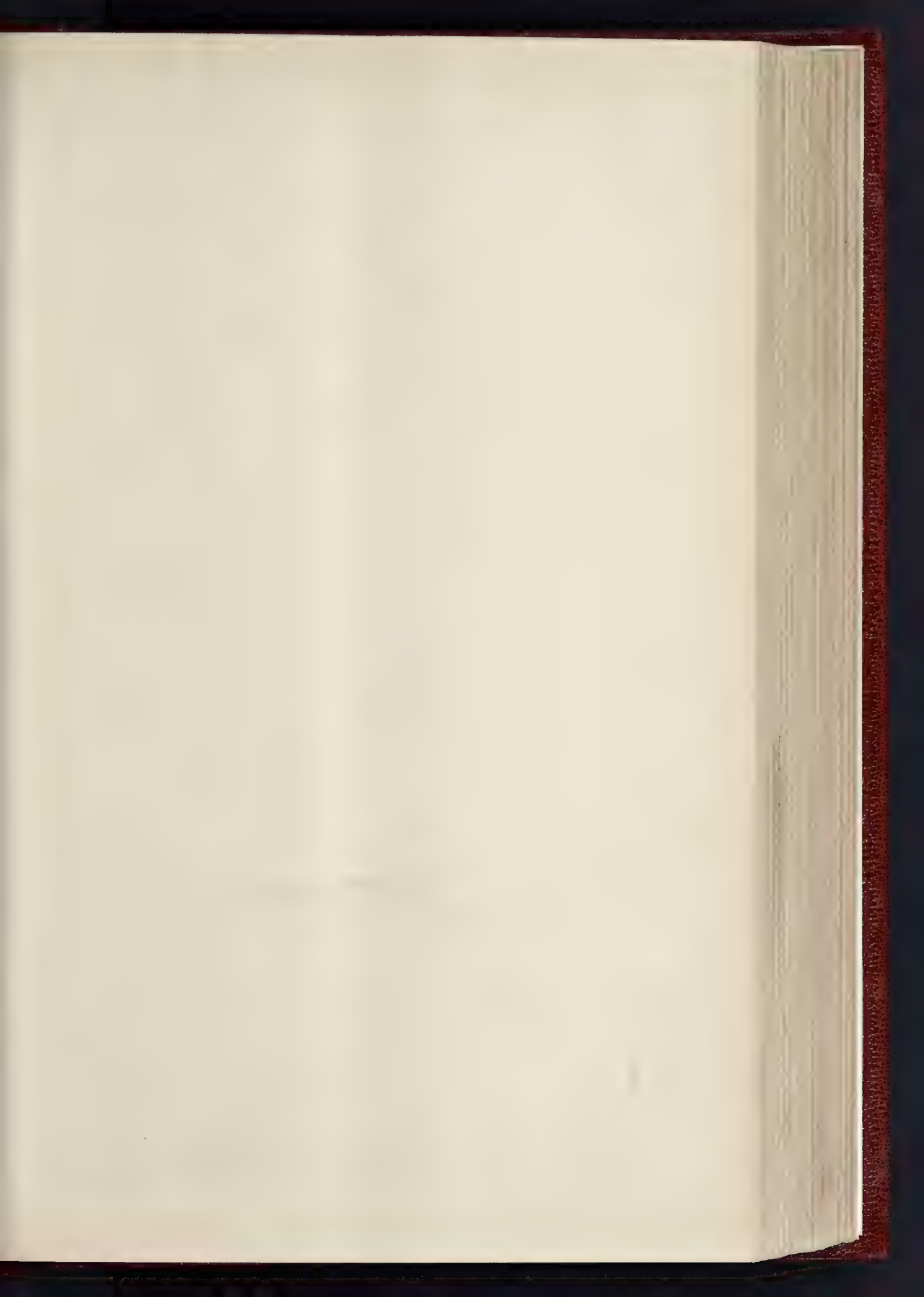


THE BUILDER, AUGUST 24, 1889

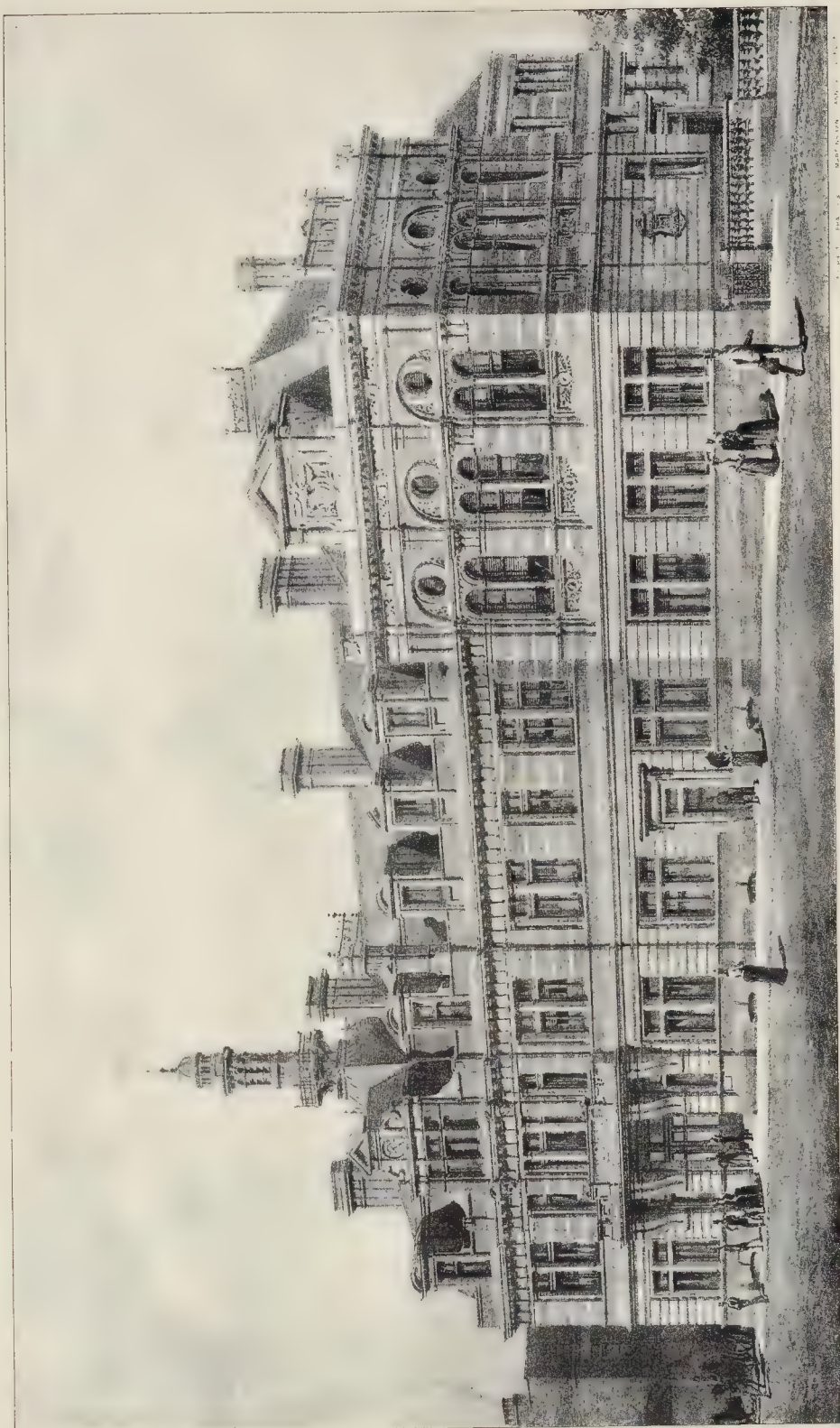


COTTAGES AT DOULTING, SOMERSET.—MR. GEORGE J. SKIPPER, F.R.I.B.A., ARCHITECT





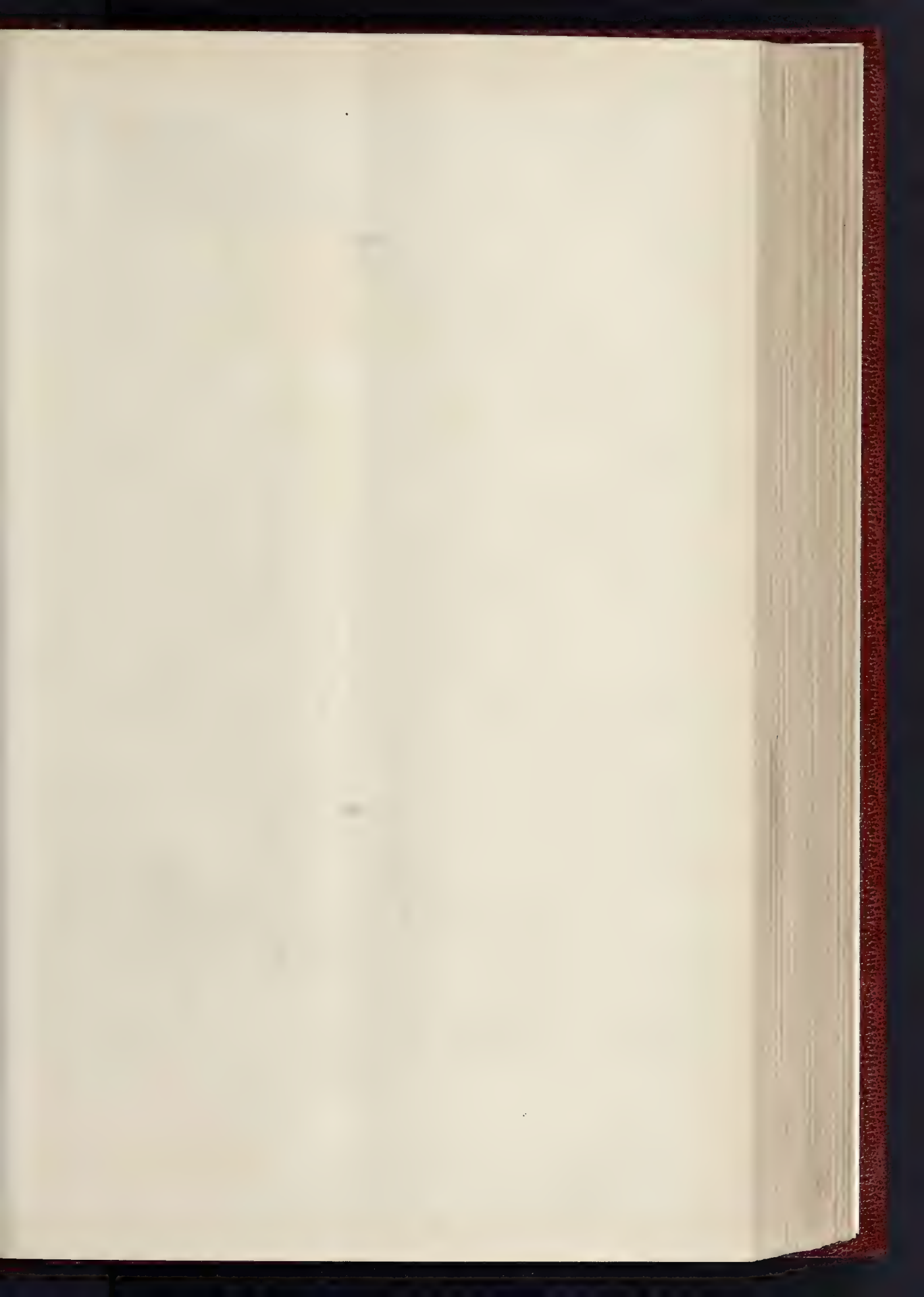
THE BUILDER, AUGUST 24, 1889



RICHMOND MUNICIPAL BUILDINGS COMPETITION.—SECOND PREMATED DESIGN

MR. T. VERITY, F.R.I.B.A., ARCHITECT.







INK PHOTO. UPPLE & CO. 22, MARTIN LANE, LONDON, E.C.

RICHMOND MUNICIPAL BUILDINGS COMPETITION.—FIRST PREMIATED DESIGN.

MESSRS. ELKINGTON & SON, ARCHITECTS.



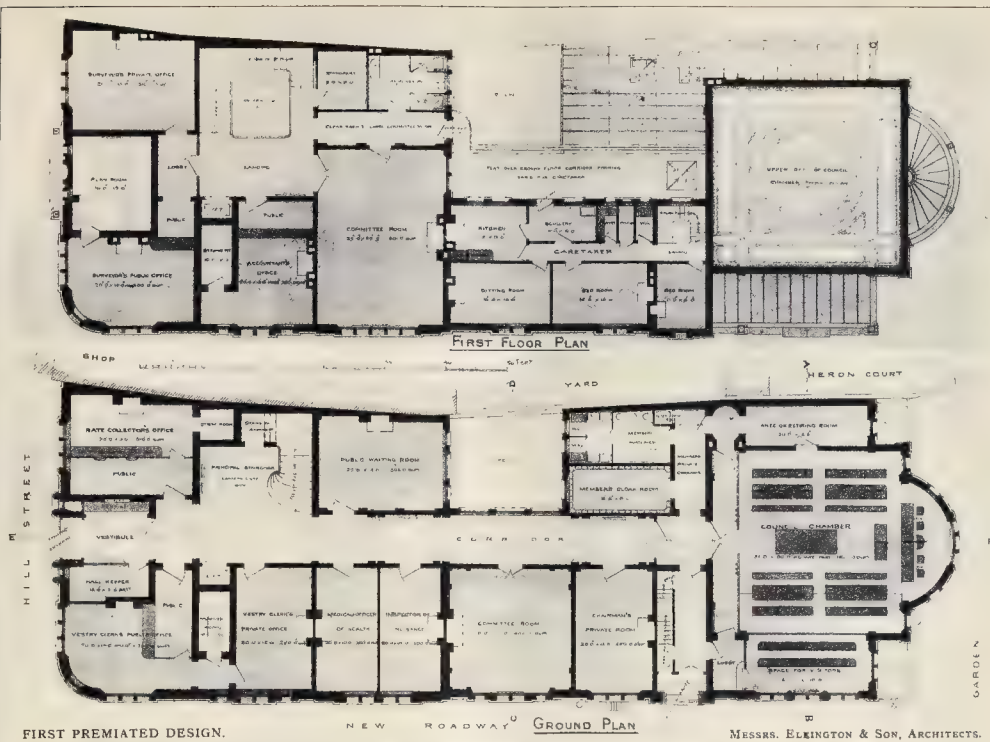


RICHMOND MUNICIPAL BUILDINGS COMPETITION.—FIRST PREMIATED DESIGN.

MESSRS. ELKINGTON & SON, ARCHITECTS.

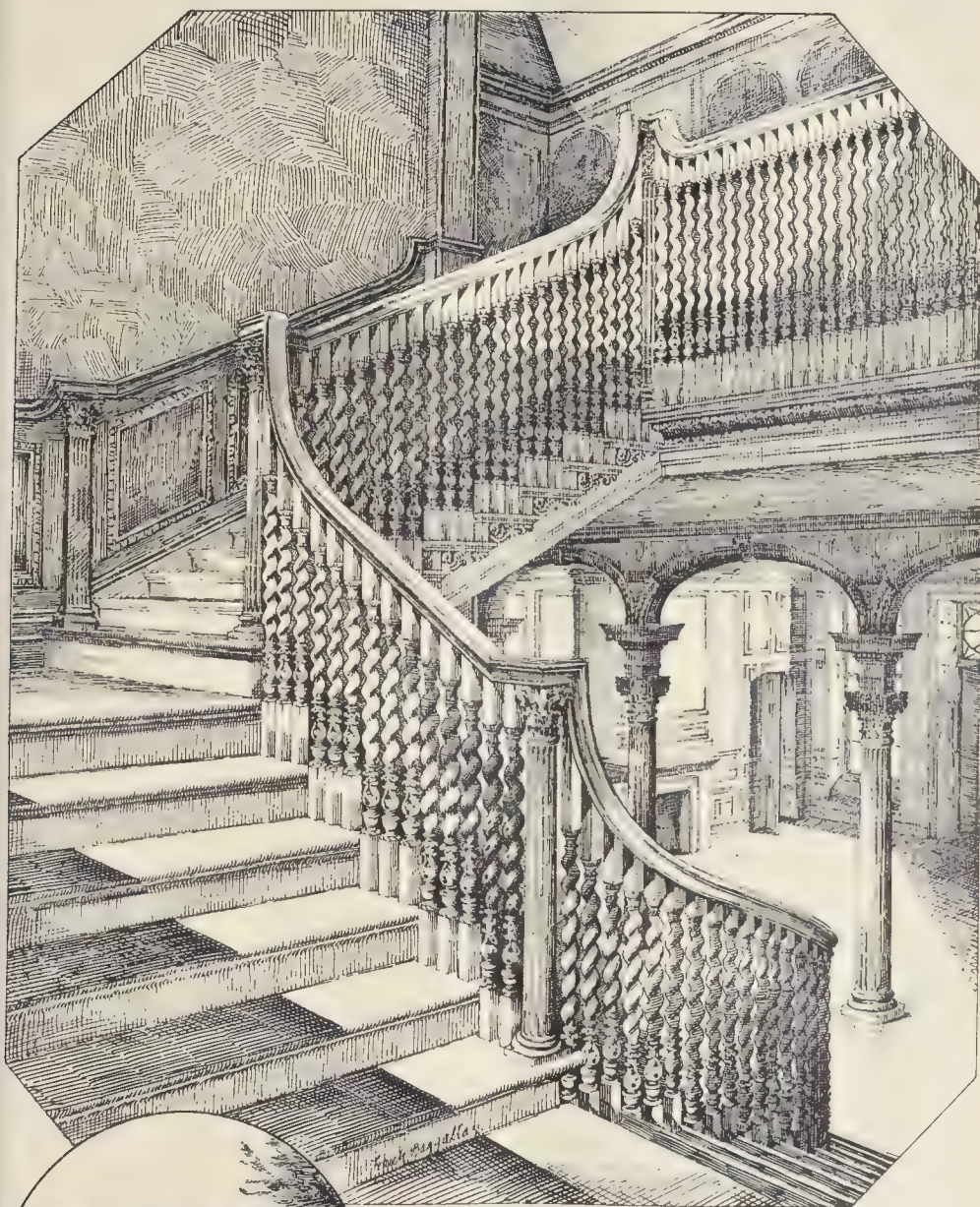












The Old Manor House.  
Wandsworth.  
Staircase & Garden Front.





either blue or green. In one instance (at Aylsham) Moses appears in the company of the saints of the New Testament, and also does John Shorne, of Dunstable, who had the reputation in the pre-Reformation times of being able to beat Satan on his own ground. Mr. Fox gave several detailed descriptions of screens, more or less perfect, at Sall, Corston, and some ten or twelve other places, but he decidedly gave the palm of all to Ranworth, where the decoration of the panels does not consist of the regulation saints, but represents the heavenly hosts, the Cherubim and Seraphim, accompanied, however, by St. Barbara. The screen in another Norfolk church which Mr. Fox mentioned was treated, he said, in a different manner altogether, the figures of three other Christian kings of the medieval times, and our own King, Henry VI., being represented on its panels. As to the roofs, he divided them into three classes:—1st, those in which the plain oak roof was picked out in colours; 2nd, those in which all the surface was coloured, the rafters being picked out in brighter colours than the rest; and, 3rd, those in which the treatment was still more elaborate, the compartments being filled with the sacred monogram, or where the initial of a saint was repeated, usually in a wreath, the rest of each compartment being filled with angels, flowers, the seraphim, &c. The roofs, added Mr. Fox, were executed in tempera, but the screens were painted in oils. The art of decoration was at its best in England from about 1375 to 1500, and Norwich, he thought, was the centre of that school of art. The reading of this paper elicited some few remarks from the Chairman, which were followed by a short discussion and a vote of thanks to its author.

The other paper, on Ancient Iron Metal Work, gave a brief account of the art as it was practised in England, from the thirteenth century downwards. This art showed itself chiefly in those wide-spreading and elaborate hinges on church-doors, of which we see specimens at Durham, at Merton College, Oxford, at the Grammar School in Norwich—the latter closely resembling that on Queen Eleanor's tomb in Westminster Abbey. In the fourteenth century this work grew more elaborate, as the use of the hammer came to be applied to more elaborate designs. Mr. Longden gave some account of the payments received by workers in iron, which showed that they were regarded as craftsmen of a superior kind; and he argued that a school of this art could be easily revived. A member of the Congress having drawn attention to the great difference to be seen in such metal work to the north and to the south of the Tweed, Mr. G. Lambert rose and remarked that the revival of such a school was merely a matter of pounds, shillings, and pence, and that if persons were found who would encourage its growth by generous payments the art would soon flourish again. *Sint Macconates, non decurat, Placeo, Marones*, is a saying as true now as it ever was. The "Norwich gates," shown at the Great Exhibition, and now at Sandringham, showed that Norwich, let alone England, was quite ready to produce metal work equal in execution to that of the thirteenth or fourteenth century. The Chairman remarked that he did not dispute such being the case as to that part of the art which consists in execution, but he doubted whether equally beautiful designs could be devised now, as the feeling which produced them no longer existed. A hearty vote of thanks for his paper was accorded to Mr. Longden, who made a few observations in reply.

On Monday, the 12th, soon after breakfast, in spite of heavy rain, the party were en route by train for Cawston, celebrated for its freestone tower, which apparently was rebuilt on a larger plan than originally in the fourteenth century. But the church, as Mr. J. T. Micklethwaite pointed out, is interesting, not so much for its fabric and for the evidences of its enlargement, as for what it still contains of pre-Reformation furniture and decoration, in which point it is surpassed by no other church in East Norfolk excepting Sall, with which it agrees in general plan. This rich furniture is a proof, he said, of the wealth and prosperity of the middle classes and of the trading community, which seems to have continued in the eastern parts of England in spite of the Wars of the Roses, which played such havoc in the west. As the chancel of this church was burnt down, the existing work, except some early stalls, is rather modern. The transepts are low and small, as is often found in Norfolk. The fifteenth-century screen,

though a wreck of its former beauty, still shows traces of elaborate painting. On the panels of the doors on the one side are the Twelve Apostles, and the Four Doctors of the Church, and on the other side are conventional portraits of saints, among whom figures Sir John Shorne, the monk of Evesham, who conquered, or had the reputation of conquering, the devil. The roof stood under a canopied roof, which was rather a singular arrangement; and the angels which decorate the hammer beams of the roof are not cut out of them, as is usual, but perched upon them. In the church are some also Medieval seats of rather unusual form. They had no backs. One has a kneeling-board, on which a person could support himself in a half-kneeling and half-standing attitude. Attention was also drawn to a curious piscina in the north transept, with a wild man carved on it, in which possibly is a latent allusion to the name of the donor, possibly a Woodman.

Passing on to Sall, Mr. J. T. Micklethwaite explained this church also. It is remarkable not only for its size and lofty proportions, but for the proofs which it still gives as to the habits of three centuries ago. From what remains of the church it is quite possible to make a plan of it as it stood in the pre-Reformation days. The chancel has no aisles, but there are two little transepts, of paddle-box form, which Mr. Micklethwaite said belong to the aisles rather than to the whole church, and which seem to have been put in because altar-space was required. There were once five altars in the church, and before and about these were many very fine flat tombstones, some of which are still *in situ*, whilst others have but set up against the walls. One of these, which Mr. Micklethwaite called a "Corpes-Brass," is curious as representing a corpse in a winding sheet, with a quaint *memento mori* inscription. The nave is lofty, and the roofs, so far as their decoration is concerned, are perfect. The old font bears the Seven Sacraments in high relief, and still has its old tall cover, which is worked by a sort of crane. The old stalls in the chancel, with their carved seats, remain, but the screen has been mutilated, probably in order to enable the zealous reformers to get rid of the roof loft above it. Mr. Micklethwaite considered that at each end of the screen was a wooden tower or turret with steps, by which ascent was gained to the roof loft. In the transepts were side chapels, partitioned off by screens, but these screens have been cut up as materials for pews. The pulpit, which stands in its original position on the south side of the nave, is of about the same date and pattern as that at Cawston. Over each porch is a parvise, that on the south being traditionally known as the "Soldier's Chamber" and that on the north as the "Old Maid's Chamber"; but the meaning of the tradition has been lost. Such little chambers, he believed, continued to be used and inhabited long after the clergy had ceased to occupy them. The chancel roof is beautiful, but Mr. Micklethwaite said that "it really has no business to stand, for it has no ties to support it; it simply stands on account of the firmness of the walls against which it leans." In the bosses of the chancel roof, as is the case in the nave and in the cloisters of Norwich Cathedral, can be read an epitome of the Gospel history. The desk is of the time of James I., and, in accordance with the instructions from Canterbury of that date, it faces eastwards for reading the prayers. The tables of the Ten Commandments and the Lord's Prayer are here, strangely enough, in their proper place, at the east end of the nave, where the people can read them, and not at the east end of the chancel. Mr. A. Hartshorne drew attention to a rare helmet, hanging on the east wall of one of the transepts, which he said is a combed burgonet of about 1540, and formed part of a funeral achievement. Before quitting the church, several members of the Institute called attention to the sad condition of the roofs both here and also at Cawston, which let in the rain, and which, if something is not done to stop decay, will some day perish; and Mr. G. Lambert remarked that there are in the parish chest some loose brasses which ought to be fixed up in the church, or they will some day be "missing." Mr. Micklethwaite observed that in order to save these two roofs, it would perhaps be necessary to appeal beyond the parish to the county of Norfolk, of which they are such great ornaments; but they should be "repaired" in a conservative spirit, not "restored."

From Sall it was no long drive to Heydon; and the party repaired to the parish church, a

Perpendicular building, but containing some good work of the Decorated period. The pulpit, Mr. Micklethwaite observed, is a good example of what is profanely called the "wine-glass" shape; but he hesitated to accept the font as a genuine specimen of Norman work. General Bulwer exhibited two gilt-headed maces which had been carried before the Earls, as Lords of the Manor of Heydon and Cawston, when holding their courts. One of them is headed with a brazen hand or gauntlet, the rebus of John of Gaunt or Gant, Duke of Lancaster. The hand grasps a ploughshare in order to show that the Manor is held in fee socage and not *in capite*. The top of the other mace represents a bearded arrow, by which tenure a part of the town or ville is "held in fee socage of the Lord." The present shafts of the maces were executed in 1637, and bear the arms of Erasmus Earle, Serjeant-at-Law, a personal friend of Oliver Cromwell, who visited him at Heydon, and of whom there are many relics and souvenirs in the ancient hall.

The next place visited by the archaeologists was Blickling Hall,\* where they were welcomed by the owner, the Dowager Marchioness of Lothian, and her sister, the Countess of Pembroke. The party, being inconveniently large, was here divided, and while one portion strolled through the beautiful Old English and Italian gardens, while others inspected the picture-gallery and great library, and admired the compartments of its ceiling, richly adorned with emblems, after the fashion so prevalent in the reigns of Elizabeth and James I.; others, again, looked over the almost unique collection of rare books and manuscripts, including an Anglo-Saxon MS. book of sermons, early copies of Chaucer, and several of the first editions of the ancient Classics. The Rev. Mr. Meyrick, the Rector of Blickling, said that the manor of Blickling belonged, more than eight centuries ago, to Harold, when he was "Earl of East Anglia in the reign of the Confessor, and afterwards passed to the Dagworths, the Erpinghams (after one of whom the great gateway of the Close at Norwich is named), and the Falstoffs, from whom it came to the Boleyns. In the reign of Elizabeth the manor was bought by the founder of the House of Hobart, who rebuilt the hall; and it had remained in the hands of successive Hobarts, Earls of Buckinghamshire, down to the present century, when the estate was carried by the marriage of a Hobart heiress with the Marquis of Lothian.

The church was next visited. It is a very beautiful building, but rather too elaborately "restored" to suit the tastes of genuine archaeologists and ecclesiastical antiquarians. We gave a sketch of the font in the lithograph plate published August 10.

On Tuesday, the 13th, the weather, though dull, was fairly fine, and the party went by train to Wroxham, where carriages were ready to convey them to Barton Turf, Tunstead, North Walsham, Trunch, and Knapton. At Barton Turf Mr. Micklethwaite, in explaining the church, showed what destruction had been wrought by a well-meant attempt to "restore and beautify" the fabric towards the close of the last century. The church is of the fourteenth century, but was much altered in the fifteenth century, as was the case with so many other churches where the parishioners were prosperous and wealthy. The screen, he said, narrowly escaped being painted over, and it is especially worthy of notice. On the north side are figures representing the Seraphim, the Dominions, Virtues, Powers, St. Zita, and St. Apollonia; while on the south are the Cherubim, Principalities, Thrones, Archangels, Angels, and, lastly, St. Barbara; and, doubtless, the Four Doctors of the Church were once on the panels of the doors which are "missing."

The next church visited, that of Tunstead, was explained by the Rev. C. B. Manning, who drew attention to the windows as good specimens of the transition from the Decorated to the Perpendicular style. "The most curious feature," he said, "in the Church is a chamber below a platform at the back of the altar, extending from one end to the other. It is approached on the north side by a flight of six stone steps; and on the south side is an entrance leading down to the chamber under the platform. The chamber is lighted by a grating. Was it a sacristy? or was it a place for depositing the relics of a saint? or was it used to represent the entombment and resurrection of Christ in some kind of 'Mystery' or play?" Mr.

\* A sketch of Blickling Hall was given in one of our illustration pages for August 10.



Micklethwaite's opinion was that this platform was the base of the very elaborate reredos, and that the coloured spaces in front were used for the display of images; if so, the steps would be for convenience in order to reach the reredos for this purpose. Father Hirst and Canon Duckett were of opinion that the platform was used for the exhibition of the consecrated Host, as the Church is a very large one, and that the chamber below may have been used as a "confessio." The north side of the aisle has a singular appearance, from the fact of the walls and pillars being out of the perpendicular.

On the way to North Walsham Mr. J. Mottram, who here acted as guide to the party, pointed out a cross which serves as a memorial of the "Peasants' Revolt" at the time when Wat Tyler put himself at the head of 30,000 of the lower order, who demanded, with arms in their hands, a redress of grievances.

On arriving at North Walsham, the party visited the parish church, which is large and imposing, consisting of a nave and aisles without any special chancel. "This," said Mr. Micklethwaite, "is a different type of church from any they had hitherto seen. It is a very good example of the tendency of the later churches to develop the plan which was like that of the basilica. Architecturally nothing could well be more different from the basilica. But it is curious how similar conditions brought about a similar plan with totally different architectural treatment. The early basilica arose from the necessity of accommodating large congregations who took a more or less intelligent part in the service. Later on, when the language in which the service was used became hardly understood, the arrangements of churches altered, for there was not the same desire to bring everybody within range of the high, or one altar. Later still the people followed the ritual, though they did not understand the words of the service, and there was a desire to come more within the range of the high altar. That led to the gradual throwing, as here, all the church into one. Originally the church consisted of nave with chancel, but the division, except for the screen, the lower part of which remains, was gradually lost. The taking away of what divided it seems to have been done in the fourteenth century. Thus the people were better able to see the altar than when there was an arch with heavy pillars practically cutting off the chancel. A church thus arranged had, he supposed, when fully developed, stalls within the screen. At the east end of each aisle is a chapel walled off from the centre of the church. At the back of the sevilla in the south wall is a broad arch that was used as a squint for people sitting on the far side of the south chapel, that they might see the high altar. It was doubtless the intention of those who built the arcades to put up a clearstory, which would have made it a very lofty church. On the screen, which stands a long way in front of the inner walls forming the chapels, are figures of the apostles, and an unusual one of the Annunciation showing the angel, one of those strange feathered monsters, in a dalmatic. Signs of a transition in doctrine are visible here in a large communion table, enriched with carving, to be seen in what was the South Chapel. It is of very late Perpendicular period, touched with Elizabethan. Upon its rim is the inscription "The body (and blood) of our Lord Jesus Christ, which was given for the preserve thy body and soul unto everlasting life. Amen." The words "and blood" have been superadded. Mr. Micklethwaite expressed an opinion that this table was not originally intended for ecclesiastical use, as there are marks of feet on the ledges below. Possibly someone, thinking it would serve as a communion table, gave it to the church.

North Walsham Church is also noteworthy for a very fine Renaissance monument, in the chancel, to one of the Paston family, of which we will give an illustration next week. It contains also some fine pieces of mediæval wood-carving, some *in situ* (bench-end heads), and some which formed part of a screen, and are preserved in the church. In the *Builder* for Sept. 24, 1887, we gave a sketch of a good Renaissance chair which is part of the furniture of the chapel now used as a vestry. The western half of the tower, which is of flint rubble with no bonding stones, fell about sixty years ago, and it still remains a melancholy ruin.

Trunch Church, which was the next halt of the party, is well known to ecclesiologists from

having been so well described and illustrated by local art. The chief objects of interest here are the beautiful roof, and a very rare and elaborate self-supporting font-cover, which is richly carved in oak, and was formerly ornamented with colour and gilding. It is, in fact, a cover not resting on the font itself in the usual way, but supported by slender wooden pillars outside the font so as to form an hexagonal inclosure, beneath which the baptismal service may be administered. This form of font is extremely rare. The church is also remarkable for its well-known and very fine roof, with spandrels filled with pierced work in geometrical design.

From Trunch the party drove on to Knapton Church, where the nave presents, at all events, one special object of interest, a grand double hammer-beam roof, on every point and angle of which stands an angel, and most of the angels, over a hundred in all, are richly coloured. In a report on the proposed restoration of the nave of this church, Mr. Gilbert Scott remarks:—"This roof is the especial glory of the church, and is a particularly fine example of the double hammer-beam construction, while its interest and its beauty is enhanced by the admirable coloured decoration, of which the greater portion remains intact. But this roof must be seen; it can hardly be described in a manner to give an idea of the effect of the numerous angels looking down from equi-distant receding points upon the floor of the nave. Truly the men who wrought and painted this roof were artists, and at the time they lived the country around, now so thinly populated, must have been pretty thickly inhabited with people who were well to do."

The font, and its elaborate cover, which originally was let down from beams, to which it is still attached, by the adjustment of a balance-weight, was much admired.

From Knapton it was but a short drive to Paston, and none who have read the "Paston Papers" can pass the ancient home of that family without recalling several incidents mentioned in that celebrated correspondence. The present inmates of the Hall, which occupies the site of the former residence of the "Good Judge," as he is called, stood at the gates to see the party drive by.

In their way back to North Walsham the party resolved, as time allowed, to make a hasty inspection of the ivy-clad ruins of the chancel at Bromholm, a special interest attaching to this as a spot the memory of which lives on in the pages of Chaucer; for it will be remembered, by some at least, that in the Reeve's Tale the miller's wife cries for help to "the Holy Cross of Bromholm." The reporter of the *East Anglian Daily Press* writes:—"The lordship of William de Glanville at Bacton was bounded by manors of Earl Warren, whose interest in the Glanvilles may have induced him to found for them this Priory at Bromholm as a cell to Castleacre. 'The Holy Cross' brought the Priory fame and wealth. That relic is said to have been thrown by a Lollard parson in the fire about the end of the fourteenth century. The Priory remains consist of later Norman and early English work. Somewhere in the field now waving with corn growing over the site of the chancel rest the remains of John Paston, whose 'wake' was celebrated with a great feast, and at whose funeral the torches in the church smoked so furiously that the windows had to be opened to let out the fumes." The stay of the party at Bromholm, however, was very short, for the inexorable bugle of their guide sounded to tell them that it was time for the carriages to drive on to North Walsham, in order to return to Norwich.

Wednesday, the 14th, was the concluding day of the Congress, and the last excursion was so planned as to give the party a sight of some of the Norfolk "Broads;" and a steam launch was to have been ready on the arrival of the train at Wroxham to take them to Ranworth and Acle. But, unfortunately, the steamer could not, or did not, arrive to its time, and in consequence the party separated, some resolving to return to Sallhouse and walk on to Ranworth, while others went back to Norwich. But "everything comes to those who wait," and the steamer arrived after an hour's delay, and took the rest, about sixty in number, on a cruise past Wroxham, Hoveton, and Sallhouse Broads. In the course of their voyage, Dr. J. E. Taylor pointed out to the party that these "Broads," as it has been observed by geologists, occur, as a rule, in the concave bends of rivers. If any occur on the convex sides, they are generally filling up, or else are already filled up. It is just possible

that in these filled-up "Broads" may be found remains of crannogs, or lake dwellings, like those discovered some twenty years ago at Trowse, near Norwich, when deep excavations were made for the sewers. That the valley of the Bure is a very ancient one may be seen by its having been cut through by some of the lowest and most recent of the Pliocene and Pleistocene beds. At the bottom of the German Ocean there are hollows well known to dredgers who bring up peat, and across it is a channel through which the Thames continued its course past Suffolk and Norfolk, and possibly effected a junction with the Rhine. Could the bottom of the German Ocean be raised up, it would be seen to be, as an Irishman would say, the Norfolk Broad district in the German Ocean. On landing at Ranworth, the party made their way on foot to the church, which, in spite of its boasting of the finest roof and parolose screen in Norfolk, is in a sad and discreditable state of neglect.

Mr. Micklethwaite, in describing the church, said that here are to be seen what were the arrangements of an ancient but small parish church. "All the old parish churches from the eleventh to the middle of the sixteenth century had at least three altars. But that was sometimes denied, and persons often said that there were no places to be seen in the church for chapel altars. But this church, consisting of nave and chancel, shows clearly the situation of the second and third altars. The high altar with the reredos occupied its usual position; the other two altars were worked up in the screen within a parolose. Arrangements for the old worship are here left, as Mr. Micklethwaite pointed out, that are to be seen nowhere else in England. There is still the roof and the rood screen, with its carved canopy and panels filled with figures of saints. Projecting from it into the nave, several feet from each wall, is work in character with the screen that formed the inner side of the little chapel. Behind the screen are the original stalls. Painted on the walls, just where the screen is placed, are two dedication crosses: originally there were twelve of them in the church." Mr. G. E. Fox, F.S.A., next added a few words, expressing his opinion that the screen is the finest in all Norfolk.

"Nothing," he said, "can exceed the beauty of its details,—the diapers and the dresses of the various figures. The manner in which the screen was painted is shown. The figure of John the Baptist was never finished. The wood was covered with a thin coating of plaster, which was carefully rubbed down and smoothed. Upon that, when properly prepared, the figure, with all its accessories, was drawn with extreme care. Then the various colours were applied. But another question arises; were these figures painted in oil or in tempera,—that is, in colours mixed with size or honey, and not with oil? It is simply impossible to say which has been used in these paintings. The older painters who painted in tempera had a certain peculiarity of touch which they continued when they adopted oil, so that we cannot distinguish whether these paintings are in oil or in tempera." Reverting to the subject which he had touched on in a paper read at one of the evening meetings, and dealing with the question as to the men who painted this Ranworth screen, Mr. Fox said that it is on record that there were 28 painters practising in Norwich at the end of the 14th and the beginning of the 15th century. Their names show that they were Englishmen, not foreigners. They were all men of Norwich or of Norfolk birth, and settled in the city. "There being so many of them rather implies that there must have been some work for them to execute constantly. Throughout Norfolk, where there was an immense number of painted screens, these men were no doubt employed in painting them. How much of their art they derived from their Flemish brethren is a subject requiring a considerable amount of investigation. In this screen there are slight traces of Flemish art,—in a head-dress, a sword, or the form of a shield,—which may have been derived from Flanders, but not enough to justify us in saying that the Flemings came and executed the work."

Mr. Micklethwaite next called attention to a very curious old lectern, which has the peculiarity of having two desks, the one above the other. In all probability it was intended for use in the chancel, as it bears as its inscription the opening words of St. John's Gospel:—"In principio erat verbum." On the other side is a lower desk, and above it vertically a desk with the Doxology, with the music from the ordinary



metrical hymns, so that should the man who was singing forget the words of the Gloria he had them before him.

One member of the Congress, Mr. Gostenhofer, here pointed out the unhappy condition of the roof of the church, through which daylight was visible in several places, and suggested that those who had derived pleasure and instruction from a study of these East Anglian churches, with their painted roofs and screens, should contribute something in aid of its repair,—with the result that a few pounds were collected on the spot.

The party then went on to Acle, some by water and others by land, passing on their way the ruins of St. Benet's, or St. Benedict's, Abbey, one of the oldest of the many monastic buildings of Norfolk, as it was founded 'by Canute some years before the Conquest; one which incurred the anger and wrath of the Conqueror, and was besieged by him fruitlessly, and in whose cemetery many nobles and knights were laid to rest. It was a Benedictine house, subject to the great Benedictine Abbey of St. Albans. Want of time and the wetness of the day, however, conspired to debar the members of the Congress from a careful inspection of the ruins of this interesting place; and, in a heavy rain, a few of them only went on to Acle. Here, again, the rain prevented all but the most adventurous from seeing the church, though its tower is noteworthy, as being round in the lower portion, while it is octagonal in its upper stages. In the tower is a small edicule, or shrine for an image, but the image is gone. The porch and the tower both contain some curious stone-work. In the middle of a field opposite the church are to be seen two small, crumbling walls and a few swelling mounds, which are all the surviving traces of the once-proud Priory of Austin Canons, founded here six centuries ago by that bold baron, Roger Bigod, whom we have mentioned in our accounts of Castle Acre and Norwich Castle.

Returning by train in good time, the members re-assembled at Norwich, and informally broke up the Congress. It would not be right to conclude our account of the Congress without adding that both in numbers and in objects of interest it was a great success, and that this success was largely due to the efforts of the local secretaries, the Rev. W. Hudson and Mr. J. Mottram, and to the Mayors of Norwich and Great Yarmouth. During the Congress the Norfolk and Norwich Club opened their doors freely to the members; and the "Art Circle" of Norwich threw open to them, without charge, its fine and extensive loan collection of plans, water-colour drawings, and engravings of the old city, including specimens of Crome, Cotman, Stannard, Marshall, Thurlte, and Miss Nichols, mostly representing the Cathedral, the Close, the old gates, the churches, bridges, courts, and alleys of the chief city of Norfolk, which even now is one of the most picturesque cities in the entire kingdom.

**Materials Wanted in Servia.**—The British Vice-Consul at Nisch, in a recent report upon the trade of Servia, observes:—"Portland cement is in great demand, and merchants are anxious to trade in the genuine article instead of the spurious ones of Austrian and German make. The Perlmossa Cement Company, whose factory is close to Kufstein, in the Tyrol, have an agent at Belgrade, and have virtually secured a monopoly of the trade. The Hydraulic Lime and Cement Factory, a Servian firm at Ripangé, near Belgrade, produces an inferior article, which sells for ordinary purposes. The quality of the window-glass, which is chiefly imported from Austria-Hungary and Belgium, is very inferior, and an attempt has been made by Belgrade merchants to introduce this article from England, with such satisfactory results that several additional wagon-loads have been ordered. Among other articles affording opportunities for British competition may be mentioned building tools and paints; but Servia is not yet ready to purchase the highest priced and best-finished goods: cheapness and durability are the principal requisites."

**Norwegian Paris Technical Grants.**—The Norwegian Government has awarded grants of about 25*l*. to thirteen gentlemen, who either are visiting or have visited the Paris Exhibition, in order to report upon various technical subjects; also a sum of money to Herr Ad. Schirmer, the Norwegian representative of architecture at the late congress.

# "COMPOSITION OF ANCIENT MORTAR."

SIR,—On my way back from Australia last April I received in Ceylon an interesting specimen of ancient mortar, over six centuries old, and as the analysis of the same may be of interest to many of your readers, I enclose copy of the results. As printed out in my paper published in the *Builder* of August 18, 1888, the best mortar always contains a considerable proportion of the lime in a state of silicate; in other words, as it exists in good Portland cement, and you will notice that this specimen contained 7·10 of silica present as silicate of lime, which made the mortar very hard and difficult to break.

JOHN HUGHES.  
Analytical Laboratory,  
79, Mark-lane, London, E.C.  
July 8, 1889.

## Analysis.

Sample of concrete six centuries old. Marked from anicut of Giant's Tank, Ceylon. Received from Mr. A. M. Ferguson, Colombo, Ceylon.	
Water (lost, at 212 deg. Fahr.)	1·18
Combined water and loss on ignition	2·66
Oxide of iron	2·20
Alumina	2·65
Lime	16·24
Magnesia	·36
Potash	·30
Soda	·17
Sulphuric acid	·53
Phosphoric acid	traces
Carbonic acid	11·11
Chlorine	traces
Silica (present as silicate of lime)	7·10
Insoluble, siliceous matters	55·45
	100·00

JOHN HUGHES, F.I.C.

## CONCRETE FLOORS.

SIR,—I am glad to observe, by the correspondence in your recent number, that interest in this subject is being awakened.

I have not yet read Mr. Hyatt's book; but shall do so at an early opportunity. With reference to his remarks on horizontal cleavage, I may say that in my earlier practice I endeavoured to act on the "single-dump" principle, having read that it was the correct thing; but I found I could not get the work done that way; as it really is not practicable to make a good finish in one heat. A contractor whose cement concrete work bears an exceptionally high reputation, and who has laid many miles of street pavement and railway platforms, and who invariably forms his pavement in two layers, assures me that when, through the upward bending (due to the earth's contraction and expansion), cracks occur, as they sometimes, but rarely do, these cracks are invariably clean, square-edged fractures, exhibiting no shelliness, nor the slightest indication of horizontal cleavage between the layers. My own very extended observation of pavement cracks confirms this testimony; and I have seen no instance supporting the theory that bending stress causes horizontal cleavage.

Doubtless, as Mr. Mark Fawcett says, terra-cotta is a more fireproof material than cement-concrete. But the expensiveness of the method of construction proposed by Mr. Fawcett renders it inapplicable to ordinary dwelling-houses and cottages.

Moreover, when terra-cotta flooring is employed, there is no need for any cement-concrete at all. The admirable terra-cotta flooring of Messrs. Doulton is specially designed to protect girders, and to afford a key for plaster ceiling. It combines great lightness and strength with fireproofness. But though Messrs. Doulton have reduced the cost to a very reasonable figure, this kind of fireproof-flooring cannot be produced so cheaply as ordinary timber floors, while cement-concrete slabs can.

Dwellings erected with cement-concrete slab floors, if a fire occurs, cannot well be subject to a heat sufficiently fierce and prolonged to destroy the virtue of the concrete. If the building were stocked with oil-casks and tar-barrels, the case might be different.

There is no material absolutely fireproof, and, as practical men, architects ought not to discard the security to life from fire which concrete slabs undoubtedly afford, and persist in building wooden roofs and floors, because some absolutely fireproof material, cheap enough for common use, is not yet discovered. For even if

\* Equal to carbonate of lime.

the basement of a man's house were stocked with tar-barrels, and the man were aroused at midnight by the cry of "Fire!" he would feel devoutly thankful if the floors of his house were of cement-concrete slabs instead of timber.

Two fires occurred in a large warehouse, with floors of concrete slabs, which I designed. One of these fires raged for a considerable time, but succeeded only in destroying some wood partitioning. The other fire destroyed thousands of pounds of tea, but only the wood shelving suffered. Either of these fires would, probably, have caused the destruction of the entire property had the floors not been fireproof. As it was, the structural damage of both fires did not reach 50*l*. Those floors are still bearing huge loads; they have not suffered in the least from the fire. This may be taken as a fair instance of the value of concrete slabs.

Mr. Fawcett speaks of some floors of concrete which collapsed without giving a moment's warning. It would be interesting if date and place were specified. Doubtless such things have happened, with concrete walls as well as floors. So also have spires collapsed. Chichester Cathedral steeple, to wit. Still we go on building spires. A few years ago a whole row of houses and shops (built of brick, iron, and timber), in Seven Sisters-road, Holloway, fell down. Still we go on building rows of houses and shops of brick, iron, and timber. Cement-concrete slabs cannot collapse if properly constructed of good material, any more than steeples and houses can fall if well built.

The reply to "Architect's" query is, Yes, certainly; equally distributed.

FRANK CAWS.

SIR,—Mr. Frank Caws's contribution to our present knowledge of concrete construction contains much information which should be of service in extending the use of concrete as a sanitary and fire-resisting material, but his remark that it would be well if others would publish their experience of concrete has as yet not been responded to, except in a brief communication from Mr. Hyatt. This is undoubtedly the result of concrete floor construction being to a great extent in the hands of specialists and patentees, whose interests do not lie in the direction of imparting to the public knowledge gained by themselves at considerable cost and time, without any equivalent but the consciousness that they have helped in bringing about a better acquaintance with one great element of healthfulness and personal safety. Architects are disposed to entrust the construction of concrete floors to well-known and experienced firms who make that subject a specialty, because they can thereby depend upon a proper knowledge being brought to bear upon the execution of their work, and which is not, as yet, common to builders and contractors. When the time arrives for wood floors in populous centres to be as rigidly prohibited as wood walls are now, and the fact is recognised that the two are but one step removed from each other in point of danger, concrete floor construction will become an essential of a builder's business.

Mr. Caws' remarks upon the necessity of using stale cement are of the greatest importance; but instead of relying upon manufacturers to store it ready for use, it is far safer for the user to store it himself on a wood floor, and well protected from damp in any form. The remarks as to the too quick removal of the centre supporting concrete floors cannot be too well impressed on every one concerned. The falls of concrete floors at Portsmouth, Faversham, and Cambridge some years ago, were all traceable to the too early removal of the centres; a mass of concrete which, on the surface, may appear thoroughly consolidated and capable of sustaining any ordinary superincumbent weight, will, if cut into, often be found gradually looser and softer until the centre is reached, when probably it may be removed by hand; the better, too, the work has been performed, the longer it takes to harden, because the more effectually has the air been excluded. Concrete taken from the inside of a wall 4 ft. thick, after having been deposited in place nearly a fortnight, could be readily crumbled apart; specimens which were exposed to hammer a month later. Mr. Caws' calculation that one of cement to four of aggregate will form a concrete two-fifths of the strength of neat cement is a conditional one, for very much depends upon the nature of the aggregate, the proportions, size, the way in which the concrete has been mixed and applied, and generally, indeed, upon the common sense employed in its application.

I do not think the practice of depositing the concrete for floors in three thicknesses will meet with general approval. My own experience is that the quicker any concrete mass can be deposited in place, and the nearer the whole approaches to monolithic construction, the stronger it is; the



intervention of a slab of concrete between two others—one in compression, the other in tension, and with little connexion or bond between them, requires, I suggest, some corroborative testimony as to its advantages.

With regard to a portion of the cement being carried through and away by the water used in mixing the concrete, I have always found that if only a moderate quantity of water is employed, no cement passes through the concrete; but the water not required for hydration may be caught in a vessel, and will be found perfectly colourless, and if the floor slab is cut through a section of the same will show the cement to be equally distributed throughout.

If the floor support is made water-tight, the result of gentle impingement of the concrete to produce homogeneity is to bring the superfluous water to the surface, which, after a short time, disappears, and assumedly is distributed throughout the mass, so that the streams of motion mentioned by Mr. Caws are increased by making the centreing or staging water-tight, as the water rises to the surface and eventually sinks again, occupying much more time than if allowed to pass through spaces left between the centreing-boards for the purpose. Mr. Caws speaks of the expansion of concrete as an ascertained result, but with stale cement I have never found this expansion. A concrete floor, 100 ft. in length, resting on iron girders, with one division-wall only upon it, and commenced and finished within a week, therefore practically free to expand or contract, and made ten years ago, has during that time not changed in form sufficiently to disturb one mortar-joint of the bricks walls supporting it. Had expansion happened the end-walls must have given evidence thereof; but, although examined at various times, they were always found to be perpendicular.

The only change of form I have observed is that of slight contraction, the result being the skin cracks alluded to by Mr. Caws, but change of temperature undoubtedly exercises considerable influence on concrete, extreme cold causing it to shrink perceptibly, as evidenced by the fissures to be found in concrete pavings in winter, but which close in summer. This points to the advisability of doing concrete paving in cold weather. Indeed, the result is so apparent that I always postpone the execution of monolithic pavements until winter if practicable, keeping them sheltered for a time with straw, old sacks, &c. Floors of concrete being protected by walls and roofs, are not so subject to change of temperature, and therefore less liable to change of form.

Mr. Caws remarks upon the great difference, in a weight-carrying sense, of a concrete floor slab supported on four sides, and if as a beam, on its ends only, and the additional strength gained if the four edges are fastened, pinned, or weighted down. This is so important a feature that I invariably construct the floor when the walls are the height to receive it, and build the continuation of the walls on the floor, the latter is thus a slab binding the walls of the building together, and becomes of the nature of a cantilever, so much so indeed that I have ascertained that one 10 ft. between supports may be cut assunder midway, and uphold itself and a good load as well, and probably much greater spans could be treated in a similar way.

The use of concrete with as small an amount of iron as possible, as suggested by Mr. Caws, is in a general way, I believe, a correct and economical method of construction, and with the cheapening of cement, and its great increase of strength, we only want reliable data to enable concrete floors to compete with wood in the way of cost. In blocks of farm buildings I have found it practicable to do this for years past; this being so, there seems no reason why it is not equally as practicable to adopt it for dwelling-houses in towns; only one factor intervenes—prejudice.

Alfredford.

THOMAS POTTER.

**The Sanitation of Stockholm.**—The report of the Board of Health of Stockholm for 1888, just issued, contains an interesting account of the analysis effected last year by Dr. Claes Söndén upon the state of the water in the Lake Mälär, by Stockholm, whence the water-supply of the city is obtained, and the end connected with the sea into which the sewage is discharged. The report goes to show that the sewage in no way affects the purity of the drinking-water, the two spots of inflow and outflow being miles apart. The water carried out to sea with the sewage is shown to contain only 2.3 to 3 milligrammes of solid matter per litre, which if water-closets were adopted in the city would, it is estimated, increase to 4 milligrammes. In Stockholm earth-closets are almost entirely used.

**The Crematoriums of Europe.**—There are now thirty-nine crematoriums at work in Europe, of which no fewer than twenty-three are situated in Italy, where, to the end of last year, 1,177 bodies had been cremated, as against 1,269 in the rest of Europe.

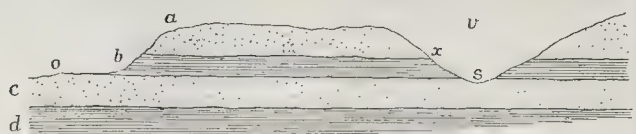


Fig. 1.

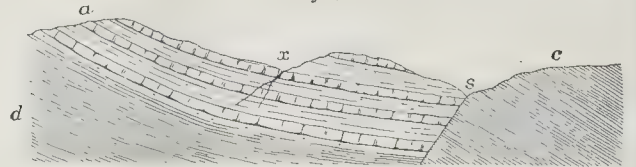


Fig. 2.

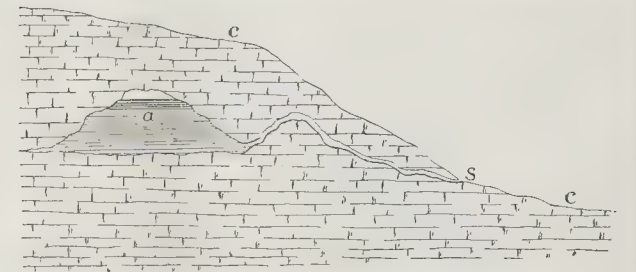


Fig. 3.

## The Student's Column.

### WATER-SUPPLY.—VIII. SPRINGS.

**S**PRINGS are bodies of water issuing to the surface from an underground source. They may be caused either by hydrostatic pressure or by continuous descent, from the level on which it fell as rain and percolated, to the point of outflow. We give the annexed diagrams to explain a few features of the phenomena accompanying them.

In fig. 1 the sandy bed, *a*, rests on an impermeable clay *b*, and the water percolating through *a* soaks to the surface of *b* and then flows down it to the point *x* where it issues as springs, perhaps here and there along the line of junction. The bed, *c*, also sandy and resting on the clay, *d*, is water laden derived from its outcrop *e*. It is cut into by the valley, *v*, which taps the supply forming springs at *s*.

In fig. 2, the water-bearing bed, *a*, resting on an impervious clay, *d*, throws out a spring at *x* through a joint, and the whole formation is faulted against a clay, *c*, causing another spring at *s*.

In many instances we know that springs do not give out the same quantity of water all the year round. Various reasons may be assigned to account for this, but, generally speaking, it may be affirmed that it is either directly or indirectly due to the variability of rainfall. This being the case, we should expect all such springs to approximately indicate rainfall periods, by the increase in their volume, and so they do, excepting, perhaps, some intermittent ones, which behave rather eccentrically. Many of these latter are observed to run periodically and occur mostly in limestone districts. The river Mole, in Surrey, is a good example of this kind of spring. It appears abruptly at intervals which are nearly regular, runs powerfully for some time, and then suddenly stops. It is conceded that all this is due to rainfall, but the fact remains that a great deal of rain may be received by the chalk on the North Downs—its source—before this spring begins to run, and the question is, Why does it not begin to run immediately after the chalk has imbibed a portion of this rainfall? Other springs do; and, why does this one wait so long before commencing to yield? The mystery may be explained by fig. 3, in which *c* represents chalk; *a*,

a cavern in the chalk having an upward curved passage subsequently leading down to the opening *s*.

The chalk absorbing the rain, gradually fills the cavern with water, and so long as the water-level is not higher than the top of the curved channel the water cannot escape, but immediately it is higher the channel acts as a siphon, and, having once commenced, the water continues to run until the whole reservoir, *a*, is emptied.

Rivers sometimes run in valleys which were formed in part by faults, and inasmuch as these dislocations of the strata frequently throw out springs (see fig. 2), it is not difficult to understand why such rivers are augmented in volume at various points along their course without the assistance of tributaries. Springs do exist in the beds of rivers, however, without the presence of faults; it may happen that any of the kind of springs alluded to in figs. 1, 2, and 3, may issue by accident at certain points in the river-bed, or, indeed, they may have had a prominent share in creating the river. The Thames is considerably increased in volume in this way.

The flow of springs and the output of wells are occasionally augmented by earthquake action. This fact was exemplified by the East Anglian earthquake of April 22, 1884, when the water-levels in two wells at the Colchester Waterworks, and many others in the vicinity, rose far above their normal heights—a fortunate circumstance, as an increased supply at that time was urgently needed. In the majority of instances we find that when the level is raised from this cause it is not permanent. It is true that for a few weeks, or months, the supply may be largely increased, but after rising to an abnormal height it is almost certain to fall very considerably before becoming anything like permanent again. The cause of this is that earthquakes widen fissures and joints in the rock, whilst they also create new cracks, which admit of the underground water circulating more freely. After a time these cracks may partially, or wholly, close to their original size, when normal conditions again prevail. In the event of the fissures becoming permanently enlarged, the permanent increase in supply, either of springs or wells, would, naturally, largely depend on the amount of water supplied by rain or otherwise to the rocks in question.

Even where the supply is permanently aug-



mented, it may not be an unmixed blessing, especially in volcanic districts, by reason of the introduction of some obnoxious mineral matter rendering the water undrinkable. It may, however, henceforth become useful for medicinal purposes; but we do not propose to deal with mineral springs.

# PROVINCIAL NEWS.

**North Shields.**—The other day, Earl Percy opened the Tynemouth Jubilee Infirmary, North Shields. According to the *Newcastle Chronicle*, the original design for the building contemplated a central or administrative block with east and west wings (for females and males respectively), but the present arrangement for accommodation of patients did not appear to warrant the carrying out of more than the west wing, the northern half of which has been allocated to females, and the southern half to males. In like manner the tower, which was intended to form the central feature of the administrative block, has been for the present omitted. On the east side of the entrance is a board-room, 16 ft. by 14 ft., and on the west the matron's sitting-room. At the opposite side of the corridor to the matron's room is the bath-room, 12 ft. 6 in. by 9 ft., and a large linen store closet. Beyond the side of the stairs northwards is the double door of the surgeons' department. This opens into the operating-room, 6 ft. by 14 ft., lighted from the top as well as the sides. This room, in addition to an ordinary fireplace, has a separate coil of pipes, so that it is always sufficiently warmed in case of accidents being brought in; also a drug store communicating with it, containing a closet for medicines and instruments, and the necessary supply of hot and cold water. At the north-east part of the centre block is placed the kitchen, 16 ft. by 15 ft., fitted with a Thermocline cooking range. In connexion with this is a scullery, 12 ft. by 11 ft., with separate range, &c., and on the east side of the kitchen is the pantry and larder, the latter being fitted with slate shelves. The wash-house adjoins the scullery. The east and west corridor has a total length of 108 ft., with windows at the ends and also at the sides, where it is a connecting link between the administrative block and the wards, which are 8 ft. apart. In it are two sets of folding doors, and the whole length is heated by hot-pipes. The corridor is branched off north and south about 25 ft. from the west end forming the entrance to the female and male wards respectively, and at this intersection four rooms are placed, two being for the use of the nurses, the one as a duty-room with small range and gas-eating apparatus for night service, with a window looking into male ward, and provided with hot and cold water, and the other nurses' room with a similar window commanding a view of the female ward. The remaining two rooms are intended for isolation wards in case of infectious complaints rendering it desirable to remove patients from contact with others in the main wards, or for the treatment of children. These wards are each 12 ft. by 11 ft. The male ward is 32 ft. by 24 ft., 13 ft. high, and contains eight beds, giving 96 superficial feet to each bed, or 1,248 cubic feet per bed. At the south end of this ward is an open fire with ventilating grate, for the purpose of distributing heated fresh air in winter and cold in summer. Behind the fire is a very large bay window, fitted all round with seats. Access to this is obtained from the ward by a door on each side of the fireplace, and the hot pipes placed all round the side walls of the ward are continued round the bay. The female ward contains six beds, and is 26 ft. by 24 ft., with separate conveniences placed externally to the ward at the north end. In all other points the wards are similarly arranged. Windows are placed between each bed. The lower part has bubble-hung sashes with a hinged upper part falling into an iron hopper frame. The bricks used are 2½ in. thick, of a red colour, red brick chases to all openings, and the foundation walls are to ground level are of cement concrete. The roofs are covered with green Cumberland slates. Particular attention appears to have been paid to the sanitary requirements. The contractors for the whole of the works are Messrs. J. & W. Thompson, of North Shields and Blyth; the sub-contractors being Messrs. Beck, of Newcastle, for slating; Messrs. Grieve & Gillispie, of North Shields, for the plumbing and gas-fitting; and Mr. J. G. Laidler, of Newcastle, for painters

and glaziers' work. The architect is Mr. F. R. N. Haswell, F.R.I.B.A., of North Shields, and under his superintendence the whole of the work has been carried out.

**Northampton.**—On the 1st inst., amid considerable enthusiasm, the Mayor of Northampton, Mr. James Barry, J.P., formally laid the commemorative-stone of the extensions of the Guildhall. The present municipal buildings were built in 1864, from the designs of the late Mr. E. W. Godwin. Since their erection Northampton has doubled in population. The extensions, which were designed jointly by Mr. Matthew Holding, of Northampton, and Mr. A. W. Jeffery, of Hastings, include a new Council chamber, a police-station, cells, and parade-ground, a mortuary, and numerous offices. Exclusive of the site, the buildings will cost £5,000. In elevation the new building will match the existing Town-hall. Mr. H. Willock, of Wolverhampton, is the builder.

# VARIORUM.

"The Railway and Commercial Gazetteer of England, Scotland, and Wales" (London: MacQuodale & Co., Limited, and W. J. Adams & Co.), is the eleventh edition of an exceedingly useful work of reference. It has been compiled from official sources, and purports to contain a complete list, arranged in alphabetical order, of every railway-station, town, village, hamlet, parish, and place in Great Britain,—its locality, population, distance from London, line of rail, nearest railway-station (when the place named is not that of a station), and distance from station—places having post-offices, money-order-offices, and telegraph-offices being distinguished, as are the "through-rate" routes for merchandise, passengers, and parcels to, from, or through London and all parts of the kingdom by the various railways, together with particulars of their arrangements and facilities for shipping goods at the principal ports for all parts of the world. No pains seem to have been spared to make the work as complete as possible in every detail. It includes upwards of 40,000 place-names, and when it is remembered that there are many towns and places of the same or nearly the same name (for example, we find that there are upwards of 180 "Newtons" situated in about fifty different counties, and fifty "Uptons" in about twenty-five different counties), we shall be justified in saying that this work will become indispensable in all large offices and places of business, a reference to it enabling one to identify and locate any particular place.—Messrs. J. & A. Churchill inform us that they hope to publish in September an important work on Fuel and its Applications, by Mr. E. J. Mills, F.R.S., and Mr. F. J. Rowan. It will be the first volume of a large work on Chemical Technology, of which Mr. C. E. Groves, F.R.S., will be the general editor, and which will be founded on one written by Richardson and Ronalds, familiarly known as "Knapp's Technology." Messrs. Mills and Rowan's work on fuel, we understand, is in reality a new work, in which the applications of fuel to arts and manufactures, as introduced by the most modern discoveries, are given to the scientific world. The volume will be profusely illustrated.

# RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

**13,155, Roof Gutters.** W. Joynson. According to this invention, leakage from the roof is prevented, and water rapidly carried off, by forming the gutter of earthenware with turned or rebated joints, and bedding the gutter in cement or similar plastic material. Another method is specified in which these earthenware gutters are used in conjunction with moulded brick to form cornices. In yet another method the roof is constructed with a "drainage surface" composed of layers of cement and slate, affixed with mortar, and used with or without felt, &c.

**13,259, Mosaic Work in Crystalline Glass or other Vitreous Substances.** W. R. Pullen.

This invention provides for the use and application of what is known as "crystalline" or "crystalized" glass, either white or coloured, and backed with gold, silver, or any other material which will produce a varied or iridescent effect in combination with ordinary gilded, silvered, or painted glass, or any vitreous substance, with ornamentation painted and fired on the surface, or otherwise cut into regular and irregular shapes and sizes, marked in such manner as to produce mosaic ornamentation for ecclesiastical or domestic purposes, the same being backed with cement, glass, or slate, or their

equivalent, the ornamentation being thus hermetically sealed against the atmosphere.

**14,175, Tools for Working Stone, Slate, Marble, &c.** L. Pichery.

This invention relates to a revolving tool carrying a sufficient number of cutters of suitable shape adapted for cutting and dressing stone, slate, or marble, especially of an irregular degree of hardness, such as "schistose" slate, in which very hard sulphurates are found. Provision is made for the ready removal of the cutters, whilst they are also firmly held with but little flexibility or spring.

**14,847, Attachment for fire-places.** T. Redmayne.

According to this invention, an iron apparatus, similar to a "coal-saver" is affixed to the front of the grate in order to economise fuel.

**17,750, Reversible sliding sash-windows.** J. Carpenter.

In this invention the sashes are made to turn down inside the apartment, one over the other, in the following manner:—The inside beads being fitted with screws, which work into slotted plates, with the exception of a 6 in. piece or so at the top, which turns inwards, allowing sufficient space for the remaining beads to be raised out of the slots. The lower sash is likewise raised to a certain distance from the sill, a spring being fixed at the bottom ends of the stile. This spring has a special pivot, which, while in a vertical position only enters a slot fixed in the pulley-stile, the sash being free to move up and down in the ordinary way. A small portion of the outside of the stile, above where the cord is fixed, is cut away to allow it free action. The cords are attached to the sash, through holes made in metal plates fixed to the stiles, which allow the sash to turn inward till it rests on the inside casing of the sill in almost a vertical position, the weights balancing the sash to allow this to be done with ease and safety. Then a necessary portion of the parting-bead or slip is cut out and fitted with pivots and made to turn into the pulley-stile. The top sash is also fitted with a spring, fixed to the horns or corners. The cords are also adjusted and fixed as in the bottom sash, and a portion of the stile also cut away. The sash is then lowered to the slot and pulled inward until it rests flat on the bottom sash, thus affording from the inside greater facility, simplicity, and safety in cleaning, painting, &c.

## NEW APPLICATIONS FOR PATENTS.

**Aug. 6.**—12,386, F. Robinson and E. Hodgson, Imitation Tiled Hearths.—12,397, H. Owens, Opening, Closing, and Securing Movable Casements, &c.—12,417, C. Rogers, Wood Screws.—12,454, J. Turpinney, Flushing Tanks or Cisterns.—12,457, W. Dunting, jun., Water Closets.—12,459, J. Mulligan and C. Swindell, Chimney or Ventilating Caps.—12,483, R. Thompson, Flushing Cisterns for Water Closets, &c.—12,499, L. Coombs, Automatic Cup-board Latch.—12,501, J. Darby, Joints for Pipes.  
**Aug. 8.**—12,526, A. Patrick, Manufacture of Bricks.—12,550, M. Dickens, Road Paving.—12,559, J. Bristow, Repairing Slated Roofs.

**Aug. 9.**—12,578, S. Coates, Door Looks and Latches.—12,620, T. Charteris, Wood-block Flooring.

**Aug. 10.**—12,623, T. Shaw, Utilising the Waste Product from Sewage Works for Building Purposes, &c.—12,665, R. Hadden, Waterproof Covering for Walls, &c.—12,672, S. Chandler, Chimney Tops.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

9,983, C. Gienlylle and W. Williamson, Fan for Chimney Cowl and Ventilators.—11,123, G. Batchelor, Drying Slurry by the Waste Heat from Cement Kilns.—11,239, F. Taylor, Nails or Fasteners.—11,630, J. Ash, Latches and Locks.

## COMPLETE SPECIFICATIONS ACCEPTED.

### Open to Opposition for Two Months.

12,729, G. Böklen, Metallic Roofing.—13,158, J. Lawson, Heating Buildings.—14,734, B. Russell, Air Inlet Ventilator.—16,687, J. Burn, Sash Fastener.—10,558, E. Baldwin, Paint for Wood, &c.—10,902, J. Toogoe, Chimney and Ventilating Shaft Tops.—11,117, J. Fryer, Extracting Cowl or Ventilator.

**The Sarcophagus of the Emperor William I.**—Professor Erdmann Encke has completed his design for the double sarcophagus of the Emperor William I. and his surviving consort, the Empress Augusta, which has been approved by the present Emperor. The two sarcophagi are of marble, between them standing the angel of resurrection, stretching the right hand over the sarcophagus of the Emperor as if bidding him to arise, whilst in the left it holds the bassoon of the day of judgment. Contrary to usage, the lids do not bear the portraits of the persons they enclose, that of the Emperor having the Imperial ermine, the sword of state, and the sceptre carved upon it, surmounted by the Crown, whilst that of the Empress is equally suitably ornamented. The entire composition is to be executed in life-size. The sarcophagus is to be erected in an annex of the Charlottenburg Museum.



## RECENT SALES OF PROPERTY:

## ESTATE EXCHANGE REPORT.

Aug. 7.—By W. W. JENKINSON (at Henley). Henley-on-Thames—Four plots of f. land.....	£288
Aug. 12.—By GREEN & SON (at Clacton-on-Sea). Clacton-on-Sea—An enclosure of f. land, about 19 acres.....	720
An enclosure adjoining, ss. 1r. 25p. f. By LANGEDE & FREEMAN. Hawlow, Kent—"The Bourne Estate," 126a. 3r. 4p. f.....	4,410
By C. & F. RUTLEY. Caterham, High-st.—Two plots of f. land.....	010
Upper Caterham—An enclosure of f. land, 4a. 0r. 30p.....	460
Two enclosures of f. land, 5a. 1r. 20p.....	050
By P. HOBSON. Stroud Green—62 and 64, Fovins Park-rd., u.t. 69 yrs., g.r. £20. 10s., r. £111 p.a.....	1,310
By GREEN & SON (of Hammersmith). Tottenham—16 to 22, Evelyn-rd., u.t. 88 yrs., g.r. £12, r. £78 p.a.....	620
West Kensington—36, Westwick-gardens, f., e.r. £80 p.a.....	280
34, Westwick-gardens, f., e.r. £35 p.a.....	
Aug. 13.—By WOOD & KIRBY. Tottenham—1 to 11 (odd), Vicarage-rd., u.t. 98 yrs., g.r. £38.....	975
By SINGLATER & SON. Kingsland—48 to 54 (even), St. Jude-st., f., r. £111 8s. 3d. Jude-st., f., r. £10 p.a.....	1,350
Hoxton—5, Whitmore-rd., u.t. 31 yrs., g.r. £2. 5s. r. £30.....	295
By WARD & CLARK. Surrey—9 to 12, Woodside, f., r. £120 p.a.....	1,115
5 to 8, Woodside, f., r. £130 p.a.....	450
F.g.r. of £20, secured upon 1 to 4, Woodside.....	
By DEBENHAM, TAYNOR, & CO. Weston-in-Arden, Warwickshire—"Weston Lawn Farm" and 17½, 2r. 17p. f., r. £173 p.a.....	3,200
By WILKINSON, SON, & WELCH (at Brighton). Brighton—43, Goldstone-rd., u.t. 39 yrs., g.r. £30 Sussex, Fyndon—F. house, cottage, and 4a. 1r. 3p. A plot of f. garden ground, 6a. 1r. 22p.....	350
Nepote Green—An enclosure of land, 10a. 2r. 0p.....	250
Aug. 14.—By CARR & CO. Dulwich—3, Crystal Palace-rd., u.t. 67 yrs., g.r. £2. 4s.....	170
11 and 13, Ferrie-rd., u.t. 87 yrs., g.r. £12. 12s., e.r. £51.....	255
By HOBSON, RICHARDS, & CO. Ilidington—26, Compton-ter., u.t. 28 yrs., g.r. £10, r. £34 p.a.....	465
By D. SMITH, SON, & OAKLEY. Haslemere—"Church Hill House" and 3a. f.....	595
Aug. 15.—By NEWBORN & HARDING. Stoke Newington—2 and 4, Grazebrook-rd., u.t. 72 yrs., g.r. £20. 15s., r. £70 p.a.....	3,000
Nos. 6 and 8, Grazebrook-rd., u.t. 72 yrs., g.r. £8, r. £78 p.a.....	705
King's Cross—211 to 217 (odd), Caledonian-rd., u.t. 51 yrs., g.r. £32, r. £178 p.a.....	1,450
21 to 225 (odd), Caledonian-rd., u.t. 51 yrs., g.r. £38, r. £181 p.a.....	1,490
227 and 227a, Caledonian-rd., u.t. 51 yrs., g.r. £28, r. £17. 12s.....	
Aug. 16.—By R. REID. Child's Hill—15, The Village and plot of land, f., r. £20. 10s.....	475
Harrow-rd.—8 and 10, Hampden-st., u.t. 36 yrs., g.r., £10, r. £24.....	800
By A. & A. FIELD. Stratford—50 to 40 (even), Mark-st., u.t. 79 yrs., g.r. £24.....	810
Bow—80 and 82, Knapp-rd., u.t. 73 yrs., g.r. £7.....	330
Spitalfields—65, 71, and 73, Hanbury-st., u.t. 20 yrs., g.r. £25.....	400
80, 82, and 84, Hanbury-st., u.t. 10 yrs., g.r. £25 Bethnal-green—70, Hare-street, u.t. 51 yrs., g.r. £8. 15s.....	230

## Miscellaneous.

**Architects as Masters of Companies.**—On the 15th of this month Mr. Wyatt Papworth was elected Master of the Company of Cloth-workers for the year ensuing. About a fortnight before, Mr. John T. Christopher, of Bloomsbury-square, was elected Master of the Company of Salters, and since then it is announced that Mr. Banister Fletcher was "sworn in as Master of the Company of Carpenters on the 13th inst." Of course of late years several architects have attained this dignity, as Mr. Charles Barry, Mr. Thomas Candy, Mr. Charles J. Shoppee, and Mr. W. W. Pocock, but probably never before have three members of the profession been elected to such a post in one year, almost in one month.

**Florence.**—The demolitions for the improvement of the centre of Florence that caused so much irritation amongst all lovers of art and taste in Italy and abroad (see *Builder*, Feb. 23, 1889), are being continued with great activity. The Loggia del Pesce, a building full of elegance and grace, erected by Vasari, has been pulled down, and in a short time the tower and palace of the Amieri will meet with the same fate.

**The English Iron Trade.**—The English iron market continues very steady, although prices have in some cases slightly given way. This has been the case with pig-iron in the north and north-west of England, the trifling decline being due to heavy sales by second-hand holders desirous of realising profits. The Glasgow warrant market has been comparatively steadier, while some Scotch makers quote higher prices still this week, No. 1 Coltness having reached 60s. In manufactured iron, trade is pretty fair, and the better rates recently obtained are tolerably well maintained. The steel-works are overflowing with orders, and some are so favourably situated with regard to work as to be able to fairly dictate terms. Shipbuilding is very active, and engineers continue as busy as ever.—*Iron.*

**The Bath Stone Firms' Workmen's Benefit Club.**—The general meeting of the Bath Stone Firms' Benefit Club was recently held at Box Hill Schoolroom. The report of the preceding year showed a balance in hand of 35l. 17s. The amount contributed by the members was 202l. 15s. 9d., and that expended in sick pay was 167l. 5s. 3d., there being a great amount of sickness during the year. The club has now 344 members. Mr. Sanson was unanimously elected treasurer, and Mr. C. F. Spackman secretary.—*Bath and Cheltenham Gazette.*

**The Sewage Question in Copenhagen.**—The sewerage system of Copenhagen is very defective, and is giving great cause for complaint, the water and fore-shore of the town being frequently in a most offensive state. The Municipality fully acknowledges this, and have under consideration a plan for the construction of three sewerage systems for the northern, southern, and central part of the town, by which the sewage will be carried right into the Sound, across the island of Amager; but the scheme is a very costly one, and cannot be carried out for some years.

**Phoenix Philanthropic Society of Painters and Decorators.**—(The Old Cave, enrolled 1827, and meeting at the "Spread Eagle," Mortimer-street, W.)—We are asked to announce that the annual dinner of the members and friends of this old-established society will take place at the Holborn Restaurant, on Saturday, the 31st inst., at 7 p.m. At the meeting of the members last week a vote of condolence with the family of the late Mr. J. G. Grace (whose death was announced in our last) was carried unanimously.

**The Swedish Woodwork Industry.**—The Swedish export trade in woodwork for buildings is steadily increasing, the value of the articles exported last year being 95,000*l.*, as against 80,000*l.* in 1887. The chief ports of export are Gothenburg, with 70,000*l.*; and Stockholm, with 20,000*l.* The largest consumer is Great Britain, with 51,000*l.*, being followed by Holland, with 10,000*l.*; Prussia, 8,000*l.*; and France and Belgium with 2,000*l.* each. &c. The export to the Cape was 1,000*l.*, and to Australia 700*l.*

**Building Materials in Tangier.**—According to a recent report of the British Consul at Tangier, "The trade in building materials continues brisk, and large quantities of bricks, tiles, deals, and iron rafters have been imported to meet the demand. English cement is giving place to French, which is much cheaper, being sold here (including duty) at 12s. per cask of 450 lb., whereas English cement costs 14s. per cask of 400 lb., or 3½ p. cent. more. Some cement also comes from Germany."

**Fatal Scaffold Accident.**—It is reported that while five men were working on a scaffold 50 ft. high, at Spring Vale Works, Bileston, on Tuesday, the scaffold collapsed. Richard Colley, aged twenty, fell on his head and was killed on the spot, and Thomas Judson, thirty-four, died directly after his admission to the Wolverhampton hospital. Thomas Bennett was terribly injured, and is in a critical condition. Robert Colley sustained a broken ankle. The fifth man escaped uninjured.

**"Rhinefeld." Hants.**—We are asked to say that the iron casements, gates, and other metal work in this building (illustrated in our last) are by Mr. Joseph H. Barford, of Maidenhead, not "J. Burford," as the name was incorrectly given last week.

**New Harbour in Russia.**—St. Petersburg journals state that the Minister of Public Works has decided upon constructing a large new harbour and docks at Windau, in Courland, at an estimated cost of 500,000*l.* This port would be open all the year round.

**The Case of Presland v. Bingham.**—In regard to this case, which involved a novel point in connexion with the law of light, and upon which we commented in a "Note" in our issue of the 20th ult., we are asked by the plaintiff to say that he made no complaint whatever regarding the height of the empty packing-cases, so far as the light was affected, they were thrown in an irregular heap, which was never of sufficient height to prevent free access of light to plaintiff's skylight. The objection complained of was a brick wall, erected to a height of 23 ft.

**Extension of Antwerp Docks.**—In consequence of the growing trade of Antwerp, the Municipality of that city has decided upon a further enlargement of the dock accommodation. It is now two years since the great docks Africa and America were opened, and, in order to connect them directly with the Scheldt, a wide canal is to be constructed, 1000 metres in length, whilst the quays along the river are to be further extended, when they will have a length of 4,500 metres. The cost of the work is estimated at about 200,000*l.*, and will be borne by the city and the State in equal proportions.

**The Armada Memorial, Plymouth.**—The *Western Morning News* reports that at a meeting of the General Committee held at Plymouth, on the 16th inst., to determine as to the erection of the statues and reliefs for the Armada memorial on the Hoe, the tender of Mr. W. Charles May, of the Studios, Fenchurch-st., Radcliffe, Hampstead, was unanimously accepted.

## PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. .... ton	7	0	0	7	15	0
Teak, B.G. .... do	12	0	0	12	0	0
Saguira, T. .... foot cube	0	3	0	0	3	0
Ash, Canada, .... load	3	10	0	5	0	0
Birch " " " " " "	3	10	0	5	0	0
Elm " " " " " "	4	0	0	5	0	0
Fir, Danish, &c. ....	2	0	0	3	10	0
Oak " " " " " "	2	10	0	4	10	0
Canada " " " " " "	6	10	0	7	10	0
Pine, Canada red " " "	3	0	0	4	0	0
" " " " " " " "	3	10	0	5	0	0
Lath, Danish, .... fathom	4	10	0	5	10	0
Walnut, strong " " "	2	15	0	3	0	0
Walnut, Cuba " " "	2	15	0	3	0	0
Deals, Finland, 2nd and 1st, std. 100	0	0	0	11	0	0
" " " " " " " "	7	0	0	8	15	0
" " " " " " " "	7	0	0	9	10	0
St. Petersburg, 1st yellow " "	11	0	0	15	0	0
" " " " " " " "	10	0	0	11	0	0
" " " " " " " "	10	0	0	10	0	0
Swedish " " " " " "	8	0	0	10	0	0
White Sea " " " " " "	9	0	0	17	0	0
Canada, Pine, 1st " " "	16	0	0	28	0	0
" " " " " " " "	11	0	0	17	0	0
" " " " " " " "	8	0	0	10	0	0
" Spruce, 1st " " "	9	0	0	11	0	0
" " " " " " " "	7	0	0	9	0	0
" " " " " " " "	7	0	0	9	0	0
Battens, all kinds " " "	6	0	0	12	0	0
Flooring Boards, sq. 1 in. pre-	0	11	0	0	14	0
pared, first " " " "	0	8	0	0	10	0
Second " " " " " "	0	5	0	0	7	0
Other qualities " " " "	0	5	0	0	7	0
Cedar, Cuba, .... foot	0	0	44	0	0	5
Honduras, &c. .... do	0	0	44	0	0	5
Mahogany, Cuba " " "	0	0	0	0	0	0
St. Domingo, cargo average " "	0	0	44	0	0	5
Mexican " " " " " "	0	0	44	0	0	5
Tobacco " " " " " "	0	0	54	0	0	0
Ronduras " " " " " "	0	0	54	0	0	0
Box, Turkey " " " " " "	4	0	0	13	0	0
Rose, Rio " " " " " "	15	0	0	20	0	0
Bahia " " " " " "	14	0	0	18	0	0
Satin, St. Domingo " " "	0	0	0	1	0	0
Puerto Rico " " " " " "	0	0	0	1	0	0
Walnut, Italian " " " " " "	0	0	44	0	0	0

METALS.	£.	s.	d.	£.	s.	d.
Iron—						
Pig, in Scotland .... ton	45	11	0	0	0	0
Bar, Welsh, in London.....	6	8	0	5	10	0
" " " " " " " "	4	15	0	6	0	0
" " " " " " " "	5	10	0	6	10	0
Copper—						
British, cake and ingot..... ton	47	10	0	0	0	0
Best selected " " " " " "	48	10	0	0	0	0
Sheet, strong " " " " " "	56	0	0	0	0	0
Chili, bars " " " " " "	43	10	0	0	0	0
Yellow Metal, .... lb.	0	5	0	0	0	0
Lead—						
Fig. Spanish, .... ton	12	12	0	13	13	0
English, com. brands " " "	13	17	0	0	0	0
Tin—						
Strait, .... ton	90	0	0	0	0	0
Australian " " " " " "	90	0	0	0	0	0
English Ingots " " " " " "	94	0	0	0	0	0
Zinc—English sheet " " "	21	0	0	23	0	0

OILS.	£.	s.	d.	£.	s.	d.
Linsed " " " " " " " "	21	7	0	21	15	0
Coconut, Com. .... ton	23	10	0	27	10	0
Ceylon " " " " " " " "	23	10	0	0	0	0
Palm, Lagos " " " " " "	25	0	0	25	10	0
Rapeseed, English pale " "	31	0	0	0	0	0
" " " " " " " " " "	28	0	0	0	0	0
Cottonseed, refined " " "	27	0	0	28	0	0
Tallow and Oleine " " "	21	0	0	40	0	0
Lubricating, U.S. " " "	6	0	0	0	0	0
" " " " " " " " " "	7	0	0	13	0	0
Tar—Stockholm " " " " " "	1	4	3	1	4	0
Archangel " " " " " " " "	0	15	9	0	18	0



# COMPETITION, CONTRACTS, & PUBLIC APPOINTMENT.

Epitome of Advertisements in this Number.

## COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
New Town Hall	Yeovil Corporation	10 Guineas	Sept. 29th	ii.

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Painting Works	Croydon Union.	F. West	Aug. 28th	xiv.
Wrought-iron Fencing	Whitefield Local Board	T. Thoro	Aug. 27th	ii.
Painting, Foreman's Cottage, &c., Workshop	Wm. Storer, Esq.	E. W. Farebrother	Sept. 2nd	ii.
Painting and Repairs	City of London Union	Official	do.	do.
Broken Granite	Barnet Local Board	do.	do.	xiv.
Crabtree, &c., Works	Portar Union	Clarkson	Sept. 4th	xiv.
Crabtree, &c., Works	County of Sussex	C. Adcock	Sept. 6th	xiv.
Take-up Roads and Laying Tar-paving	Walthamston Lon. Bd.	Official	do.	xiv.
New Post Office, Wimbledon	Com. of H. M. Works.	do.	do.	ii.
Houseware Pipe Saver, &c.	Ware R.S.A.	Russell Austin	Sept. 9th	ii.
Houseware Pipe Saver, &c.	Penny Stratford Bch. Bd.	W. Hall	Sept. 14th	ii.
Houseware Pipe Saver, &c.	Teddington Local Board	H. York	Sept. 18th	ii.
Houseware Pipe Saver, &c.	Lodding County Council	G. T. Hine	Sept. 24th	xiv.
Houseware Pipe Saver, &c.	do.	C. H. Howell	Sept. 30th	xiv.

## PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Jack of the Works	Shirley, &c., Local Bd.	2l. 10s.	Aug. 29th	xviii.

## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 Noon on Thursdays.]

**ALTHORNE (Essex).—**For the restoration of, and pairs to, the tower of the Church of St. Andrew at Althorne, Essex. Mr. H. Hardwicke Langston, architect, Great James-street, Bedford-row, London.—Chas. Read. £320 0 0

**ASHTON-UNDER-LYNE.—**For alterations to the "Travelers' Call" Inn, Portland-street, Mr. J. H. Ashton, architect, Warrington-street, Ashton-under-Lyne.—J. W. Williamson, Ashton-under-Lyne. £123 0 0  
Jno. Robinson, Ashton-under-Lyne. 119 10 0  
R. H. Booth, Stalybridge. 116 0 0  
Thos. Dean, Ashton-under-Lyne. 115 0 0  
E. Gardner, Ashton-under-Lyne. 113 0 0  
Allen Holmes, Ashton-under-Lyne. 113 17 6  
J. Cropper, Ashton-under-Lyne. 109 0 0  
\* Accepted.

**CHESHUNT.—**For additions, &c., to Fairley farm, Golf's Oak, Cheshunt, Herts, for Mr. G. Ongler, Esq. R. G. Mansfield, architect, 11, Powerscroft-road, West Clapton, N.E.—H. S. Hawkins, Mile-end. £1,228 0 0  
J. Bunce, Cheshunt. 1,050 0 0  
C. & R. Archer, Cheshunt. 1,049 0 0  
H. Winkley, West-green, N. 950 0 0  
F. Sanders, Cheshunt. 879 0 0

**COLCHESTER.—**For repairs and painting at the Union workhouse, for the Colchester Board of Guardians. Mr. W. Start, architect, Caps-chambers, Colchester.—Repairs. Painting. Total.  
W. A. Chambers. £351 0  
W. Rogers. 235 0 £70 0\* £305 0  
J. Rice. 286 16  
F. Dupont. 275 0  
R. B. Mount. 178 10\* 84 0 289 10  
E. Baker. 76 0  
G. Northover. 75 0  
A. E. Cole. 71 15  
C. Mills. 69 10  
J. Bennell. 61 10  
H. P. Lewis. 55 10  
H. W. Peck. 48 0  
Accepted, Rogers for painting and Beaumont for repairs.

**COLCHESTER.—**For erecting new factory, Stanwell-st., Colchester, for Mr. John Kavanagh. Mr. J. F. Hey, architect.—Additional story. Total.  
Chambers. £1,897 £680 £2,587  
Dupont. 4,935 803 5,838  
Everett. 4,749 648 5,397  
Diss. 4,50 0 600 5,100  
Dobson. 4,495 690 5,098

**CRUICKSHANK (Northamptonshire).—**For alterations and additions to Euston Hall, Northamptonshire, for Major General Sotheby. Messrs. Everard & Pick, architects, London.—R. & H. Herbert, Leicester. £2,981 0 0  
Green Bros., Northampton. 2,767 0 0  
Farnell & Son, Rugby (accepted). 2,748 0 0

**ENDERBY.—**For new Club Room, "New Inn" Enderby, near Leicester, for Messrs. Everard, Son, & Co. Messrs. Everard & Pick, architects, Leicester.—W. Elliott, Leicester. £190 7 0  
Thos. Mason, Leicester. 188 0 0  
Murby & Cliff, Enderby. 182 11 7  
Phipps & Geary, Enderby (accepted). 180 5 8

**KING (Suffolk).—**For building four cottages at King, Suffolk, for Mr. M. Webb. Mr. Jno. Flatman, architect, Newmarket.—Carridge & Shaw, Cambridge. £261 0 0  
[Six tenders submitted.]  
\* Accepted.

**KXNING (Suffolk).—**For building new infants' school at KXNING, Suffolk. Mr. Jno. Flatman, architect, Newmarket.—Richard Arber. £255 0 0  
Holland & Kell. 650 0 0  
W. P. Fuller. 643 0 0  
Simpson & Son. 625 0 0  
Kerridge & Shaw. 620 0 0  
H. J. Lenzell. 600 0 0  
Saint & Son, St. Ives, Hunts. 680 0 0  
Cowell & Son (withdrawn). 438 0 0  
\* Accepted.

**HACKNEY.—**For the erection of the Mission Church of the Good Shepherd (in connection with St. Philip's, Dalston), in Wilman-grove, London-fields, for the building committee. Mr. W. G. Sheehy, architect, 168, Strand, W.C.—J. H. Mollett. £376 0 0  
J. Anley. 597 0 0  
White & Co. 593 0 0  
J. Walker. 579 0 0  
Turtie & Appleton (accepted). 578 0 0

**HARROW.—**For pulling down and rebuilding premises at Wealdstone, for Mr. G. Fox.—Gullett Bros (accepted). £550 0 0

**HORLEY (Surrey).—**For the erection of banking premises at corner of High-street, Horley, for Messrs. G. & S. Head. Messrs. E. & C. H. Burston, architects, Horsham and Horley.—R. Jennings, Charlfield, Horley. £1,320 0 0  
J. Brown, Lamber-road, Horley. 1,186 0 0  
W. Plledge, East Grinstead. 597 0 0  
\* Accepted.

**HORSHAM.—**For repairs and painting, &c., to the East Parade and Trafalgar-road Schools, for the Horsham School Board. Messrs. E. & C. H. Burston, architects and surveyors, Horsham and Horley.—H. Murrell, Horsham. £191 10 0  
Aldridge Bros., West-street, Horsham. 184 0 0  
sham (accepted). 184 0 0  
J. R. Nightingale, Carfax, Horsham. 138 0 0  
\* Withdrawn, through mistaken calculation.

**LEICESTER.—**For erecting new schools, Clarendon Park, Leighton, Leicester. Messrs. Everard & Pick, architects, Leicester.—Mason, Elvworth. £3,778 19 6  
Hutchinson & Son, Leicester. 3,537 13 0  
Major & Son, Leicester. 3,539 13 0  
Kellott & Son, Leicester. 3,531 10 0  
Tulley, Leicester. 3,512 2 0  
T. & H. Herbert, Leicester. 3,479 0 0  
Fox, Leicester. 3,454 3 0  
Bass, Leicester. 3,438 1 8  
Gimson & Sons, Leicester. 3,416 4 3  
Riddett, Leicester. 3,413 0 0  
Mason, L., Leicester. 3,382 4 0  
Tyers, Leicester. 3,367 13 0  
Hewitt, Leicester. 3,359 0 0  
Elliott, Leicester (accepted). 3,307 11 0  
Richardson, Leicester. 3,145 0 0  
Ratnett, Leicester. 3,065 0 0

**LONDON.—**For building factory at Haggerstone, E., for Mr. Becken. Mr. John Hamilton, architect.—Bale. £2,490 0 0  
McCormick. 2,390 0 0  
Jarvis & Son. 2,330 0 0  
Mower & Son. 2,137 0 0  
Godfrey. 2,117 0 0  
Scott. 1,998 0 0  
Shumour. 1,994 0 0

**LONDON.—**For alterations and additions, &c., at 15, Young-street, Kensington, W., for Mr. R. P. Evans. Mr. J. Stevens, architect.—Wall. £1,043 0 0  
Levitt. 810 10 0  
Presley & Co. 783 0 0  
Buckridge & Co. 740 0 0  
Cripps. 717 10 0  
Giles & Co. 649 16 8  
Kearley. 677 18 0

**LONDON.—**For the rebuilding of "The Pagoda" public-house, Bermondsey New-road, S.E., for Mr. W. H. Chapman. Mr. J. W. Brooker, architect, 13, Railway-approach, London Bridge, S.E.—H. L. Holloway. £3,330 0 0  
C. Deering & Son. 3,300 0 0  
Outhwaite & Son. 3,280 0 0  
W. & F. Croaker. 3,195 0 0  
Barnan & Son. 3,176 0 0  
W. Downs. 3,117 0 0  
Gill. 3,087 0 0  
G. J. Kirk (accepted). 2,987 0 0

**LONDON.—**For painting and other works at the Paddington Infirmary, Harrow-road, for the Guardians. Messrs. A. & C. Harston, architects, 15, Leadenhall-street. Quantities not supplied.—G. & W. Carr. £560 0 0  
F. T. Chisholm. 434 18 0  
H. C. Clifton. 369 0 0  
T. Gamage. 355 0 0  
Collier & Billingham. 340 0 0  
C. H. Handover. 348 0 0  
W. H. Handover. 315 0 0  
W. G. Lilly. 313 0 0  
C. J. Shaw. 280 0 0  
N. Edwards, jun. 253 0 0  
W. Davenport. 244 0 0  
G. Foxley, Regent-street (accepted). 185 0 0

**LONDON.—**For repairs to buildings and furniture to Hammond-square School, Hoxton, N., for the School Board for London.—Parsons & Son. £133 0 0  
J. W. Nottingham. 119 15 0  
G. Cruwys. 117 0 0  
Barker. 116 0 0

**LONDON.—**For alterations, repairs, &c., to 16, Cleveland-mews, Hyde Park, W. Mr. W. Jacoby Gibbon, architect, 36, Great James-street, Bedford-row, W.C.—Greston & Co. £273 0 0  
E. L. Nunn. 258 0 0  
Macfarlane Bros (accepted). 218 0 0

**LONDON.—**For new drains, sanitary improvements, pavers' work, gas, and decorations, at 45, Warwick-square, Belgravia, S.W. Mr. H. Hardwicke Langston, architect, 9, Great James-street, Bedford-row, London.—E. D. Hook. £276 0 0  
John Smeaton (accepted). 233 0 0

**LONDON.—**For alterations and repairs at "Highbury Barr Tavern," for Messrs. T. Wright & Sons. Mr. Wm. West, architect, 19, Graves-street, Strand. No quantities supplied.—Lambie. £289 0 0  
Pearman. 635 0 0

**LONDON.—**For additions to University Club, Bethnal-green. Mr. A. H. Thompson, architect.—E. Triggs, The Chase, Clapham. £1,893 0 0  
[No competition.]

**LONDON.—**For decorations and sanitary work to No. 5, Victoria-road, Clapham, for Mr. F. Ridsdale.—E. Triggs, The Chase, Clapham. £181 0 0  
[No competition.]

**MANSFIELD.—**For new Sunday schools, Mansfield, for Methodist Free Church Connexion. Mr. B. Frank Vallance, architect, Mansfield. Quantities supplied by the architect.—S. & G. Frisby, Mansfield. £1,947 15 0  
John Greenwood, Mansfield. 1,830 0 0  
Evans & Woodcock, Hyson Green, Nottingham. 1,824 0 0  
Fisher Bros., Mansfield. 1,785 0 0  
Samuel Dudson, Mansfield. 1,741 0 0  
Edward Cuddy, Mansfield. 1,780 0 0  
W. A. Vallance, Mansfield. 1,589 0 0

**MANSFIELD.—**Revised Tenders.  
John Greenwood, Mansfield. 1,505 0 0  
Evans & Woodcock, Hyson Green, Nottingham. 1,494 10 0  
Fisher Brothers, Mansfield. 1,450 0 0  
\* Accepted.

**MANSFIELD.—**For alterations and additions to dwelling-houses, Rotherham-gate, Mansfield, for Mr. Gregg. Mr. R. Frank Vallance, architect, Mansfield.—Saml Dudson, Mansfield. £397 0 0  
Chambers, Paget, & Wess, Sutton-in-Ashfield. 353 11 0  
Fisher Bros., Mansfield. 335 0 0  
John Greenwood, Mansfield. 330 0 0  
John Ashley, Mansfield Woodhouse. 317 1 8  
Edward Cuddy, Mansfield. 310 0 0  
S. & G. Frisby, Mansfield. 300 0 0  
Evans & Sutton, Sutton-in-Ashfield. 238 10 0  
\* Accepted.

**MANSFIELD.—**For alterations and additions to Mr. John Reynors's premises, Mansfield. Mr. R. Frank Vallance, architect. Quantities supplied by the architect.—John Greenwood, Mansfield. £225 0 0  
W. A. Vallance, Mansfield. 207 10 0  
James Evans, Sutton-in-Ashfield. 203 9 0  
Fisher Bros., Mansfield. 200 0 0  
Saml. Dudson, Mansfield. 182 17 0

**MANSFIELD.—**For draining, forming, metalling, curbing, and paving Grove-street, Mansfield, for Mansfield Improvement Commissioners. Mr. R. Frank Vallance, Town Surveyor.—S. & G. Frisby, Mansfield. £247 0 0  
J. W. Fisher, Mansfield. 609 0 0  
J. Bradley, Lincoln. 458 4 0  
W. A. Vallance, Mansfield (accepted). 413 0 0  
John Lane, Skegby (withdrawn). 370 0 0

**MANSFIELD.—**For new dairy, Market-street, Mansfield, for Mr. Wm. Hollins, jun., J.P. Mr. R. Frank Vallance, architect, Mansfield. Quantities supplied by the architect.—Saml. Dudson, Mansfield. £272 0 0  
S. & G. Frisby, Mansfield. 798 0 0  
Fisher Bros., Mansfield. 750 0 0  
W. A. Vallance, Mansfield. 730 0 0  
John Greenwood, Mansfield. 718 11 6  
\* Accepted subject to modification.

**MANSFIELD.**—For pair of semi-detached houses in the Park, Mansfield, for Mr. F. A. Robinson. Mr. R. Frank Vallance, architect, Mansfield:—  
Edward Cuddy, Mansfield..... £1,080 0 0  
Fisher Bros, Mansfield..... 965 0 0  
W. A. Vallance, Mansfield..... 914 0 0  
Evans & Sutton, Sutton-in-Ashfield..... 910 0 0  
Samuel Dodson, Mansfield..... 897 0 0  
Evans & Woodcock, Hyson Green, Nottingham..... 879 0 0  
John Greenwood, Mansfield..... 843 0 0

**NEWMARKET.**—For building a house and shop in the Station-road, Newmarket, for Mrs. Saich. Mr. Jno. Platten, architect, Newmarket:—  
Simpson & Son, Newmarket..... £725 0 0  
[Six tenders sent in.]  
\* Accepted.

**NEW SOUTHGATE.**—For alterations and additions to the "Alexandra" Arms, New Southgate, for Mr. C. A. Worral:—  
Wheatley..... £198 0 0  
Voller..... 259 0 0  
Eaton..... 215 0 0  
[Surveyor's estimate, £248.]

**NOTTINGHAM.** For the formation of roads, and laying sewers, &c., on the Cavendish-hill Freehold Land Society's Estate, Nottingham. Messrs. Hazell & Son, surveyors, Nottingham. Quantities supplied:—  
R. Keeling..... £548 0 0  
Holmes Bros..... 590 0 0  
John Hawley & Son, Ilkeston..... 480 10 0  
E. Cope..... 452 8 6  
Samuel Thumbs..... 449 0 0  
W. Erost..... 436 10 0  
Arthur Morris, Carlton..... 345 0 0  
Jas. F. Price (accepted)..... 310 0 0  
[The rest of Nottingham.]

**OLTON (Warwickshire).**—For rebuilding a farm-house at "The Holleries," near Olton, Warwickshire. Mr. Edward Turner, architect, 81, Hart-street, Bloomsbury-square, London:—  
Thos. Smith, Birmingham..... £357 0 0  
J. Barnsley & Sons, Birmingham..... 643 0 0  
Bragg Bros., Solihull..... 604 0 0

**POTTERS BAR.**—For new forcing-house and heating arrangements. Messrs. Benison & Bargeman, architects:—  
E. Triggs, The Chase, Clapham..... £155 0 0  
[No competition.]

**RICHMOND (Surrey).**—For road materials for use in the town of Richmond, Surrey. Mr. Walter Brooke, A.M.I.C.E., Town Surveyor:—

	A**	B†	C‡	D§	E
H. Covington, Battersea.....	—	—	—	—	4 0 ... 4 3
E. Downs, Richmond.....	13	3 ..	—	—	4 1 .. 4 2*
W. Griffiths, Kingsland.....	14	10 ..	—	—	—
J. Horsford, Faversham.....	—	—	—	—	4 6
A. & F. Manuelle, City.....	14	10 ..	—	—	—
Novell & Robson, Kensington.....	14	9 ..	—	—	—
G. Pearce, Brentford.....	—	—	—	—	5 0 ... 4 5
J. Rannalls, Farnham.....	—	—	12	8 ..	10 8 ..
T. Turner & Sons, Chelsea.....	14	7 ..	—	—	—

\* Accepted.  
\*\* Broken blue Guernsey granite, per cubic yard.  
† Broken Penile stone, per cubic yard.  
‡ Broken Penile stone slittings, per cubic yard.  
§ Broken chalk flints per cubic yard.  
|| Broken brown or pit flints, per cubic yard.

**TOTTENHAM.**—For erecting St. Mary's Vicarage, for the Marlboro' College Mission, Messrs. J. E. K. & J. P. Cuts, architects, 25, Southampton-street, Strand, W.C.:—

M. A. Humphreys & Son, Tottenham.....	£2,310 0 0
Gould & Brand, Camden-town.....	2,193 0 0
James Holl-way, Lavender-hill.....	2,059 0 0
Thomas Taylor, Kingsland-road.....	1,997 0 0
John Tyerman, Waltham-road.....	1,987 0 0
Arthur Porter, Tottenham.....	1,907 0 0

**WALTHAMSTOW.**—For the erection of a new mission hall at Higham Hill, Walthamstow, for the Rev. W. Douglas. Mr. W. A. Longmore, architect, Bridge-chambers, Walthamstow:—  
Green & Lee..... £725 0 0  
Roeley & Son..... 646 10 0  
Fuller..... 593 0 0  
Challis..... 585 0 0  
Reed..... 529 0 0  
Scott..... 513 0 0

**WEST WICKHAM.**—For house and stables at Hawes Farm, West Wickham, for Mr. Packe. Mr. A. R. Steuning, architect. Messrs. Young & Brown, surveyors:—

Smith.....	£2,580	2740
Crosley.....	2,768	669
Mid-Kent Building Works, Ltd.,	2,725	579
Lynn & Duncan.....	2,689	621
Cooper.....	2,500	610
Sabey & Son.....	2,498	570
Palmer (accepted).....	2,430	566

**WEST WICKHAM.**—For stable and coach-house, at Wood Lodge, West Wickham, for Sir J. F. Lennard, Bart. Mr. A. R. Steuning, architect. Messrs. Young & Brown, surveyors:—

Smith.....	£1,120 0 0
Cooper.....	1,010 0 0
Crosley.....	990 0 0
Sabey & Son.....	895 0 0
Palmer.....	885 0 0
Lynn & Duncan.....	867 0 0
Mid-Kent Building Works, Ltd.,	867 0 0
Beckham (accepted).....	859 0 0

*Alterations and Repairs, Shortlands.*—In last week's Builder, p. 128, for "J. Watson, Dulwich, accepted," read "T. Watson," &c.

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### TO CORRESPONDENTS.

St. Thomas, Charterhouse (such notices are hardly within our notice).—R. M. (we cannot go further into the subject at present).—D. B. (thanks).—H. D. H. (attended to).—H. L. & W. & Co. A. W. E. (we should say the younger members would be much more benefited by travelling in the company of the older ones).—T. W. A. (too late).—H. J. N. (ditto).—C. W. B. & Co. (ditto).  
All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline printing out books and giving addresses.  
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## ILLUSTRATIONS.

The Paston Monument, North Walsham Church, Norfolk.—From a Drawing by Mr. H. H. Statham .....	Double-Page Ink-Photo.
Sketches in the Loire District .....	Double-Page Photo-Litho.
The Chapelle du Marobé, Bléré .....	Single-Page Photo-Litho.
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### On the Banks of the Loire.



UST it be confessed? The Loire is rather disappointing. So much has been said of its châteaux; they have been extolled to such an extent as the finest development of the Renaissance movement

this side of the Alps, that when one actually sees them, and examines them, Hope is cheated by Fact, and the eye hardly keeps the promise held out to the imagination. Perhaps the chief reason for this feeling is that everything is so much restored; and with whatever sentiments one does or ought to regard the restoration of ancient buildings, to the sketcher it means disappointment, while to the sentimental architect it means the disturbance of old associations, the knowledge that no discoveries are left for him to make, and the removal of the moss and the lichen which, as an architect, he loves, but which, as a surveyor, he knows are better replaced with neat pointing. That is not the stone on which the elbow of the Duke of Guise rested when they summoned him to the audience which ended in his murder. It is useless to look on the floor for the stain of his blood, for the floor is modern. The new stone is like the old, and so, may be, are the floor tiles, and perhaps the Duke himself could hardly tell the difference, but the sentimental architect in vain tries to accept the one as of equal value with the other.

There is another reason. When the sketcher goes forth to sketch, however much he may be delighted with the curious and the beautiful, he undoubtedly hankers after the useful. Moreover, unless he has unlimited time at his disposal, he desires subjects for which an hour or two will be enough. But in these châteaux by the Loire he is sadly hampered by the carving. All the external stonework from which he might hope to get suggestions is nothing without the carving, and few contracts in these days will bear to be weighted with carving. Hardly a sketch can be made that does not involve hours' work in drawing the carving. He cannot leave it out or merely indicate it, for the work is nothing without it, and he cannot put it in, for he has not time. And so he is disappointed.

And then there is the Loire itself. It is

admitted on all hands to be a deceitful river. From its size one would expect it to play a great part in navigation and strategy. Nothing of the kind. Its swift current, its shifting sands, and its liability to sudden floods, banish all craft, except a few flat-bottomed boats, from its bosom; while, from the days of the barbarians to the war of 1870, it never offered more than a temporary check to the invader, save only when Joan of Arc kept the English at bay along its banks. It is too wide to be beautiful, the hills along its sides are dwarfed by its extent, the bridges which crawl across it are monotonous from their length, its turbid waters invite no bather, its strong stream warns off the oarsman. It has been called majestic, but its majesty is one of fear and not of love.

But let us drop these peevish reflections, and look round with more cheerful eyes. Orleans, Blois, Tours,—do not these names stir the spirit? They are all on the Loire, all flourishing towns, in which new streets and modern boulevards intersect and surround tortuous alleys, lined with old houses that have never been restored since they were built three or four centuries ago. Let us go to Orleans first, which is the highest up the Loire, and first reached from Paris. Beyond the cathedral there are no ecclesiastical buildings worth seeing. There are many churches, but they have lost all, or nearly all, their interest. In England one is hardly surprised to find churches without much character. What escaped the violence of Reformers and Puritans, ran the risk of decay from the neglect of last century; and what survived that neglect has fallen a prey to the learning and zeal of the restorer of our own day. Besides, the change of ritual itself was enough to account for the gradual loss of ancient features. But in a country that has always professed the same faith, in buildings that have always witnessed the same kind of services, one naturally expects most of the original flavour to be retained. And one is apt to forget that if England had her Reformation, France had her Revolution, and that the mobs of 1790 were even more destructive than the iconoclasts of our two Cromwells. In France, too, as in England, the love for Gothic work died out for two centuries; for many years zeal for the old religion cooled, and the result was the neglect of which we see the effects to-day. But, whatever the cause, the fact remains that the churches of Orleans are devoid of interest,

and that the cathedral itself, though a fine building, is tame and lifeless as compared with Chartres or Tours. The old cathedral fell a victim to the violence of the Calvinists in 1567, all save portions of the east end, and it was rebuilt in a style that was dying, if not dead. Flamboyant of the seventeenth century is as dull as Early English of the nineteenth. From 1601, when the first stone was laid, the works progressed till the Revolution in 1790. Many architects were employed, but their successive efforts will hardly delay the sketcher for very long. He will find more interest in the narrow, old-fashioned streets.

Although Orleans is a thriving modern town, still there are to be found many ancient houses by those who will look for them, beyond those mentioned in the guide-books. These indispensable volumes enumerate the most notable,—the old Hôtel de Ville and the house of Diana of Poitiers, now both museums; the house of Agnes Sorel, rich in detail, and where one first makes the acquaintance of the elaborate circular stone staircases of the district, with their spiral handrails and strings worked on the newels, and their carved cornices following the rake of the steps as they mount up the walls; the house of François I., now a warehouse, but still retaining its staircase and other features half submerged beneath the tide of barrels and boxes. They also mention the house of Jeanne d'Arc, but hasten to explain that none of the work of her day is left in the structure we see, a remark which may be extended to the town generally—for of work which her eyes might have rested on, or her hand have touched, there is hardly a stone to be found.

We give here a few illustrations of the characteristic stone staircases of the district. The first (fig. 1—see lithograph plate), from the house of François I. in Orleans, is a comparatively small example, the steps being not above 3 ft. wide. The sketch shows the stout stone newel, ending in a base into which the handrail dies. There is a plain moulded cornice beneath the end of the steps, both on the newel and on the wall. The next, from the house of Agnes Sorel (fig. 2, lithograph), also in Orleans, shows a larger staircase, 5 ft. or 6 ft. wide, with the plinth, handrail, and cornice winding round the newel, and a slightly-carved cornice following the rake of the steps up the wall. The enclosing walls are square on plan. In the next example (fig. 3, lithograph), from Chambord, the walls are circular on plan, and the space between the handrail and cornice on the newel



is divided by a string similar in section to the handrail: this view also shows the finish of these members at the top. The fourth example is from the Château de Chaumont (fig. 4, lithograph). Here the detail is more elaborate. The work on the newel, which is 3 ft. in diameter, is very much injured, but we can still distinguish a series of canopied niches, separated by twisted shafts, the whole work being crowned by a carved cornice. The steps are 8 ft. wide, and the surrounding walls form an octagon on plan. The elaborately-carved cornice under the steps is, however,

It is a curious, dilapidated place. Its substantial houses overrun with squalid children, its ruinous tower and mutilated castle, its picturesque views, where the detail, though hopelessly injured, still suggests its former splendour (fig. 5, lithograph), combine to give it the dismal appearance of an ancient gentleman in rags. It looks as if the place had neither wealth enough to preserve its former state, nor energy enough to make the old give way to the new. And yet it has its own interest, and offers not a few scraps to the sketch-book, such as fig. 6 subjoined.

not to say coarse; and the humour of the "Cent Nouvelles Nouvelles" finds its counterpart in some of the carving of the main front at Blois. The carvers of the Renaissance observed a greater restraint, and the work of François I. abounds in beautiful, delicate and spirited design,—design which to-day is reproduced in *faience* and in metal-work to such an extent as, apparently, to require two special industries to supply the demand for plates and articles of jewellery.

The château is, of course, the great attraction at Blois, but the town offers other build-



circular on plan, and the soffits caused by the circle resting on the octagon are supported by corbels variously carved.

It is obvious from these few examples that the variety of ways in which the dominating idea of a wide circular staircase can be treated is very large; and, as a matter of fact, no two examples are treated exactly alike. The finish of the newel at the top gives rise to much good detail. Sometimes it is treated as part of the balustrade wall, and merely coped at the same height; but oftener it is carried up, crowned with a capital, and made the central shaft from which vaulting ribs are sprung on to the outside wall, as at Blois. There is one unfortunate result from carrying the main lines in a raking manner up the walls, and that is that the designers have thought it necessary to put the door heads on the rake as well (as shown in the view from Chaumont). This is undoubtedly an awkward expedient; and indeed the difficulty of harmonising the raking lines of the stairs with the horizontal lines which must necessarily occur at the top in connection with the roof, is one which happened in every case and which was seldom satisfactorily surmounted.

If any one wishes to gain some idea of the appearance of a fifteenth-century town, let him go to Beaugency, which lies between Orleans and Blois. The direct road from the station leads into the more modern portion of the little town, but a very short walk will take the visitor into streets and alleys where every house has some feature of the fifteenth or sixteenth century. The streets are of the same width now as then; they have the same turns and the same declivities. The outlooks are somewhat altered, no doubt, for six out of seven of the gates are gone; the castle, built by "Le beau Dunois," has been shorn of much of its beauty, and converted into a workhouse; the great donjon, or "tour de César," now rears itself up only some 70 out of its ancient 115 ft.; the walls of the town merely remain in places, but the imagination has no great difficulty in filling the gaps and in picturing the ancient aspect of the place when the castle commanded the long bridge that straggled across the Loire on its narrow pointed arches, of which some still remain, and the walls presented their sullen towers to the stranger, while above the gabled houses, with their good stone fronts wherein all the windows and doors were carefully wrought, rose the great square mass of the gloomy "tour de César."

From Beaugency the broad, brown Loire flows swiftly on to Blois, whither the far-famed château attracts many, many visitors. To make the round of a show-place in England with a large party to whom the guide drones out his oft-told tale is bad enough; but to do the same when the dismal tidings are told in a foreign tongue is to endure the boredom without gleaming the information which may be held as an inadequate compensation. To this ordeal, however, the visitor is subjected at Blois, and through many rooms he is taken, all swept and garnished, and restored and decorated, in a manner as thorough as it is beautiful; and beautiful the visitor admits it to be, though his sentimental soul shrinks from its evident newness and sighs for the actual walls that witnessed the stirring events briefly narrated by the guide. Here stood the Duke of Guise when he was summoned to his last interview with Henri III., this was the room he crossed, there was the door which was locked so that he might be compelled to pass into a room convenient for his murderers; there he received the first blow, here he came to die, yonder is the room where meanwhile two monks, in ignorance of the nature of the deed, were offering up prayers for the success of "an enterprise undertaken for the peace of the Kingdom." Then, again, this was the window from which the captive queen, Marie de Medicis escaped by letting herself down by a rope; that was the boudoir of Catherine de Medicis, and yonder was the observatory where she sought guidance from the stars. But the stars, if in their eternal revolutions they can recollect so fleeting an interval as the life of Catherine de Medicis, would hardly recognise her observatory to-day; the parapet to which the fair fingers of Queen Marie clung is now new and white; everything is beautifully and learnedly restored; large masses of white stone obscure themselves on the eye that loves to decipher history for itself among time-worn devices, and they distil from it a tear to mingle with those shed by a row of disconsolate gargoyles, which seem to mourn their lost estate as they lean against the wall amid rank grass, and stretch their long necks to the sky, as do the dogs that howl (fig. 7 above).

The detail at Blois is very interesting. It is chiefly of two periods, of Louis XII., and François I. There is also some work of the thirteenth century, and some by Mansard which offers few attractions by the side of its more interesting neighbours. The facades of the fifteenth century were exceedingly robust,

ings of interest. Between the château and the river lies the Church of St. Nicolas, formerly St. Laumer, a very fine structure of the twelfth century, with an interesting early dome over the crossing of nave and transept; and with capitals in which classic feeling is visibly retained. The building is well worth inspection, both on account of its fine proportions, and because here one sees, what one can hardly be said to see in England, Gothic that has evidently not yet freed itself from the leading-strings of its parent Classic. The cathedral is, like that at Orleans, largely of posthumous Gothic; but the towers are distinctly Classic, with columns and entablatures breaking round them, and a curious feature is the introduction of nervous Gothic gargoyles projecting from the angles of the Classic cornice. The situation of Blois, on a high bank of the river, gives rise to many steep, winding streets, which are, as usual, extremely narrow. The effect is picturesque, though a little smelly. Here and there occurs a good timber front of the fifteenth century, or a stone house of the sixteenth, while the course of the ancient walls of the town can still be easily traced by masses of masonry, fragments of towers, or, where these are gone, by the narrow curved streets which seem to have followed the windings of the wall.

A few miles below Blois, and high up on the other bank of the river, lies the Château de Chaumont, which may have suggested to Scott the description of the Château de Hautlieu, in his capital introduction to *Quentin Durward*. But the one is not the other. Chaumont was never so dilapidated as Scott makes Hautlieu, not even though they are rebuilding a whole wing of the real château. It certainly is a shock, when one is in search of the ancient ways of doing things, to be confronted by an immense area of white stone blazing between serried ranks of scaffold poles; to pass over a brand-new draw-bridge, and find lying against the hoarding, plaster models of antique-flavoured grotesques not yet free from the straw in which they were packed in Paris. But, stay, O querulous sightseer, and either hold your tongue, or hold your hand when restorations fall in your way. Chaumont was once the residence of Catherine de Medicis; here, too, she watched the stars, as she did at Blois; but she wearied of the place, and compelled an exchange with Diana of Poitiers, who reluctantly gave her Chenonceaux in return. The château is built round three



sides of a square, the fourth being open, and affording a wide view across the Loire; and it is garnished with a large number of the round towers with conical roofs, which impart so much of their character to the châteaux of the Loire. The detail is of the usual kind, the most notable feature being the circular staircase already illustrated. There is also a good deal of interest to be found in the chapel. Considering the number of hands through which the place has passed, and the fact that for some time it was a china factory, we ought perhaps to be thankful that so much is left, and to be grateful to the accomplished architect who is rebuilding a portion of it in the fashion in which he thinks it originally was, or ought to have been built.

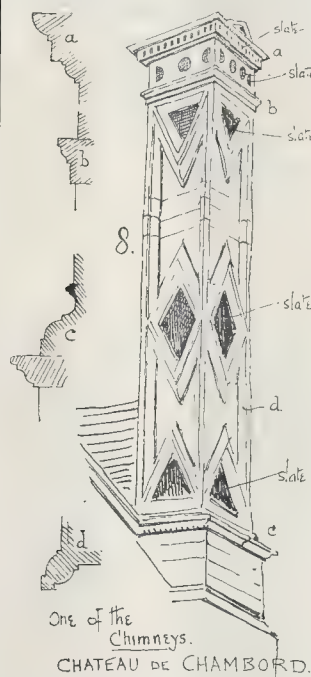
To an English eye all these French châteaux lose much of the charm which ought to be theirs by reason of the treatment of their surroundings. We are accustomed to see our old mansions in a fair setting of velvet turf, and bright flowers, and noble trees. They order things otherwise in France. Trees they have, it is true, and at Chaumont they have a cement tree and rustic bridge, fashioned on a framework of iron, and so like nature as to be the admiration of all beholders. But the flowers they forget or neglect, and they make hay on what should be their lawns. At Chaumont men and women were busy on the grass between the gravel walks and even up to the walls of the chateau. At Chambord, all round the princely palace the grass was marked in lots for sale to whomsoever would bid the best price.

The triste air that Chambord wears is doubtless owing largely to this thrifty expedient, but much of it to the disposition of the place itself. The plain range of low buildings that encloses the courtyard, the arid waste of loose gravel that forms the court itself, the absence of any endeavour to harmonise the building with its surroundings, all combine to deprive it of living human interest and to render it as dull as an architectural model in a museum. Compare it for a moment with Montacute or Rushton. It is much larger, cost vastly more, has ten times as much carving, and is as unattractive in comparison as a discourse on divinity by the side of a number of the old "Spectator."

And yet Chambord has had an eventful history. It was begun by François I. in the year 1526, and was the model, or source of inspiration, for most of the châteaux of the Renaissance in France. Louis XIV. filled it with his splendour till he left it for Versailles. The empty hall is still pointed out where he witnessed the first performance of Molière's *Bourgeois gentilhomme*. From its terrace Marshall Saxe used to review a regiment of horse by way of solace in his declining years. It was plundered at the Revolution, and given by Napoleon to the Prince de Wagram, from whose widow it was purchased by public subscription and presented to the Comte de Chambord, whose heirs now possess it.

When one leaves the general appearance to examine the detail, one is struck with admiration at every turn—it is so profuse and so varied. The chimneys, the dormers, the turrets, and, above all, the great central lantern, are covered with delicately carved medallions, and corbels, and caps, and finials. Niches with the shell ornament by way of canopy; pediments with heraldic shields and ribands and the ubiquitous salamander; chimneys crowned with lacelike carving, far too minute to be seen so far aloft; all these meet one at every turn. The funds of three successive monarchs were devoted to the work; so there was some scope for the Universal Carver of the period. If anything, the ornament is a little overdone: the eye is wearied, and the brain confused with the multitude of chimneys and turrets and dormers. One of each would be enough to secure the eternal fame of an ordinary house. And all this wealth of detail breaks forth only at the parapet: all below that is plain ashlar, save for a few pilasters and windows and arched balconies. The plan of Chambord alone would make it picturesque. The plain sur-

faces of the great circular towers round which the shadows creep all day, the constant sombreness of the arcades, and the winding strings of the staircase turrets are themselves elements of a striking group, but compared with the wilderness of ornament which adorns the roof, they sink into insignificance. Amid all this splendour of carving, it is curious to find how much reliance for effect has been placed upon the feeble device of nailing slates in lozenges and circles, and by way of filling up panels (fig. 8),—a means of decoration



which entails much repair and a constant appearance of neglect, as the loss of a single slate visibly spoils the figure of which it formed a part.

Of all the staircases which this district affords, the great staircase at Chambord is the most elaborate. It consists, indeed, of two, winding simultaneously round a great hollow newel, or enclosed well, some 10 ft. or so across. The diameter is large enough to allow the two staircases to serve the same floors, starting and landing on opposite sides of the well. The walls of the well are pierced, so that, as it has been said by many admiring writers, two people can ascend and descend at the same time without ever meeting, and with only a passing glimpse of each other. Above the flat at the level of the parapets, this wide well is carried up as a turret stair to the top of the great lantern which crowns the whole work. In spite of all its drawbacks, however, Chambord well deserves the title bestowed by the guide-book of "la merveille de la Renaissance."

Perhaps, of the three chief towns of this district, Tours is the most interesting. The cathedral is fine, and the town itself is largely made up of ancient houses abutting on narrow streets, in which, along with most potent smells, one can inhale not a little of the atmosphere of four centuries ago. Things were newer then and in better repair, but their main forms have altered little, and from some of the paved lanes, not wide enough for causeways, you can step into little courtyards (fig. 9, lithograph) that have scarcely changed since they were built. There in one corner is the winding staircase of wood, under a roof but otherwise open;

close by, in another corner (for the yard is very small) is the well, with a stone head and a wooden windlass; near to it (far too near to suit our sanitary officers) is the drain, leading—whither? Immediately behind us, as we sit, is the other side of yard, and above us from a small patch of sky, fall the fierce rays of the sun, lighting up the squalor which has settled down these many years on the picturesque half-timber walls. There are plenty of such courtyards in Tours, if you will only dive into dark entries; and in the search for that which has not changed, you will see much that has undergone notable vicissitudes. Here is a turret once corbelled out over a street, but now cut back to the wall line, and reduced to half its former size; there are the stone labels of an ancient mansion, worn away by packages hauled up and down by a crane,—for the place is now a warehouse; yonder is a coach-house, enclosing a grand stone pillar that still bears shields of arms and some of the little cupids that sprang up in such thousands during the sixteenth century. Wherever you go, you meet at every step some mark of a bygone age. Eventually, no doubt (if you have a guide-book), you will find yourself in the house called after Tristan l'Hermite, the hangman of Louis XI., owing probably to the fact that, amid the various mouldings, one is fashioned like a rope. The house is of brick, and so is the circular staircase, with its newel and steps cleverly contrived on a kind of skew-vaulting, that winds round the newel. Of course, there is said to be an oubliette, and from the summit of the turret signals used to be made to the towers of Plessis-les-Tours; but legends are often fitted to localities without much exercise of the reasoning faculties, and in these cases the least said (in a foreign tongue) the soonest mended. Not far from this house, in a little open space, is the fountain de Beauce, well worth examination for the spirit and delicacy of its carving.

The way from this fountain to the cathedral passes across the site of the Abbey Church of St. Martin, of which nothing is now left but two towers, one on one side of the street, and the other at some distance on the other. These stood at the west end of the nave and the north end of the north transept, and some idea of the vast size of the abbey may thus be gathered. Its fame was proportionate to its magnitude, and it was this sacred edifice, or, rather, its predecessor on the same spot, which did much for the making of Tours,—for to it flocked thousands of pilgrims, and the reputation of the shrine of St. Martin gradually gathered round it a town as large as the ancient city of Tours, to which it was adjacent. The division between the two towns is now quite obliterated, and a matter merely of historical interest. The cathedral is an interesting building, of all styles from the twelfth century to the sixteenth, during which long interval it was continually growing. The choir is of vigorous Early French work, the western towers are strongly tinged with Renaissance, to which period belongs the charming open lantern that crowns the staircase of the southern tower. The north tower also has its peculiar attraction, the *escalier Royal* (fig. 10, lithograph), an open, circular staircase, supported on the intersection of eight thick skeleton vaulting-ribs at the parapet level. This north tower is finished at the top with a vaulted dome, on the keystone of which is decipherable part of an inscription in French and Latin, giving the date of completion (1507): AN MIL. V. ET. VII. FVYFAICT. CE. NOBLE. CLOCHER. R. . . . NO. FETM. EST. ISTVD. ET. EST. MIRABILE. OCLIS. . . . From the parapet of the tower a fine view can be obtained of the town. All round is a wilderness of ancient roofs intersected with narrow, crooked streets; here and there are the trees of a garden, and yonder the continuous line of foliage that shades the new boulevard—above the roofs rise many towers, notable among them the two that mark the site of St. Martin's Abbey church; near them, hardly to be distinguished, is the turret called after Tristan l'Hermite; and



far away, by a shining roof, we are told Plessis-les-Tours can be seen. Close beneath our feet is the Tour de Guise, interesting to an Englishman as being the last relic of a Royal palace built by Henry II. of England; among the houses, somewhere by the Towers of St. Martin, are the remains of the cloisters of that church, a small but beautiful piece of Renaissance work, now enclosed in the buildings of a convent. All along one side of the town flows the broad river, spanned by a long bridge across which in January, 1871, the German army entered the town.

From Tours two more notable châteaux are reached, Azay-le-Rideau\* and Chenonceaux, as well as the memorable town of Loches. Azay-le-Rideau is a small and rather curious little market-town on the banks of the Indre. At the end of a narrow street are the gates of the château, which lead into an irregular yard, across which the visitor finds his way to a wooden bridge, and so to the front of the house. Though smaller than the châteaux already visited, it is quite as pleasing, and far less overpowering in the multiplicity of its carved subjects. It is very simple in plan, being merely L shaped, and at each corner rises a circular tower crowned with a steep conical roof. The windows are ornamented with the usual pilasters, carved in low relief, and the top story is brought forward on a row of bold corbels, recalling the methods of military architecture already almost obsolete when this house was built. The front entrance is the most richly-treated feature. It consists of two arches, over which are grouped the double windows of the staircase, two stories high. As these windows (being on the half-landings) do not range with those of the main floors, they are enclosed between pilasters, and thus divided from the main front; they are formed into a feature by themselves, and with their niches and carved friezes and panels give great richness and importance to the entrance. In the panels beneath the lower windows are the salamander of Francis I. (fig. 11) and the ermine of Anne of



Brittany (fig. 12). The former has the motto, "Nutrisco et extinguo," and the latter "Ung seul desir." There are two explanations given of this device and motto of Francis. One is that it is a misreading of the motto on a medal which was struck in his honour in 1504, which shows a salamander in flames and the Italian words, "Nutrisco. albuono. stingo. elreo. MCCCCCIII." (I nourish the good and extinguish the bad); and the other is that he adopted the salamander as denoting his ardent disposition, and the Latin motto, "Nutrisco et extinguo," as implying that while nourishing his passions he could at any time extinguish them.

The interior of the château contains many objects of interest in the way of furniture and pictures; and the staircase is not in a circular tower, but consists of two straight flights to each floor, lighted, as already said, on the half-landing by the windows over the front door. In this respect it is like the stair-

case at Chenonceaux, but while the vaulting of that is enriched at the intersections with bosses only, this at Azay-le-Rideau has long ornamental pendants, which give it a very rich appearance. The steps themselves are much worn away, and as they are slippery with long use, the pleasure of gazing at the ceiling is closely allied to the pain of taking a sudden seat on the edge of a step. The situation of the château near the river adds to its charm, as some of the water is utilised to form a small lake, part of which ripples up to the very walls and receives the image of the quaint turrets on its surface.



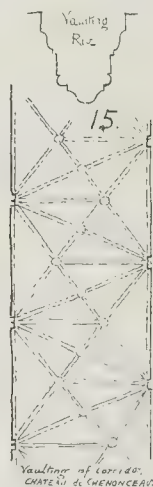
Even more picturesque in its situation is the Château of Chenonceaux, which is built partly on two very small islands on the Cher and partly on piers which stretch across the river and form an actual bridge, carrying two long galleries. At the present time the aspect of the place is very cheerless, for misfortunes have befallen the owners, and the place, with all its furniture, is to be sold. The rooms are all but empty, the tedious process of removing the furniture and the accumulated odds and ends of years is coming to a close; the floors are littered with scraps of paper, and pamphlets, and old newspapers; workmen pass and re-pass on their melancholy task, with no more feeling for its sad significance than if they were dragging the lots about in an auction-room. Eleven o'clock arrived, they repair to the servants' hall, which soon resounds with their mirth,—a strange contrast to the decorum which reigned there in Madame's time. And the house itself: it is restored, of course, and has been carefully kept up, the very pains which have been bestowed upon it only rendering its present condition the more melancholy. From one empty floor to another the visitor can wander at his will; all the rooms are open to his profane step, from the bath-room with its poor frescoes, bad in drawing and broad in taste, to the long gallery, where the ceiling was undergoing a process of grand decoration only a month or two ago. And such a process! One is almost thankful to find it cut short. The room is more than 100 ft. long, by some 16 or 20 wide. The whole ceiling is covered with a nightmare of the clever French art of to-day.

It represents, in divisions which run confusedly into each other, the various countries of the world, specimens of whose inhabitants, with appropriate surroundings, are divided from each other by real objects, such as spears and assegais, and palm-leaves and many pieces of looking-glass, all secured to the ceiling. This mixture of the real and the ideal is bewildering enough in itself, without making the imagination pass at a bound (as it must) from Paris to Pekin, or Trouville to the Transvaal. And yet the whole thing is done with wonderful cleverness and skill, and we may at least be grateful that modern French art has not given us on this ceiling the acres of the gory and the nude with which it delights to cover the walls of the *Salon*.

The depressing effect of the château is not relieved by going to the large, neglected Italian garden, where decay must have set in long ago. But when it was cared for, and kept in good order, when the rank weeds did not half clothe the surface, and when the parapet walls were entire, the effect must

have been very fine. The parapet walls are treated in a curious but effective manner. They are covered with a reddish stucco into which black cinders have been stuck while wet, in a series of exceedingly elegant designs. The process, however, would be somewhat costly, for, although the materials are cheap, it would require a trained and skilful hand to arrange them (fig. 13).

In spite of the unsparing restoration that has taken place, there is much that is old and genuine left in the château, such as ironwork and woodwork, and sixteenth-century wall-coverings. The staircase is (as already noticed) treated in a different way from most of those in the district, being in straight flights returning on each other (fig. 14, lithograph). The plan of the vaulting of the entrance corridor, too, is rather unusual (fig. 15). The



whole place, with its drawbridges, and turrets, and its isolated tower, with the water flowing beneath it, its landing-stage, and the long lines of its Italian garden, forms a group as picturesque as it is uncommon; and withal, the Englishman, as he gazes upon it, feels that in his own land are things he likes even better.

Between Chenonceaux and Tours is the little town of Bléré, also on the Cher, and on the outskirts of the town is to be seen a curious monument of the Renaissance, called La Chapelle du Marché (see separate lithograph plate). This, at least, is not restored: it bears on its face and all about it marks of the uninterrupted neglect of a long series of years. It is, however, under official patronage, for the key is kept at the Mairie, and so long as wilful destruction is averted, it tells its tale, and will tell it, as well as, and better than, if the most learned *savant* from Paris were brought down to set it to rights. It is a two-storied structure; the lower one is vaulted, and was used as a chapel; the upper one is domed and is inaccessible, no traces of any means of access being visible. The detail is all of good Renaissance character, the carving of the capitals and the piscina being of the usual beautiful delicacy. It was erected as a memorial to Guillaume de Seigne in 1526, and, as he was Receiver-General of the Artillery, the doorway is carved with cannons shooting forth flames, and with panels of cannon-balls and flames. The building, though small, is of considerable interest.

Along the valley of the Cher, past many dwellings cut in the rock through which, ages ago, the river slowly made its channel, the railway finds its way back to Tours. But as we leave this fertile district where the acacia blossoms scent the air, as we recall the princely pile of Chambord, the terraces of Chaumont high above the Loire, the rooms at Blois empty of everything but gloomy memories, as we think of the shadows that

\* A view of Azay-le-Rideau, reproduced from a photograph, was given in the *Builder* for March 30 this year.



lie round Azay-le-Rideau, or the air of desolation that envelopes romantic Chenonceaux, we feel that in our own land we have places no less beautiful, and we look forward to driving once more in quest of ancient manor-houses through quiet lanes amid the fragrance of our English bean-fields.

NOTES.

**N**OT the least important of the many schemes which have been undertaken by the Post Office for the public benefit comes into operation on Monday next. We refer to the Telegraph Money Orders, the issue of which will, however, for the present, be confined to London, Liverpool, Manchester, and about a dozen other important centres. They will be a somewhat expensive luxury,—the commission being exactly double that upon ordinary Inland Money Orders,—and will not be issued for a greater amount than 10*l*. In addition to the increased commission, a charge will be made, at the ordinary Inland rate, for the official telegram authorising payment at the office of payment, and for the repetition thereof, the minimum being 9*d*. The higher scale for commission may be easily understood, but the additional charge for transmission, &c., will probably prevent many from making use of the new system. The charge for the repetition of the message might very well be borne by the Department, seeing that it is quite as important to them as to the remitter that correct particulars be telegraphed. Of course, any message to the payee concerning the remittance must be paid for by the sender at the usual rate; and, altogether, it seems likely that the system will be rather too costly to be very extensively adopted. At the same time, as it provides a ready means for the immediate remittance of small sums, certain kinds of business transactions will be facilitated, and if the experiment proves successful in the towns selected, it will doubtless be extended.

**T**HE Royal Scottish Academy has applied for a new Charter, and, amongst the reasons for that request being granted, it is stated that "the Academy has, since the existing Charter was granted, carried its objects into effect with much success." Several letters have been addressed to the *Scotsman* with the object of refuting that assertion. Especial objection is taken to the manner in which the pension fund has been administered. The word "aged" has been held to apply to all members who reach the age of sixty, and not as implying that they are incapacitated or in needy circumstances, and it is alleged that members in possession of ample means have not scrupled to claim a pension, thereby decreasing the amount available for needy members and widows. The Academy, it is maintained, was established "not to enrich artists, but to advance art," and that it has not done so to the extent that might reasonably have been expected. The full designation of the body is "The Royal Scottish Academy of Painting, Sculpture, and Architecture," but amongst the three allied arts the latter two have been almost ignored. There is a life school for the painter, but no modelling class for the sculptor, or any means of instruction for the architectural student. Mr. Dick Peddie is the only architect who is an Academician, and he defends the body of which he is a member; but he meets with a plucky opponent in the person of Mr. Hippolyte J. Blanc, who is an outsider. "Painters," he says, "may have a claim to first place, but not to a monopoly, as they have at present, and as is proposed in the new Charter. Proportionate representation alone can secure what the public, and especially the art section of it, have a right to look for. Why divorce architecture till there is not one practising architect on the Academy roll? Surely the art which has given a home to the Academy for upwards of forty years—the art which makes a city, the art which lays the

foundation for both sculpture and painting—should not be discarded."

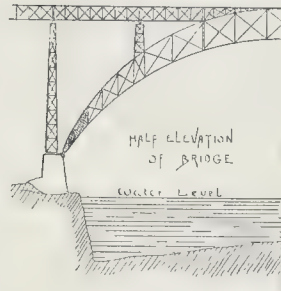
**M**ESSRS. POWELL, of Whitefriars, had on view last week a very fine stained-glass window, circular in form, designed by Mr. Holiday, and intended for the Library of the Drew Theological Institute of Madison, New Jersey. The subject given to Mr. Holiday was "Theology," the treatment being left entirely to the artist without any further suggestion. He has represented "Theologia" as a draped female figure in a smaller circle in the centre of the window, seated on a globe and facing the spectator, the space on each side of the figure, above the globe, being filled by two angels in adoration with outspread wings. Across the circle, behind the figure but in front of the attendant angels, runs a broad inscription bar with the words,—*SICUT EXALTANTUR CÆLI A TERRA SIC EXALTATE SUNT VLE MEÆ A VIIS VESTRIS.* Around the outer circle of the window are grouped allegorical figures as subordinate to "Theologia." In the upper portion appear "Fides," "Caritas," and "Spes"; below are on one side "Historia" and "Philosophia," on the opposite side "Scientia" and "Ars," and beneath is appropriately placed the figure of "Humilitas" leading forward by the hand a child who looks upward to the centre figure, with the motto "*Docet miles vias suas.*" The design is truly decorative in style in relation to the material, but without the slightest affectation of archaism or Mediæval stiffness; the figures are natural and free in their attitudes, but so arranged as to fill up the space well without any appearance of constraint. The warmest and richest colour is reserved for the central compartment, the rest being kept subordinate but still rich in tone. The window is one of the finest of Mr. Holiday's designs, and has been admirably carried out by Messrs. Powell from his coloured cartoon.

**U**NDER the heading "Floral Anachronisms in Art," Mr. Tegetmeier, in a letter in the *Field* of last week, calls attention to an amusing instance of anachronism in Mr. Dendy Sadler's clever picture, in the last Royal Academy, "The Widow's Birthday." He says:—

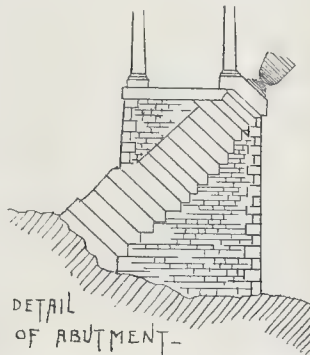
"The gentlemen are all three attired in costumes such as were worn towards the close of the last century, say from 1770 to 1800. Trained over the front of the widow's house is a fine specimen of Clematis jackmanii. It is quite characteristic, and admirably painted. This beautiful clematis is a hybrid, which was produced, about 1855, by crossing Clematis viticella with C. lanuginosa, the latter species having been brought to Europe from China for the first time in 1861, by Mr. Fortune. The clematis portrayed in the picture did not exist till some seventy years after the date at which the costumes of the gentlemen were worn. Again, Clematis jackmanii blooms in July and the beginning of August; by the end of the latter month the flowers are over and the petals shed. In the picture the plant is in full bloom, yet one of the gentlemen bears a brace of partridges, which indicates September."

The partridges along with the flower in bloom was a great slip; in regard to the first part of the charge, we do not see that painters are bound to know the history of gardening. The two mistakes are of a different order. The flower might just as well have been produced a century earlier, if gardeners had been as expert and enterprising as in later times; but it could not have bloomed in partridge-shooting time. An expert critic could probably pick out many more instances of the inattention of painters to the actual facts of what they are portraying. We will give one mechanical error from the last Academy; in a picture representing men at the pump on board a ship the pump is shown as a double plunger one, worked by a crosshead handle, one stroke being down while the other is up; but the water is shown pouring out of the nozzle on the down stroke side as freely as out of the other side, the artist having contented himself with painting a pump and water pouring out, without thinking of the *modus operandi*.

**A**MONG the small pavilions of various kinds which skirt the char-à-banc railway at Paris, at the Champ de Mars end, is a neat-looking house bearing the name of "Eiffel." This, which is one small compartment with a central passage and a door at each end, appears to be intended as a compendium of M. Eiffel's engineering works previous to the Eiffel Tower; but the show is not very extensive. It principally consists of one model and some drawings illustrating a couple of large iron bridges constructed on a special plan of M. Eiffel's, and which we presume illustrate that use of arched ribs which he claimed the other day to have invented, and to have applied to the lowest story of the Eiffel Tower. A sketch of one of these, made from the diagrams exhibited, will indicate better than words the nature of the work



illustrated. This is the rough elevation of the bridge erected by M. Eiffel over the Douro, in which an arched form is combined with a straight girder. The system of building the curvilinear girder from a very narrow base looks very workmanlike in the sense that it allows easily for the provision for movement of the girder under variation of temperature (as it is allowed for in the same way on the roof of the Galerie des Machines); it has however the objection of concentrating an enormous weight on a very small impost area. The manner in which the masonry pier is built to provide abutment for the curved rib is shown in the enlarged sketch of the pier.



These bridges have a bold and very original appearance, but we hear that they have not proved entirely satisfactory in execution; that they sway to a certain extent, which indicates an error in theory of construction, and that bolts have been known to drop from them into the valleys beneath, with, of course, considerable chance of injury to persons passing, which indicates, if not error, at least deficiency of another kind in the practice of construction.

**T**HE following information, given by Sir H. Maxwell in the House of Commons on Tuesday evening, in answer to a question as to the condition of the roof of Westminster Hall, is we presume authentic as to its facts, and may be of interest to those of our



readers who have not noticed it in the *Times* report—

"In answer to Mr. Isaacson, Sir H. Maxwell said.—The roof of Westminster Hall has been recently inspected and is in good condition, with some exceptions round the dormers on the eastern side. It is, however, proposed to remove these dormers shortly, and to make good any defects. There are no bolts holding the slates on the roof, the old slating having been held on by very small oak pins weighing under an ounce each, some of which, displaced at the time of the explosion, may possibly have fallen. The remainder of the slates, which were fixed after the explosion, are secured in the usual way with copper nails."

At the death, on March 6 last, of Louisa, Countess Dowager of Kinnoull, it was stated that she was the last survivor of the lady patronesses who in a former generation gave a *cachet* to society, and ruled supreme in the assembly-rooms in King-street, St. James's-square. Almack's was since known as Willis's Rooms, from the Mr. Willis who there succeeded to Almack, and was, in turn, succeeded by his son, now deceased. In June, 1886, a company was incorporated by name of "Willis's Rooms (Limited)" to purchase the business, with effects, stock-in-trade, &c., from Mr. James Taylor for 55,000*l.*, of which sum the larger portion was to be obtained on mortgage. By order of the first mortgagees the whole leasehold property is to be put up, as a going concern, for sale at auction in October next. The property is held upon leases, with covenanted extension, for about fifty-five years unexpired, at an aggregate rent of 1,248*l.*, reduced by a portion let off for 445*l.*, to 803*l.* per annum. It comprises Nos. 26, 27, and 28, King-street, southern side. No. 27 is a picture-shop; No. 28 a wine merchant's, with part reserved for the Orleans Club billiard-rooms. No. 26, designed by Robert Mylne for Almack, contains the big hall or ball-room, 90 ft. by 42 ft., two large ante-rooms, a supper or assembly room, 45 ft. by 42 ft., with serving-rooms, offices, and the like, and a range of living-rooms above. To Almack, a Scotsman, and his connexion with the Thatched House Tavern and the present Brooks's Club, we adverted in a "Note" on December 8 last. On February 12, 1765, he opened his new rooms in King-street with an ill-attended assembly, as is described by Walpole in a letter of 14th *idem* to Lord Hertford. For particulars of the balls and routs that were celebrated at Almack's by a circle whose rigid exclusiveness is a thing of the past, our readers should turn to the pages of "Recollections of Society," by the late Lady Clementina Davies, *née* Drummond (1872), Captain Gronow's "Reminiscences" (1872), and the "Journal" of T. Raikes, and similar books. Hither removed the Dilettanti Society upon the demolition of "The Thatched House," St. James's-street; and carried their fine collection of portraits, whereof the two groups by Sir Joshua were lately placed in the new staircase at the National Gallery. Here Braham and Mrs. Billington enchanted their audiences eighty years ago; here Charles Kemble gave readings from Shakespeare; and at Willis's Rooms, in 1851, Thackeray first lectured in public, choosing for theme the English humourists, he being then at work writing "Esmond."

THE Town Council of Edinburgh have approached the Government with the object of procuring the concession of a portion of the ground behind the ornamental stone screen in front of the General Register House. This portion of the city may be looked upon as its Charing Cross, where there is a concentration of traffic from all directions. A movement with this object was made about fifty years ago, and the screen wall was then placed back several feet from its original position. Considerable opposition was raised to that proceeding, as it was by many considered that damage would be inflicted upon the fine architectural effect of the façade of the Register House, which owes much to the screen in front of it. The fears entertained were not realised, but we suspect that a fur-

ther concession will have a damaging effect aesthetically. It is at the east end, at the top of Leith-street, where the congestion of traffic is most felt, and the throwing back of the screen, or its total removal, seems the only feasible means of getting over the difficulty.

THE site fixed upon for the new Scottish National Observatory is the eastern slope of Blackford Hill, immediately to the south of Edinburgh. This hill was recently acquired by the City as a place of public recreation, and the Town Council has expressed its willingness to give up the portion which may be necessary for the new buildings at the same cost per acre as was paid for it. As already stated in this place, the old observatory on the Calton Hill has been acquired by the city, and the new buildings are to contain the magnificent set of instruments presented to the nation by the Earl of Crawford.

AN archaic marble relief which has been exciting a good deal of attention in Athens is published in the new issue of the "Bulletin de Correspondance Hellénique" (xiii. v., 1889), by M. Lechat. The relief is remarkable in the first place for the admirable preservation of its ancient colour. The background has been painted blue; the hair is mostly red, but in one case brown, and the dress of the figures is partly red, partly brown. We mention the colour especially because unfortunately the reproduction is not a coloured one. Of still greater interest is the scene represented. A man walks in front, piping on the double-flute; behind him come three women figures dancing. Were this all we should have no hesitation in pronouncing the relief to represent Hermes with the three dancing nymphs—a well-known type preserved in countless reliefs; but in the present instance there is a curious addition,—the last woman holds by the hand a diminutive male figure, possibly a child, possibly a mortal of small stature as compared to the three goddesses. M. Lechat unhesitatingly pronounces the design to be a representation of the three Graces led by Hermes; he thinks the small male figure is a mortal initiated to their dance; but M. Lechat goes rather too fast in drawing this conclusion. That the Graces were worshipped near the Propylæa we know from Pausanias, and the relief in two fragments was found not far away; but the reliefs hitherto known of the Graces represent them alone, without Hermes; the figure of the diminutive mortal joining the dance is also wholly without precedent. Be the subject what it may, the design is very interesting, and will remind many a traveller of the *syrtos* he may still see danced by the modern Greek peasant.

At a sitting of the Consistory Court, in St. Paul's, on the 19th inst., Dr. Tristram, Q.C., Chancellor of the Diocese, granted a faculty for the carrying out of various improvements in the parish churchyard of St. Mary, Islington. The vicar, it seems, has undertaken to make very substantial contributions towards the building of a Mission and Parish hall, whose site he has purchased, and of a new vicarage house, both of which will abut upon the burial-ground. So a faculty was sought for the making of a new pathway through the churchyard. This pathway, like the others here, will be railed in, and be fitted with end gates. The Fire Brigade station, as we are informed, stands on the site (once the "Old Parr's Head" yard and skittle-ground) of the former vicarage whereat, during the last eleven years of his life, Dr. Johnson used to stay with the Reverend George Strahan, son to William Strahan, the King's Printer, and to whom he bequeathed his Greek testaments and Latin bibles. In this churchyard were buried his friend, John Nichols (1826), of "Literary Anecdote" fame; Richard Earlom (1822), engraver of Claude's "Liber Veritatis"; and Osborne (1763), whom Johnson chastised for impertinence. The Parish church,

having a tower of brick and a stone steeple, was built in 1751-4 after the designs of Lancelot Dowbiggin, who competed with Gwyn and Mylne for the making of old Blackfriars Bridge. His design for the bridge, of eleven arches, appeared in the *London Magazine* for April, 1756. On taking down the old Gothic church, the date "1483" was found inscribed on a stone beneath the western gallery. A woodcut of it, after Toms's view of 1738, will be found in Hone's "Every-Day Book" vol. ii., cols. 505-6. The churchyard, of about one acre and a half, was laid out in 1884, at cost of the Vestry and the late Metropolitan Board of Works. The latter body set about the widening of Upper-street rather more than two years ago. Those alterations have almost quite destroyed the old-fashioned aspect of the main thoroughfare. Augustus Welby Pugin's drawings of old Islington were engraved on thirty-one copper-plates in 1810. Amongst the best illustrated books upon its history and topography, are J. Nelson's, 4to (1810), and T. E. Tomlin's "Perambulation," 8vo (1858). We read, also, that the Vestry, having decided to adopt the Public Baths and Washhouses Acts, will borrow 50,000*l.* wherewith to provide three separate establishments for a population which already exceeds 300,000 persons.

WE regret that we received last week a copy of the *Coventry Times* of August 21, containing a letter from Mr. Webster, the clerk of works who has been employed at the work on St. Michael's tower, too late to comment on the said letter as we would have wished. It affords a striking example of the curious union of scientific ignorance with inordinate vanity, or what is sometimes called "bumptiousness," which frequently distinguishes those who boast of being "practical men." In a letter overflowing with self-complacency, Mr. Webster undertakes to show how, in spite of the opinions of the architects, St. Michael's tower can be made strong enough to swing the peal of bells again; and this is how it is to be done:—

"It is a well-known fact that iron built into walls will never rust or corrode, because the atmosphere cannot get at it. On this principle, iron hoop bond is always built into thin brick walls—it adds great strength to them, and certainly never rusts. Where iron is built and bedded in with pure Portland cement the strength obtained is immense, because Portland cement has an affinity for iron, as it has for stone. It is, practically speaking, as hard as iron, and goes right into the stone. (If iron is objected to, use copper.) This fact—which cannot be questioned—being admitted, that a plate of iron used in this way must strengthen the wall to such an extent that it is impossible to estimate or to calculate it, the only problem to be solved is one of simple multiplication; put as many of these bands into the walls as will make the steeple strong enough to allow the bells to be rung up in full peal in the octagon."

It seems too absurd to notice such a statement seriously, but as some people in Coventry seem to be making a kind of oracle of Mr. Webster, they had better be told plainly that the statement above quoted is only remarkable for the astonishing ignorance of his business which it displays as coming from a clerk of works; that it is one of the commonplaces of building experience that iron in any quantity is one of the most destructive things that can be put into stone or brick walls; and that as to the analogy of hoop-iron bond, Mr. Webster is wrong in three different senses. 1st, hoop-iron bond being so thin in substance cannot be compared in its effects with thicker masses of the same metal; secondly, it is not looked upon now, by the best constructors, as anything more than a temporary assistance in tying together new walls on a risky foundation, and is somewhat doubtfully regarded even in that capacity; thirdly, that even hoop-iron bond has been known to rust sufficiently to cause the overthrow of a wall. Col. Seddon in his "Builder's Work" (the best practical book on building construction of late years) mentions a case where hoop-iron bond rusted up to three-quarters of an inch in thickness,



and caused the fall of a prison wall under a wind pressure which otherwise would have had no effect on it. Perhaps after this the wisecracks who have been "running" Mr. Webster in the local paper referred to will think it as well to receive his effusions with a little more caution.

#### THE BIRMINGHAM ELECTRICAL AND INDUSTRIAL EXHIBITION.

It was originally intended that the Exhibition in Bingley Hall, Birmingham, should be entirely devoted to the applications of electricity, but it was ultimately decided that it should also comprise industrial exhibits. The display cannot compare in extent with the vast shows of electric and power plant to which the public have become accustomed of late years, and on this account it was the more disappointing that a great many of the exhibits were at the time of our visit far from complete, while vacant spaces alone served to mark what the official catalogue led one to suppose would eventually be filled with objects of great interest.

Messrs. Fowler, Lancaster & Co., of Birmingham, are the engineers to the committee. The lighting undertaken by them has been carried out by means of Thomson-Houston plant; forty arc lamps of 2,000 candle-power are used—twenty-four in the Hall itself, six in the Winter Garden, and ten outside the building.

To the left of the entrance is an artificial coal mine, which, when finished, will give those who do not care about going down a real pit an excellent idea of what a working mine is like. The scheme has been carried out by Mr. Foggs, engineer to the Earl of Shrewsbury, whose aim has been to make it as realistic as possible. The lift is not yet in working order, but it is constructed so that when visitors have been lowered a little distance the walls of the shaft move rapidly upwards, while an artificial draught is produced by means of a Blackman's fan, supplied by Messrs. Wright & Co., of Birmingham. Finally, the cage reaches the cellars of the hall, where everything is arranged as in an actual mine. At present the illusion is spoilt by the temporary entrance being down a few steps through a side door. Close by the head of the pit-shaft the National Telephone Company have a call office, which is placed at the disposal of visitors to the Exhibition.

The Machinery-hall is in the opposite corner of the building, and may next be visited. Steam is supplied from two Galloway boilers capable of working up to 800 h.-p., each, at a pressure of 100 lbs. to the square inch. Messrs. Greenwood & Bailey, of Leeds, exhibit an 80 h.-p. Armstrong & Sims engine, which drives the Thomson-Houston dynamo for the Committee's lighting. Messrs. Ruston, Proctor, & Co., of Lincoln, have an 80 h.-p. compound engine. Messrs. Robey & Co., of Lincoln, a 30 h.-p. compound, and two high-speed electric light engines, only one of which is compound. These latter run by no means silently, and will not compare favourably with the high-speed engines of certain other makers, the beautifully-balanced parts of which ensure silent working with a minimum of wear and tear. There is also an Otto gas-engine, in which the old slide-valve is dispensed with and an ignition-tube used.

Just outside the Machinery-hall, the Anglo-American Brush Company have erected a Raworth vertical compound engine, which drives their exhibit in a somewhat novel way. The engine drives a 35 Kilowatt Mordey alternator, giving 2,000 volts; part of the current goes direct to a transformer circuit of 100 volts for lighting a portion of the Hall with eight 2,000 candle-power Brush alternate-current arc lamps, in series with each of which is put an impedance coil. The rest of the current goes to a 24 Kilowatt Mordey alternator, which is thus made to act as a motor, and drives an E2 Victoria Machine for supplying 400 incandescent lamps. Such an arrangement would not, of course, be used in practice, but in view of recent controversy, this particular exhibit is of very great interest.

Mr. A. A. Goldston, of Middlesbrough, has always been a strong advocate of the Brush system, and the lighting he has undertaken is carried out, entirely in series, from a Brush dynamo-machine, with the addition of certain devices of his own. To one of the high-speed Robey engines, driving Mr. Goldston's dynamo, is attached an electrical governor for constant

current, to which has been added a heavy armature, which falls and cuts off steam should the current stop, thus preventing all danger from racing. An ordinary Brush regulator, connected as a shunt across the field magnet coils of the dynamo, is also placed in position, and can be used instead of the electrical governor. The fifteen Brush arc lamps so controlled run with remarkable steadiness, in series with fifty 32-candle-power low resistance incandescent lamps; these latter are fitted with an exceedingly simple form of cut-out, which is placed entirely inside the bulb. A special form of main switch, to be used in each house in town lighting, completes the special features of Mr. Goldston's system.

Messrs. Scott & Co., of Newcastle-on-Tyne, exhibit a new form of dynamo-machine for the first time; it is four-poled, with a flattened ring armature, the coils coupled up so as to need but two brushes. The field magnets, arranged in a square and set up on one corner, present rather an odd appearance. At present the machine is running six 3,000 candle-power Tyne arc lamps and a motor abreast. The same firm also exhibits launch-engines, pumps, and various other objects of general engineering interest.

Messrs. Laurence, Paris, & Scott, of Norwich, are showing some of their dynamos and motors, these latter being placed in various parts of the Hall to give power to the machinery of other exhibitors. They also show a small dynamo and special form of steam-engine coupled together on one bed-plate, besides meters, switches, cut-outs, and various other contrivances.

Messrs. Laing, Wharton, & Down, of London, exhibit Thomson-Houston electric lighting plant, and give a prominent position to an electric welding machine. The one shown, or rather shortly to be shown, in action, is supplied with the necessarily large current by means of a transformer at the back of the apparatus. When in working order this stand will form one of the chief attractions of the Exhibition.

Messrs. Elwell-Parker & Co., of Wolverhampton, are showing their various dynamos, motors, and accessories, their machines being also exhibited by other firms in various parts of the Hall, notably at Messrs. Crossley's stand, where a 4-h.p. Otto gas-engine drives an Elwell-Parker machine for the purpose of charging a battery of their B31 type accumulators.

Messrs. J. E. Hartley & Co., of Birmingham, exhibit the various chemicals and apparatus used for electro-plating, as do also Messrs. W. Canning & Co. and Messrs. Cruikshank, of Birmingham. Considering that Birmingham produced the first plating machine, it is curious what peculiarly bad dynamo-machines electroplaters are contented to use; not only are they badly designed, but some of them are so flimsily constructed that the wonder is how the armatures hold together for any length of time.

The Edison & Swan Company naturally have the finest display of incandescent lamps in the Exhibition. Artistically arranged in a glass case, there are lamps varying in size from  $\frac{1}{2}$  to 500 candle power. A new focus lamp, for use in a lantern, has the filament coiled into a helix, which is doubtless a great improvement in many cases. The Electrical-Power Storage Company fill their stand with various forms of accumulators and automatic apparatus to be used with them.

The Planet Electrical Engineering Company, of Westminster, have eight alpha arc lamps lighting part of the Hall; their chief peculiarity is that the regulating mechanism is actuated by a little motor, the field magnets of which are in series with the arc and the armature in shunt with the magnet coils. They apparently require some little adjustment, after which they will doubtless run satisfactorily.

Messrs. Fowler, Lancaster, & Co., have on view some very handsome designs for electroliers, and general fittings, which are at present being arranged. Messrs. Thonet Brothers, of London, exhibit some electric chandeliers in bent wood. They are decidedly novel, and though somewhat heavy in appearance, will admirably suit certain styles of decoration. Messrs. Appleton, Burby, & Williamson, of London, show a very varied collection of switches and cut-outs made of inflammable materials, and constructed so as to give the least possible trouble from sparking. The contacts are very massive, and the switches for large currents snap off as soon as the handle has moved through a certain angle. They also show an automatic arrangement for use with se-

condary batteries, and a patented form of battery cell made of some pliable material. The General Electric Company have a very interesting case of apparatus for almost every conceivable purpose in which electricity plays a part. Some of their pushes and switches are very novel and quaint in design. Messrs. Woodhouse & Rawson display an interesting collection of old telegraph instruments and some measuring instruments of neat construction, but their stand is far from complete. The Acme Electric Works, of London, show a great many Cockburn switches and cut-outs, and some multiple-break switches.

Messrs. Walter T. Glover & Co., of Manchester, Messrs. W. T. Henley, the Callendar Bitumen Telegraph and Waterproof Company, of London, and Messrs. Fowler & Co., of Leeds, have stands showing the various wires and cables respectively manufactured by them for electrical purposes.

Messrs. Buller, Jobson, & Co., of London, Birmingham, Dudley, and Hanley, have erected a telegraph-wire centre on the roofs of two houses, carrying every conceivable form of insulator with wires attached. Budding electrical engineers would do well to study this structure very closely. Mr. Julius Sax, of London, has a very interesting exhibit of electric bells, burglar alarms, automatic fire-call bells, electric billiard markers, and a great number of other useful contrivances.

A Snelgrove electric weighing machine has been sent by Messrs. W. T. Avery, of Birmingham, in which the counterpoise is shifted to the right position on the lever by a little electromotor. The Admiralty show a Whitehead Torpedo complete and in section, together with other apparatus for carrying on marine warfare.

Well-arranged cases of apparatus are exhibited by Messrs. Nalder Bros. & Co., of Westminster, and Messrs. John Davis & Son, of Derby. Messrs. Muller, of Bradford, send a case of the well-known Schuckert measuring instruments.

The Schanschiff Electric Battery Syndicate have on view some of their primary batteries for incandescent lighting on a small scale; as have also Mr. T. Coad, of London.

Readers of Sir David Salomons' little book have an opportunity of seeing the somewhat complicated arrangement of apparatus used by him in his installation at Broomhill for automatic regulation; although the collection goes into a small glass case, time and patience will be required to follow the connections and functions of the various parts.

Some of the gas-engines which are doing work prove that the Otto is now by no means alone in the field. Messrs. J. B. Barker & Co., of Birmingham, show a Forward gas-engine, with rotary ignition, which appears to work with almost perfect regularity; and a Griffin gas-engine, which is double acting, exhibited by Messrs. Dick, Kerr, & Co., of Birmingham, shows the great advances that have recently been made in this kind of engine.

A feature which is especially noticeable throughout the exhibition is the free use that has been made of electric motors for the machinery in motion; apart from the interest attached to such use from an electrical point of view, the gain in appearance and safety to attendants and visitors by dispensing with unsightly counter-shafting and dangerous belts is immense; it is to be hoped that in all future exhibitions of machinery, whether electric or otherwise, this means of transmitting power will be universally adopted.

Amongst the exhibits that will eventually add to the interest of the exhibition must be specially mentioned the aerial telpher line, which will carry visitors round the gallery of the Winter Garden, now in course of construction by the United Electrical Engineering Company, of Westminster; this example of overhead electric traction will be novel to most of those who visit Bingley Hall. The Julien Electric Tramcar Company have space reserved for one of their cars, and Messrs. Immisch & Co., of London, will shortly have one of their motors, designed for tramcar traction, on view at their stand. Messrs. Crompton & Co., of Chelmsford, promise an electric crane, all the movements of which can be controlled by three levers. From Messrs. Shippey Bros., of London and Levallois-Perret, great things may be expected, as the list of the plant they propose exhibiting extends over more than two pages of the catalogue, though as yet the few articles which are in position call for no special notice.

At the end of the Hall opposite the entrance





An American Country House.

an organ-gallery has been erected, and from it Messrs. Gilmer's Military Band plays selections of music at intervals during the day; the organ has been supplied by Mr. Halmshaw. In front of the gallery artificial rock work has been tastefully arranged, and the sound of the small cascades and fountains splashing into a little lake on the level of the floor is very refreshing to listen to.

The gymnasium attached to the hall has been converted by Messrs. Vertegans & Co. into a Winter Garden, at one end of which there is a small artificial waterfall.

Everything possible has been done to make the Birmingham Exhibition as attractive and complete as the space at command will allow.

#### AN AMERICAN COUNTRY HOUSE.

THIS is an example of the modern "picturesque" American country residence. The ground-story walls are of brick, and the upper walls covered with shingles. The architect was Mr. R. H. Robertson.

#### THE CAMBRIAN ARCHAEOLOGICAL ASSOCIATION IN BRITANNY.

FOR the first time in the history of the Cambrian Archaeological Association has the annual meeting been held outside the limits of Great Britain. This year, instead of visiting some locality in Wales, it was determined to go to Brittany, and to make Auray and Morlaix the chief centres for the excursions. It had long been felt by the committee that it would be very desirable to give the members of the Association an opportunity of comparing the antiquities of the Principality with those of Brittany, not only because the race of dolmen-builders at one period inhabited both countries, but also on account of the intimate connexion which existed between the early Breton and Welsh saints. The science of comparative archaeology is almost lost sight of in England, and it seems to be quite forgotten that many of the problems which, looked at from our narrow insular standpoint, appear to be insoluble, are not really so if we would only take the trouble to go further afield and examine the ancient monuments and objects preserved in museums abroad.

Animated with a desire to enlarge the scope of Welsh archaeology, a party of twenty-two members of the Association started from Southampton at six o'clock in the evening of August 12 in the South-Western Railway Company's steamer for St. Malo direct. After a smooth passage, St. Malo was reached early on the following morning. Before proceeding further on the journey some hours were spent

in wandering through the narrow streets of this rather dirty town and walking round the ramparts of the walls, from which beautiful views of the sea are obtained on all sides. St. Malo, or Malo, was a Welsh saint who founded the see of Aleth, a Gallo-Roman city occupying the site of what is now St. Servan, in the middle of the sixth century. Bishop Jean de la Grille removed the see from Aleth to the Ile d'Aaron, afterwards called St. Malo, in A.D. 1144. The nave of the present cathedral dates from this period, its vaulting being supported by columns with Romanesque capitals ornamented with grotesque human heads, syrens, dragons, beasts, &c., carved in granite. The town of St. Malo is completely surrounded by its old walls, above the ramparts of which are seen the tall roofs of the houses within and their massive chimney-stacks piled up high against the sky, as one enters the harbour from the sea.

At midday the party continued their journey by rail to Vannes. The scenery between St. Malo and Rennes is flat and uninteresting, the only object which has any attraction for the antiquarian being the Cathedral of Dol, founded in the sixth century by St. Samson, who if not a Welsh saint, was, at all events, educated at St. Iltyd's College at Llantwit Major, in Glamorganshire. After leaving Rennes, the railway follows the valley of the River Vilaine, that gives its name to the Department of Ile et Vilaine, and the prospect, as seen from the train, becomes more varied. High cliffs of purple slate rise abruptly from the river, and picturesque little water-mills with undershot wheels are placed on a stone pier in mid-stream wherever a weir occurs. The landscape is in places very pleasing, and the white patches of buckwheat, surrounded by fences formed of slabs of slate set on edge, were new to those accustomed to the bright yellow corn-fields of England with their trim hedges. Passing Redon, a glance was obtained of the massive Romanesque tower of the church. Vannes was reached a little after 7 p.m.

On Wednesday, the 14th, the members were met by their President, M. le Dr. de Cloezadeuc, at 9.30 a.m. and conducted by him to the Museum of the Société Polymathique du Morbihan, of which he has been the President for several successive years. This museum contains all the antiquities discovered in the dolmens in the district of the Morbihan, most of which have been systematically explored by the Société Polymathique. It is particularly rich in polished stone implements, beautiful in form and made out of the hardest materials obtainable, such as fibrolite, jadeite, and diorite. More than one hundred of these axes came from out of a single-chambered cairn, called Mané-er-Hroek, at Locmariaker, together with a unique stone ring of jadeite. The great tumulus of Tumbac, in the Commune of Arzon, has contributed almost

as many axes, and a necklace composed of 107 beads and ten pendants, all made of a bright blue stone resembling turquoise. One very remarkable feature with regard to the axes is that a large proportion of them were found to have been broken purposely before being buried, whether to prevent their being used by any one except the owner, or for some reason connected with the religious belief of the neolithic inhabitants of the Morbihan, it is now impossible to determine.

The Vannes Museum is in an old house, No. 8, Place des Lices, quite unworthy of so valuable a collection. M. l'Abbé Mené, the curator, and author of the very excellent catalogue, was present on the occasion of the visit of the Cambrian Archaeological Association, and the members profited much by his lucid explanations and kindness in allowing every facility for inspecting the objects under his charge. The collection is arranged in three rooms on a chronological basis—(1) containing Celtic antiquities, (2) Gallo-Roman, and (3) Mediaeval and Renaissance.

After leaving this museum, an inspection was made of the cathedral. It has been so much remodelled at a late period as to be almost devoid of architectural interest. In the sacristy, however, is preserved a curious twelfth-century reliquary, which was well worth seeing. It consists of a small rectangular box made of oak and covered with paintings on vellum of knights on horseback hunting, and domestic subjects. Some of the shields are of the kite shape seen on the Bayeux tapestry, and the costumes are altogether well worth careful study.

In the afternoon a visit was paid to the mineralogical museum of the Comte de Limur, a veritable enthusiast in all matters relating to his favourite pursuit. An hour or two was most pleasantly spent in listening to the Comte discoursing on the various stones of which the implements found in the dolmens were made, and the localities whence they were obtained. Some doubt seems to exist as to whether the blue stone called "callais" in French, of which the necklaces from the tumulus of Mané-er-Hroek are made, was imported from abroad or not. M. le Comte de Limur has several specimens of a similar stone obtained from Creuse, in France, and he believes the necklaces to be of native origin.

A walk through the streets of Vannes and round the town walls concluded the labours of the day. Many of the old houses are worthy of the attention both of the architect and the lover of the picturesque, especially those near the cathedral, in the Place Henri IV. No. 4, Rue du Pont, is a good example, with an inscription in French giving the date 1665. It is a characteristic feature of the houses in this part of Brittany to have the two side-walls of





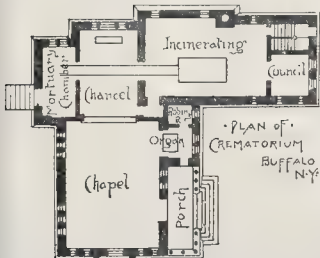
Crematorium and Chapel, Buffalo, N.Y.—Messrs. Green & Wicks, Architects.

granite showing on the front, and ornamented with mouldings, stringcourses, or carving. The portion of the front between the two granite side-walls is chiefly of timber. Each story projects further into the street than the one below, as in the domestic architecture of the same period in England, but the horizontal beams are of large dimensions, and much more elaborately moulded. The ends of the joists supporting the floors appear below the horizontal beams at intervals, like corbels, and the mouldings are stopped between each. On the fronts of some of the houses there is a good deal of carving of considerable merit, and the student might well spend a week at Vannes sketching and measuring the details. The best views of the old walls of the city are obtained on the east side, where the Tour du Conétable is to be seen. Its Medieval character and general outline reminds one of Nuremberg, and those delightful buildings crowned with sharply-pointed roofs that so often form the background to Albert Durer's etchings.

We hope to continue our account of the meeting next week.

#### CREMATORIUM AND CHAPEL, BUFFALO, N.Y.

THIS example of crematorium architecture was built from the design of Messrs. Green & Wicks, architects, of Buffalo. The materials



are a warm-coloured stone for the main portion of the walls, with darker brown stone dressings, and a red tile roof.

#### THE SLIDING RAILWAY.

ONE of the exhibits at the Paris Exhibition which has aroused a considerable amount of attention and interest is what is known as the "Chemin de fer glissant," by the use of which it is maintained that speeds of from 87 to 124 miles per hour can be secured without difficulty or danger, that curves of 44 yards radius can be employed with safety, and that gradients of 1 in 24 can be surmounted with ease, all these advantages being obtained at a less cost for working than where the ordinary motive power and train are employed.

It is further claimed that a train running at a speed of 100 miles per hour can be stopped in 30 yards without shock or jar, that any length of train can be used, the power employed being simply proportional to the number of vehicles of which the train is composed, that the speed is constant, and that for this reason collisions are almost impossible, and trains can be run to follow one another very closely.

This system of railway is the invention of a French engineer, M. Girard, who was killed in the Franco-German War. The plans were bought by another French engineer, M. Barre, by whom the invention has been brought to the condition under which it has for some weeks past been exhibited on the Esplanade des Invalides, at the Paris Exhibition.

The construction of the railway is as follows:—Continuous wrought-iron braced supports, about 6 ft. high, carry cross-girders of H-form, spaced about 4 ft. between centres. On these are placed longitudinal timbers, which carry the rails, made of cast-iron, of bridge-form, about 10 in. wide on the face, planed throughout, and cast in lengths of from about 10 ft. to 4 ft., the shorter lengths being used where there are changes of gradient. The carriages are supported on cast-iron slippers instead of wheels, each slipper being about 18 in. by 10 in. in plan. The under sides of the slippers, which come in contact with the rails, show a number of grooves cut in the surface parallel to the sides and ends, each groove being about 1/4 in. wide and 1/4 in. from the next one, there being some three grooves on each side of the slipper. The middle portion of the face, about 12 in. by 4 in., is cut out, and offers no surface for contact. Each groove is stopped off into short lengths, and this is said to be an essential feature, as if the grooves were not stopped off

the water would run to one end, and the frictional resistance would have to be multiplied by three.

Between the longitudinal wrought-iron supports for the rails is placed a cast-iron water-pipe, about 8 in. in diameter, from which rise at short intervals (the length of four carriages) branch vertical pipes, provided with horizontal nozzles pointing in the direction in which the train has to run, and slightly across it.

The carriages in use at present are simply open trucks, and each of those which carry passengers is provided with four slippers, while that one which contains the water-supply (the use of which will be explained later), and in which are the valves and handles for starting and for regulating purposes, has six, as it is heavier than the others. Supposing the weight of a carriage and its load to be four tons, then the pressure on a slipper will be one ton, and per 1 in. of surface of supports, 13 1/2 lb.

To each carriage is fixed, at the height of the nozzle of the water-pipe, a straight turbine, so to speak, extending the whole length of the carriage, and so arranged that the water impinging on it will force the carriage forward. At the side of the carriage, and at about the same level, is placed a rod, also extending the whole length of the carriage, but shaped to a parabolic form at the ends in plan. This rod is provided with a small horizontal movement, which can be regulated from the train, and its use is to open the valve which admits water to the turbine, and which is closed again automatically immediately the carriage has passed.

The experimental line is about 150 yards in length, and the trains start from each end from the top of a gradient; thus, the starting-power used is that of gravity.

When it is desired to start the train, water, under pressure, contained in tanks in one of the carriages, is admitted to the slippers, when the water, in its endeavour to find an exit,—an endeavour which is retarded but not stopped by the annular grooves,—lifts the slippers from the rails, and a film of water is introduced between the surfaces; this reduces the friction, it is said, to about 3 lbs. per ton of weight carried, and the carriages immediately start down the incline. When the parabolic side-rod on the carriage meets the first valve, which is situated at the foot of the incline, it opens it gradually, a stream of water, under a pressure of some 150 lbs. per square inch, is delivered into the turbine, and the carriage is driven forward.



When the carriage has passed the valve, it closes automatically, and is again opened and closed as the next carriage passes, and so on to the end of the train. When the next station is approached, the propelling force ceases to act by the omission of the opening levers for the valves, or by the removal of the side-rods from contact with the levers; the carriages begin to ascend the incline, and are retarded thereby, and further retardation and ultimate stoppage is produced by the shutting off of the supply of water from the slippers, which thus come in contact with the rails, and, rapidly increasing friction is produced up to probably 400 lbs. per ton of load.

The essential elements in the invention are that the supporting and propelling power shall be that of water; that there shall be no wheels, but that a water film shall be produced between the slippers and the rails, thus reducing the friction of motion, so it is contended, by some 95 per cent. The locomotive being absent, its weight, amounting in many cases to some 30 per cent. of the total load carried, has not to be taken into account. To this must be added the weight of the wheels, axles, and brake-gear, and thus a large amount of tractive force may be saved beyond that accounted for in the friction of motion. Opposite to each nozzle, and on the other side of the turbine attached to the carriages, is an opening designed to receive the waste water and to carry it into a continuous wrought-iron trough, the whole width of the line, whence it is collected in sumps and pumped up again for further use, if pumping be necessary, or, if such should not be the case, it is allowed to run to waste. Along each side of the track there are wrought-iron conduits to receive the leakage from the slippers, which is considerable.

Having briefly described the railway and the advantages claimed by its inventors, we may proceed to consider how far these are supported by facts, and what are its obvious disadvantages.

The line is distinctly in an experimental stage, and its real capabilities cannot possibly be judged until it has been tried upon a larger scale; until the waste of water, which is at present a serious drawback, has been minimised; and until the claims put forward have been made the object of careful experiments and analysis; nor is it possible to enter into the economic question of comparative cost in the short space of an article, even if the data were clearly and definitely fixed, which is far from being the case; but there are many points of interest which may easily be considered and fairly commented on.

There should be no doubt of the advantages offered by the system of water-borne sliding friction, in contradistinction to rolling friction, if it were certain that at high speed the former were only 5 per cent. of the latter; there should be much less tractive force required, there should be greater steadiness, less undulation and vibration, and the height of carriages and therefore of bridges and tunnels, might be materially reduced. But can this great difference between sliding and rolling friction be proved and maintained in practice? Our own impression is that wheeled carriages would start down the incline provided as easily and at the same pace as do the sliding carriages, and that, therefore, the frictional difference can be but trifling. By getting rid of the locomotive, &c., the paying load is increased, and the weight on rails diminished, and, therefore, a much lighter road should support the train, objects much to be desired and long aimed at by engineers, but without much success. But is the road lighter and less expensive than that in ordinary use? On the other hand, it is admittedly heavier, and more expensive. One advantage claimed is that the efficiency of a turbine depending upon regularity of speed, a constant efficiency is maintained, the propelling power being constant, and the proportion of load to propelling power also constant. But this is only true on the level, and becomes entirely fallacious the moment an incline is reached.

The claim that speeds of eighty-seven to 124 miles per hour can be secured, and that curves of forty-four yards radius can be passed with speed and safety, requires demonstration, and the assertion that gradients of 1 in 2½ can be surmounted is one of economy, the advantages offered by this system being that there is no locomotive or wire rope to carry, that the friction of motion is presumably less, and that, therefore, the load to be hauled is lighter; but the forces of gravity, which in such

a gradient are very much greater than those of friction, are not affected in any way.

The prominent disadvantages of the system appear to be that the road is exceedingly expensive, rails are required 10 in. wide, with planed surfaces and of great stiffness and rigidity, and they have to be made in very short lengths, which is entirely opposed to stiffness and rigidity.

A continuous conduit running the whole length of the line is necessary to receive the waste water; the rails must be raised a considerable distance above the ground, in order to allow space for the water-pipes, another expensive item.

The centre of gravity of the train is low as regards the rails, and supposing the rails to be the real supports, this would be advantageous. The rails, however, are not the real supports, but the ground 6 ft. lower; thus the centre of gravity is higher than on an ordinary railway, and when the frequent and invariable subsidence in the line occurs, the great weight of the superstructure would make lifting a very tedious and expensive job, and might, not impossibly, necessitate the stoppage of all traffic for a period.

The motive power is water, which would be liable to be frozen in cold countries, and a comparatively small amount of frost would probably load the turbine with ice, and make it ineffective. In countries where water is absent, the line would be useless. Where pumping would be required, the question of economy becomes more than problematical, as we must consider the efficiency lost in boilers, engines, pumps, pipe-track, and, finally, on the turbine.

When steep gradients have to be surmounted, say, at the rate claimed of 1 in 2½ or 2.334 ft. per mile, the working pressure of the main being 150 lb. per square inch, the pressure would be reduced from that amount to nothing in 778 ft. of horizontal motion; therefore, to maintain even an average pressure of 150 lb., it would be necessary that there should be pumping stations at every 778 ft., and that the working pressure should be increased to 225 lb.; and even under these circumstances the final pressure would be only 75 lb., and the action of the turbine would become most inefficient. The other alternative is to have more frequent pumping stations, and such a proceeding would be ruinous.

Water must be carried in the train at a moderate pressure for the supply of the slippers, and as the leakage from these is considerable, a vast quantity of water, amounting probably to 120 tons for a 20-mile run, would have to be carried, whereby the saving of locomotive weight would be more than neutralised, or it must be picked up at frequent intervals, and forced to the required pressure by power carried in the train. On very steep gradients to pick up water would be next to impossible, and it would at all times require considerable power to do this.

In going up a gradient of 1 in 2½ the pressure on the slippers of the first carriage would be, say, 14 lb., but at the rear of a train only 300 ft. long, or about seven saloon carriages, the pressure would be 144 lb. per square inch, and the water would stream out and be rapidly lost.

The patentee proposes to lay out his line so that there should be a rising gradient to every station in both directions, in order to facilitate starting and stopping; but such an arrangement is impossible in practice, and it would be necessary that the power employed should start the train.

The difficulty of conducting marshalling and shunting arrangements on such a line, where starting is difficult and points and crossings suitable for the purpose could not be easily devised, would be enormous.

As regards the speed of trains being constant, this is true so long as the line is level and each vehicle is of the same weight per unit of length; but it is no longer true if gradients have to be surmounted, nor if the other conditions are unfulfilled.

We should prefer to have business elsewhere when this or any other train is brought to a state of rest from a speed of 100 miles per hour in a distance of 30 yards, and we think the bill for damages would prevent the experiment being repeated.

As at present designed, the line is not applicable to overhead railways, and though on level ground, and with unlimited water power obtained for nothing, or next to nothing, and when shunting operations were reduced to a minimum, it might be worked cheaply, the

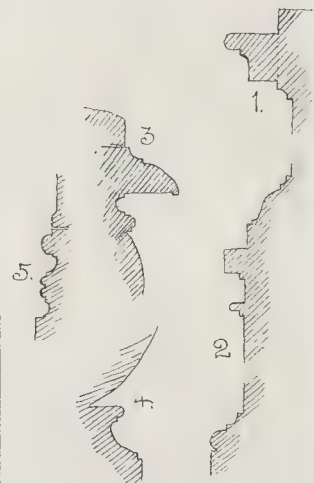
road must always be expensive, and it remains to be seen whether the valves could be kept tight. On steep gradients, and for general purposes, we consider the system to be altogether inapplicable in its present state.

## Illustrations.

### THE PASTON MONUMENT, NORTH WALSHAM CHURCH.

**T**HIS monument, to the memory of Sir William Paston, and put up by that worthy knight to his own honour while he was yet living, in the year 1608, is one of the finest and best-executed examples in the country of a type of monument which was commonly adopted to perpetuate the memory of wealthy or important persons in the churches of their own district during the seventeenth and latter part of the sixteenth centuries. The type, of which the main feature is nearly always a recumbent effigy beneath a round-arched canopy, must be familiar to every one, but it is not in every parish church that we can find a monument of this class so sumptuous in design and scale, and carried out with such refinement of detail; and whatever we may think of the self-assertiveness of Sir William Paston, in thus ordering and overseeing the execution of his own monument during his lifetime, we probably owe it to his personal care and taste that his monument is so well executed; and after all it must be further pleaded in extenuation that a man who builds his own monument probably pays for it himself, whereas when it is left till after his death the survivors have to pay for it.

The monument, to which some reference was made in an article on "Notes of a Holiday on the Norfolk Coast" two years ago in the *Builder*, occupies the greater portion of the north wall of the shallow chancel of North Walsham Church, which was one of the churches visited by the Archaeological Institute in their recent annual excursion, as mentioned in our last issue. The main portion of it is in white marble; the panels, pyramidal finials, and columns being in three different marbles; the centre finial is of a dark bluish mottled marble, the side ones of a lighter coloured and more striated marble; the columns are of a mottled or granulated marble of a warmer tone; the column marble and the dark one are alternated in the panels. The mouldings, of which a few sketch profiles are



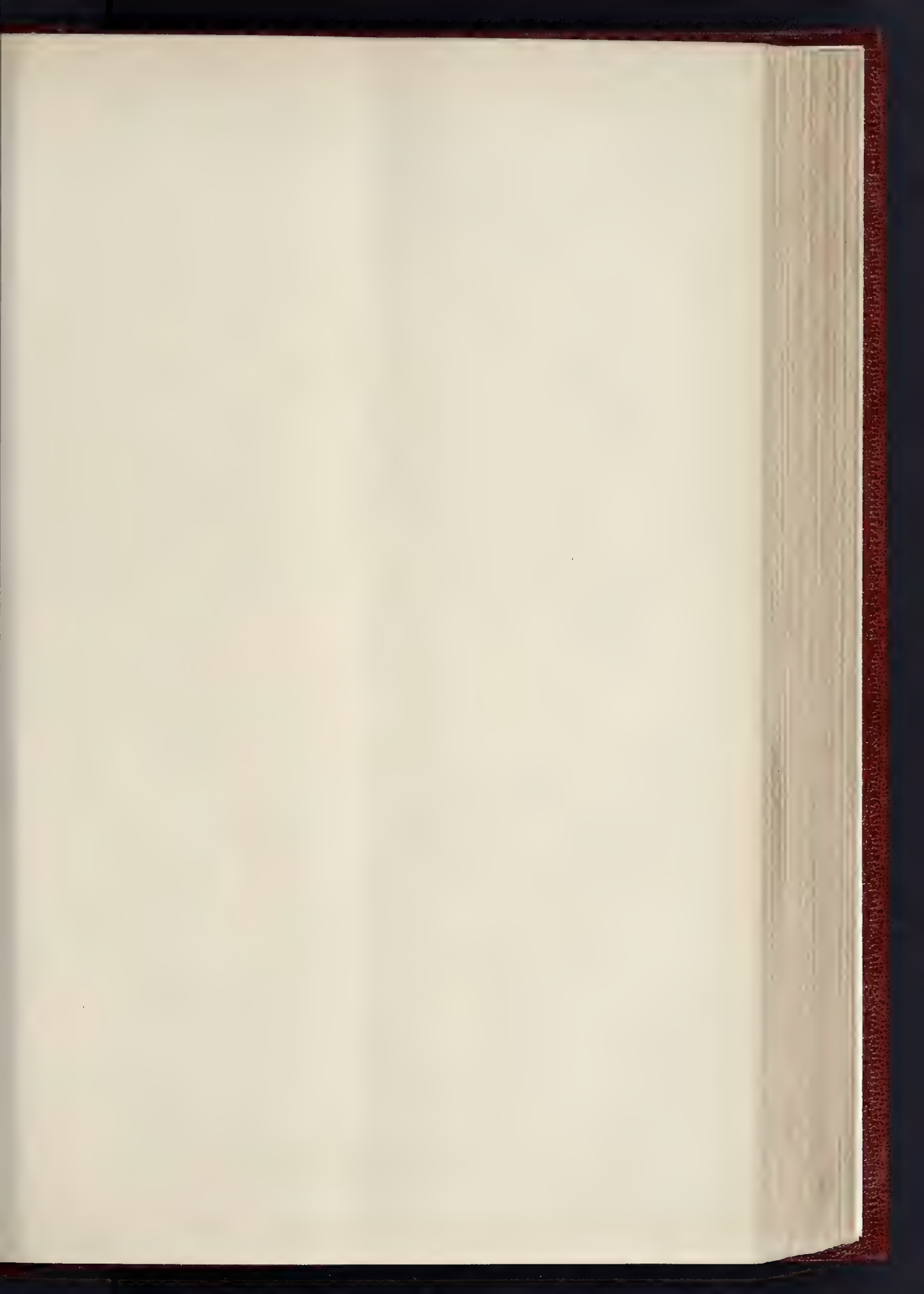
Sections of Mouldings, Paston Monument.  
(Sketched only.)

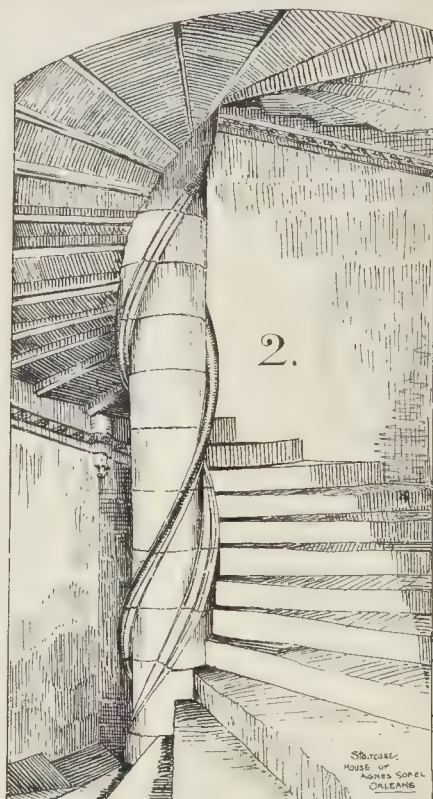
1. Sarcophagus.
2. Plinth.
- 3 and 4. Cornice and base of Sarcophagus.
5. Base of Columns.

subjoined, are of fine character, and the figure, with all the details of the armour beautifully finished, is very well executed.

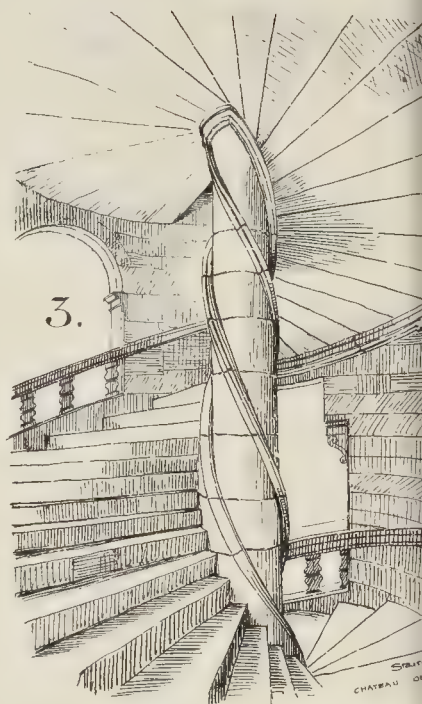
The decorative work in the spandrel over the figure, in the back of the recess, though it is not of the highest school of ornament, is of the very best of its school, and is most minutely







Sketch of  
House of  
Monsieur de  
Orleans



Sketch of  
Chateau of  
Orleans



Courtyard  
of  
Tours



Sketch of  
Tours



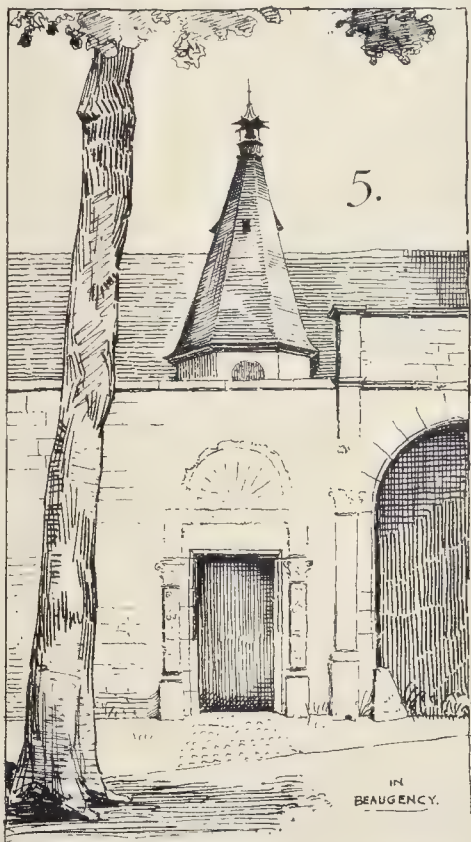
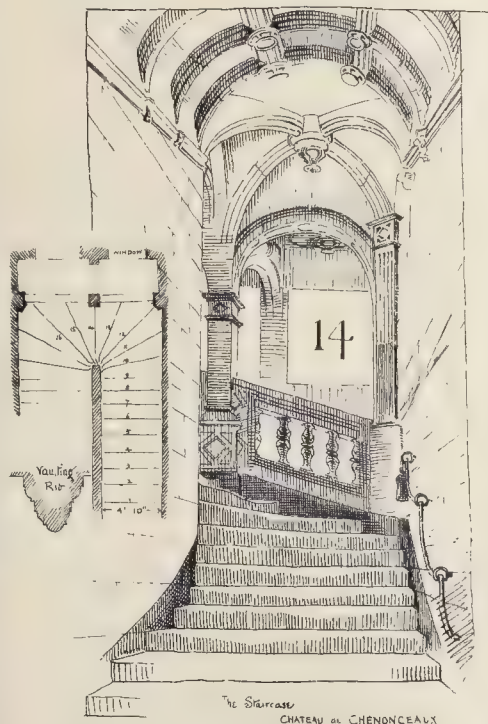
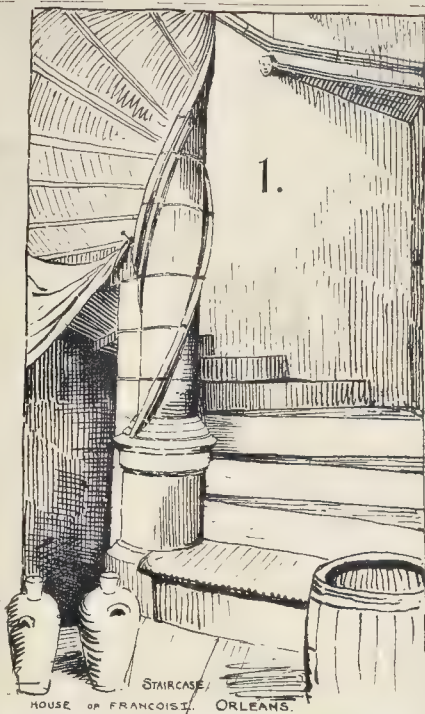
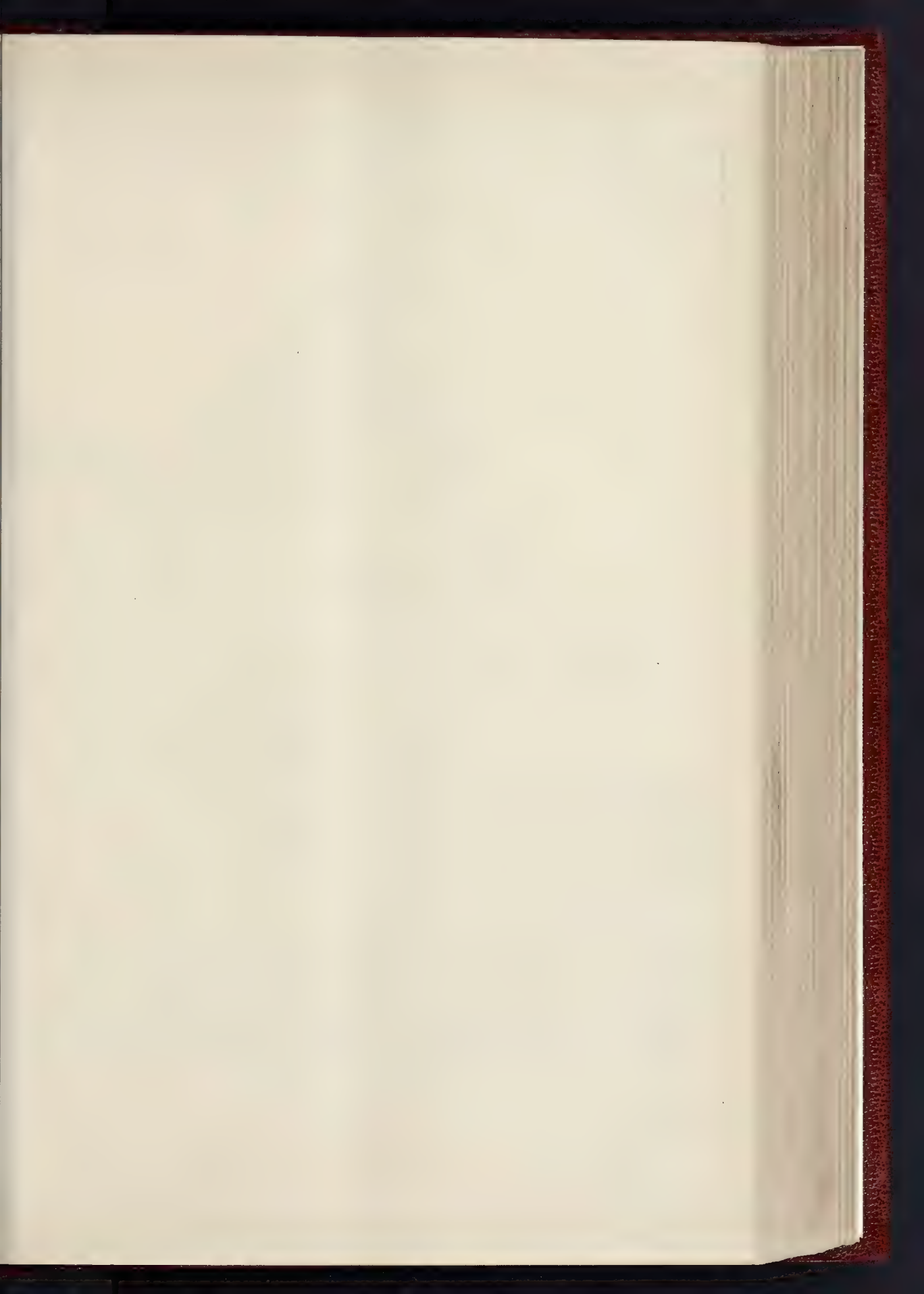


PHOTO LITHO. SEPAR. F. & C. 32, MARTIN LEBLANC, PARIS, N. 57, 1889







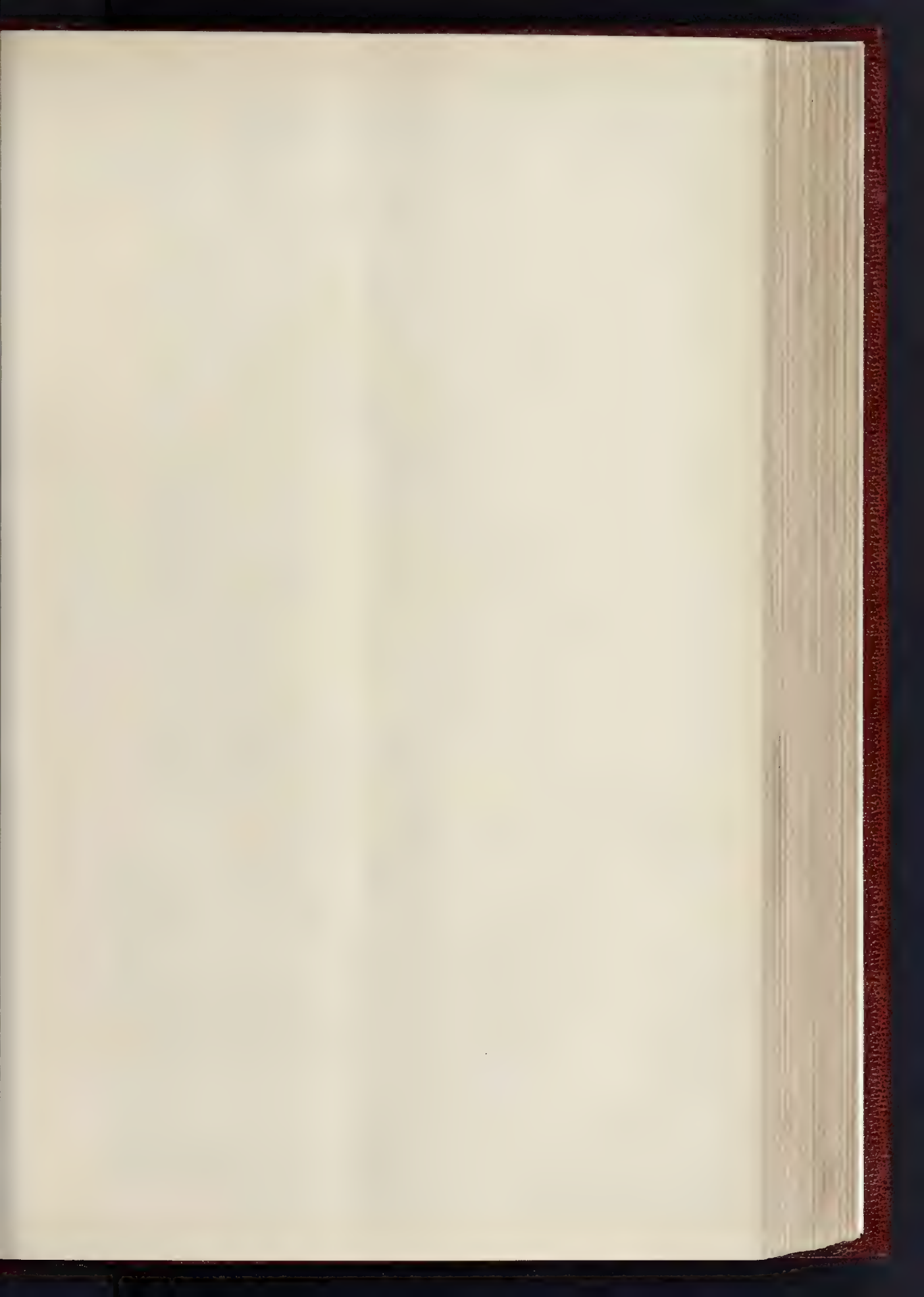


The Phototype Co., 323, Strand, London.

THE IMPERIAL PALACE, STRASBURG. CENTRE OF PRINCIPAL FRONT.

HERR HERRMANN EGGERT, ARCHITECT.





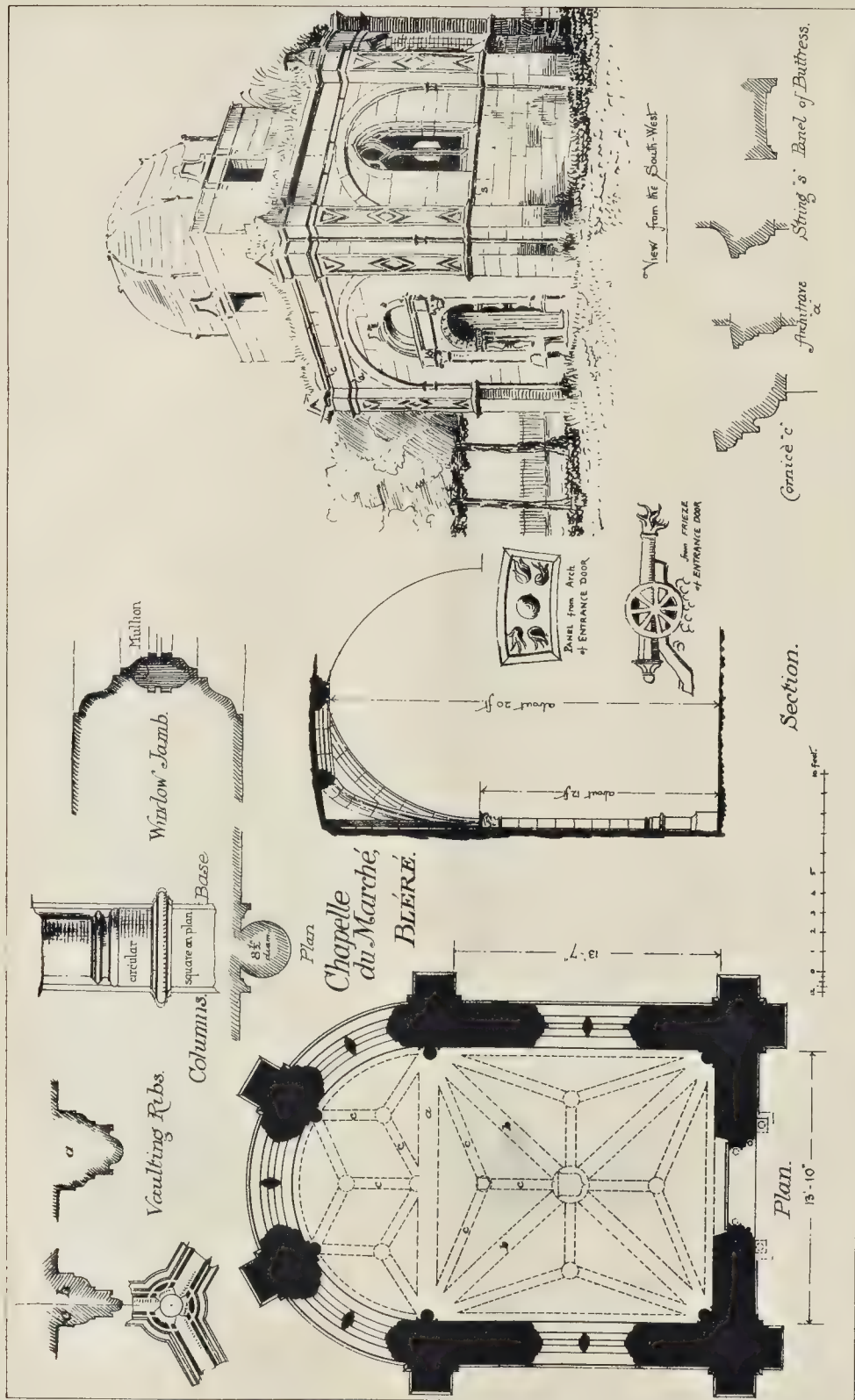






PHOTO LITHT. KIRKUP & CO. 22, MARK LANE, LONDON, E.C.

ST. ÉTIENNE, CAEN.—FROM A DRAWING BY MR R. J. HAINES.







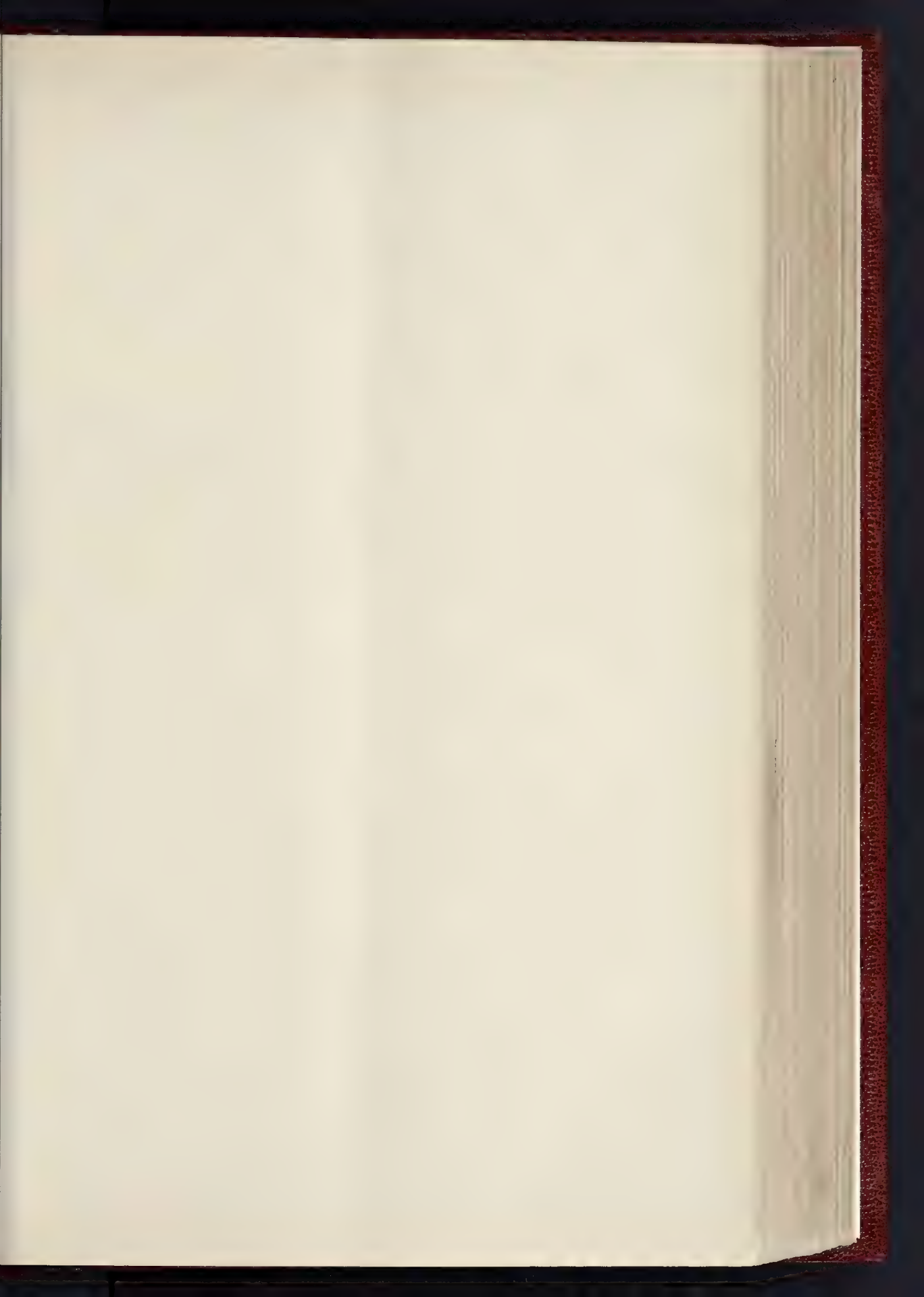
The Phototype Co., 30, Strand, London.

THE IMPERIAL PALACE, STRASBURG. GARDEN FRONT.

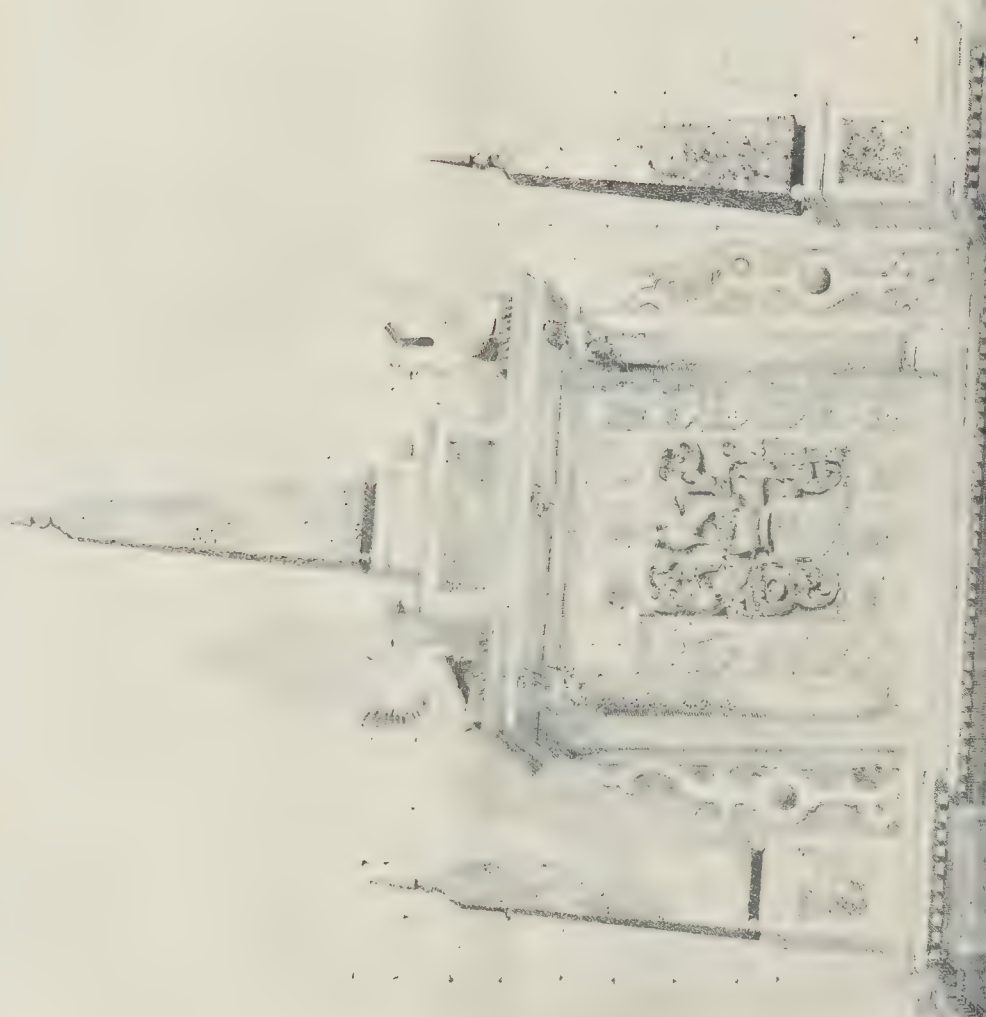
HERR HERRMANN EGGERT, ARCHITECT.



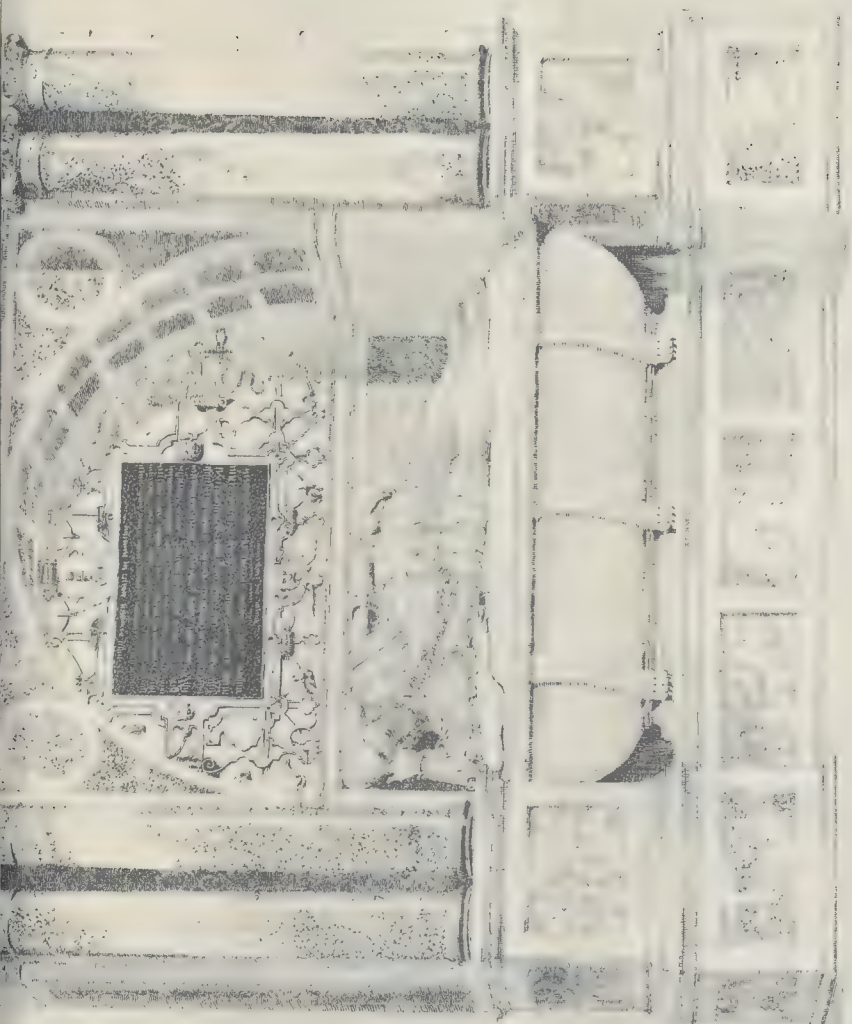




THE BUILDER, AUGUST 31, 1899.





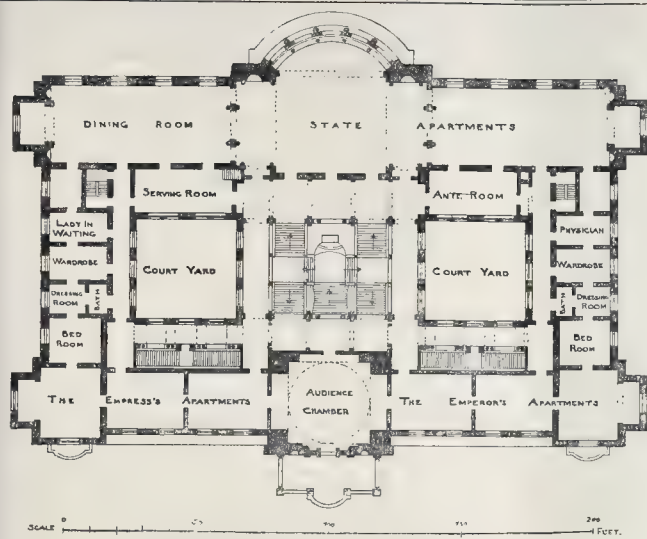


THE PASTON MONUMENT, NORTH WALSHAM CHURCH, NORFOLK

FROM A DRAWING BY MR. H. H. STATHAM.







Imperial Palace, Strasbourg.—Plan of Principal Floor.

finished in every detail. As an indication of the elaboration of detail gone to in this work, it may be mentioned that all the strap-work in this portion of the decoration is edged with narrow double fillets, gilt, as in the accompanying sketch of the detail at one corner of the

churches in and about Caen; it is in a sadly deplorable state, being apparently used for some purpose akin to that of a Local Board depot. It is somewhat severe in treatment, but the tower and transept form a fine composition. The west front is more ornate.

The other "St. Etienne" at Caen is the fine Abbaye aux Hommes.

#### THE IMPERIAL PALACE AT STRASBURG.

LAST week the daily papers described the tour made by the German Emperor through Alsace-Lorraine, and how on his arrival at Strasbourg he stepped out on to the balcony over the portico of the palace there, in order to show himself to the people. We have on a previous occasion briefly alluded to this building, and we now publish the first-floor plan, with views of the garden-front and the central portion of the main facade.

Our readers are, of course, aware that on the termination of the Franco-German War, Alsace and Lorraine became not Prussian, but Imperial German provinces. The capital of Alsace had no building capable of being conveniently turned into an Emperor's residence; on the other hand, the new extensions of the city outside the old fortifications, and the laying out of new streets and squares in this new quarter, seemed to offer a good opportunity for the erection of such a structure. A site of suitable dimensions was therefore reserved for this purpose, and Mr. Hermann Eggert, an architect attached to the Ministry of Public Works at Berlin, was deputed to design and superintend the execution of the new palace.

A reference to the plan will show that the general arrangement consists of a parallelogram 223 ft. by 141 ft., with the covered entrance, hall, and grand staircase upon the central axis. Two courtyards, about 40 ft. square each, are placed on either side of the chief staircase, with wide passages running round them communicating with the various suites of rooms. The basement is devoted to the kitchen offices; the ground-floor contains the guard-rooms, aides-de-camp's offices, and living and mess-rooms, &c.; whilst the second-floor is taken up with bedrooms, &c., for the Imperial retinue. On the first-floor are the reception-rooms next the front, the banquetting-rooms at the back, whilst at the two sides are the Emperor's and Empress's private apartments. The style adopted is the florid Renaissance of the Berlin school, with heavily-rusticated masonry for the lower parts and the quoins of the projections, with lighter treatment upwards and delicately-moulded work for the columns and gable of the central loggia and dome. The stone is a yellow sandstone, and the roofs are covered with "Metlach" red tiles. Fire-proof construction has been adopted throughout for the floors, and the roof-trusses and rafters are all of

iron. No costly marbles, &c., have been used in the interior, the architect trusting to colour for the rich effect which he hopes to produce when the finely-finished surfaces are dry enough to admit of elaborate hand-painting.

#### COTTAGES AT DOULTING, SOMERSET.

THE description of the cottages shown in one of our illustrations last week was accidentally omitted by our printers in "making-up."

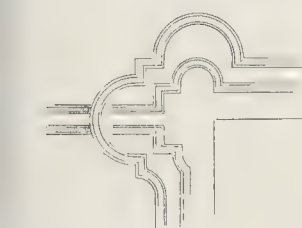
The cottages were built about five years ago, for Sir Richard H. Paget, Bart., M.P., to fill up the void existing between two terraces of cottages. With these buildings erected the terrace became comparatively a long one for a village, and means of access for carts, &c., to the rear had to be provided for, which accounts for the archway. As it was not desirable to leave the archway open, and to meet the needs of pedestrians, the wrought-iron gates were formed the shape of the "V" style, so common in this county. These gates, made by a village blacksmith, are interesting examples of artistic ironwork. The oriel window commands a view of the celebrated "Abbot's Barn." The idea in the design was to boldly break up the line of roofing by the large gable. One of the cottages is larger than the others; the two smaller contain two living-rooms, pantry, &c., and three bed-rooms each. The walls are built entirely of Doulting freestone, from Mr. Trask's quarries. The roofs are covered with slates. The builder was Mr. F. Pullen, of Shepton Mallet. The architect is Mr. George J. Skipper, F.R.I.B.A., of Norwich.

#### COMPETITIONS.

**Cromer Town Hall.**—In reference to this competition, the particulars of which were advertised in our columns, we are informed by the Secretary of the Cromer Town Hall Company, Limited, that about 150 applications were received for the conditions of competition, and that twenty-eight designs were sent in. The design selected was that bearing the motto "Experience," of which Mr. George J. Skipper, F.R.I.B.A., of Norwich, proved to be the author. The design bearing the motto "Elegance with Economy," by Mr. A. T. Scott, of Norwich, was placed second. Since this was in type we learn that Mr. Skipper has received instructions to prepare working drawings and specifications with a view to obtaining builders' tenders for the work.

**Conservative Club, Acorington.**—In the competition for this building, which is to be erected on a site extending from Cannon-street through to Paradise-street, three designs were sent in, bearing the mottoes "Beaconsfield," "1889," and "Primrose," his favourite flower. The *Acorington Observer* says that the names of the architects were not divulged until the Building Committee went into the merits of each design very carefully. They had the assistance of an experienced and disinterested expert, and after much consideration came to the conclusion that the design signed "Beaconsfield" was most suitable, subject to certain modifications. This recommendation was submitted to a meeting of representatives of the Primrose League and of the ward committees, and upon the designs being put to the vote, the design "Beaconsfield" was adopted unanimously, and on the sealed letters being opened it was found that the architects were Messrs. Morley & Woodhouse, of Bradford. The design is estimated to cost 7,350*l.* to carry out.

**Allahabad under Water.**—Very heavy rain recently fell at Allahabad and the surrounding district, which caused great damage to houses, a large number of which totally collapsed. In the city matters assumed a very serious aspect indeed, as the streets and lanes were completely under water, and presented the appearance of streams, rendering traffic, vehicular and pedestrian, most difficult. All the kutchah roads in the new civil station are described as having resembled miniature rivers, while the drains and the side-walks along the pucca roads were completely flooded. The local Meteorological Department registered 5.41 inches of rain up to 10 a.m. on the 24th inst. From the morning of the 22nd to 10 a.m. on the 24th no less than ten inches of rain fell, making the total from January 1 25.06 inches, against 15.07, the normal total.—*Indian Engineer* (July 31).



inscription tablet. The tablet is in black marble, and on it the following inscription is cut in bold Roman capitals:—

PIETATI ET BENEFICIE SACRVM  
OBDOREMUS HIC IN DOMINO CIVILIS PASTORIS EQVVS  
AVRATVS ANTIQVA ET NOBILIS STIPES ORTVS COGNATIONE  
NOBILISSIMI PAMILII CONJUNCTVS HOSPITALITATE PERANOS  
IV ET POST MORTVM XX DVNATVA CLAVVS AD REPARAND  
DAS CATHEDRALES ECCLESIAS BATHONIE ET NORWIC  
COLLEGIVM Q. GONSVILLI ET CAII NVNIFICVS PAVPERIBVS  
VILLIS TALEMOTHE BENEFICIIS QVI SCHOLAM IN ROC LOCO  
AD INFORMANDAM IUVVENTVTVM CONCORSBQ. AD DIVIN  
VERBVM DISSEMINANDVM REDDIDIT IN PERPETVVM ASSIG  
NATIS PIE INUITIVIT ET MORTALITATIS MEMOR HOC MO  
NVMENTVM CESTA 928 IN CHRISTO RESVRGENDI SIBI  
VIVVS POSVIT  
ANNO DNI 1608

The griffin and the helmet on the panel of armorial bearings are gilt; the rest of the panel, with its bold scroll ornaments, is painted a dull red tone to throw up the crest. The shields arranged round this panel are only here sketched approximately as to their general appearance; some of the detail would have been too small to show intelligibly on the drawing.

H. H. S.

#### SKETCHES IN THE LOIRE DISTRICT.

THE subjects of the three pages of sketches in the Loire district will be found referred to in the first article in our paper this week.

#### ST. ÉTIENNE LE VIEUX, CAEN.

THIS powerful little drawing, by Mr. R. J. Haines, was in the last Royal Academy Exhibition. In some respects it is rather too much like an imitation of the drawing of another period, but it is well done, and shows that the author can use his pen effectively in drawing. The building is one of the many desecrated



## ESSEX ARCHEOLOGICAL SOCIETY.

DELIGHTFUL weather favoured the annual gathering of the Essex Archaeological Society, which took place on the 16th inst., in the Epping district. The following account is abridged from the *Essex County Chronicle* :—

The financial statement read by Mr. King showed a balance in favour of the Society of 51*l*. 19*s*. 3*d*. The report of the Council stated that the additional periodical meetings, commenced two years ago, had been very successful, and had been invariably well attended. During the year twenty-two members had joined, and the losses by death or otherwise had been very few. In October the Council resolved to reappoint local secretaries for the principal towns and districts in the county. Eight were appointed at the Coggeshall meeting, and others had since been added. It was hoped that this would conduce to the advantage of the Society. Referring to the congress of representatives of the leading archaeological societies promoted by the Society of Antiquaries, and to the subjects then considered, the report stated that the Essex Society had since been admitted into union with the Society of Antiquaries. The union of the leading archaeological societies of the kingdom for a common object ought to be regarded as the event of the year in connexion with archaeology. The resolution of the Council to associate the Society with this work, the steps taken to increase the number of their own meetings, and their endeavour to extend the usefulness of the Society by the appointment of local secretaries, would no doubt meet with the entire approval of the members. Increased practical work would require corresponding financial support. The Society's share in the maintenance of the museum was a heavy item of expense, and their ability to secure objects which ought not to be lost to the county was restricted by their limited means. The Society was probably never stronger numerically, but the Council urged members to endeavour to secure further subscribers.

The Chairman (Mr. G. Alan Lowndes, President) moved the adoption of the report, and said he had had an exceedingly interesting correspondence with their friends in America. Owing to the large Puritan emigration from this part of England, the names of most of the places in Essex were reproduced in New England. There were Springfield, Colchester, Dedham, and many others. He had received copies of the "New England Historical and Geological Register," and he had been able to assist their American friends in certain ways.

Mr. Laver seconded the adoption of the report, which was carried.

Mr. Gould proposed that the President, Vice-Presidents, Council, and officers be thanked for their services, and that they be re-elected. He said he met two Americans at Ely the other day, and one of them said that the town which interested them most in England was Colchester, and that the thing which most interested them in Colchester was the museum. The resolution was seconded by Mr. C. F. Hayward, and carried.

The Chairman announced that the annual meeting next year would be held at Harwich, and that the October meeting would take place at Burnham.

Mr. Pritchard read an interesting paper on "English Ecclesiastical Seals of the Official Class." He produced examples of seals, including the matrix of the Bishop Stortford seal, found at Ipswich by Dr. Taylor. Only about thirteen of these seals were now known to exist.

A carefully-prepared paper, by the Rev. Cecil Deedes, on "The Preservation of Parochial Records," was read by Mr. King. Mr. Deedes dwelt upon the importance of preserving the secondary or subordinate records, and gave many examples of words peculiar to East Anglia. It was agreed that both papers should be printed in the *Transactions*.

Mr. King then read what was described as a remarkable Latin charter, dated 21st of May, 1485, by Robert Fabian, a citizen of London, author of "The Concordance of Histories," and an Essex man connected with Theydon Garnon.

After the meeting an adjournment was made to the Cock Hotel, where luncheon was served.

Luncheon disposed of, brakes were called into service, and the party drove through a delightful piece of country to Theydon Garnon Church. The edifice is in an isolated position, and is environed by trees. The chief feature is

the massive brick tower, clothed almost entirely with ivy. According to an inscription, this was built in 1520, Sir John Crosby giving "by his goods towards the making of this steeple." Mr. Hayward said the steeple was a very good example of brickwork, and it was chiefly valuable as an early example of brickwork. He suggested that the ivy which clothed it should be cut down, as the tower was more important than the ivy. It was a fatal mistake to allow ivy to grow over a fine piece of architecture, as it was sure in time to pull it down, and he hoped some notice would be taken of this. Mr. Kemsey, who had been churchwarden for twenty-seven years, said they felt somewhat tender about removing the drapery of greenery. Mr. Hayward replied that he could understand this, but urged that they should sacrifice the ivy and save the tower for future generations. Mr. Hayward commented upon other features of the building and upon the monuments and brasses, and said that the present church was no doubt built upon an earlier foundation. Mr. King soon gave the signal to start again, and through a pretty undulating country the party proceeded direct to Hill Hall, the Essex seat of Sir Wm. Bowyer Smyth, Bart., but now occupied by Mrs. Cleland, by whose kind permission the fine old mansion was visited. The house crowns a bold eminence, and commands beautiful views of the surrounding country. The party having assembled in the hall, surrounded by valuable portraits, old armour, and other historic objects, the President said that Mr. Chancellor (Mayor of Chelmsford) was publishing a book upon the old monuments in the Essex churches, and had kindly sent him proofs of the description of the tomb in Theydon Mount Church. Another delightful drive brought the party to Albyns, the seat of Sir William Abdy, Bart., but now occupied by Mr. Humphrey. The party were very cordially welcomed by Mr. and Mrs. Humphrey. Albyns is a fine old mansion, and proved one of the most interesting places visited. It has been said that it was built by Inigo Jones; this is doubted, and Mr. Hayward said he was unable to find any trace of the famous architect about the building. The great features of the mansion are the elaborately-worked ceilings, the fine oak panelling, and the massive and beautifully-carved oak mantelpieces. An inscription in the crest bedroom announces that "This house was repaired, sashed, and beautified by Sir John Abdy, Bart., 1764," but, as the Rev. T. Cochrane pointed out, the "beautifying" appears to have consisted in hiding the rich oak panelling of this particular room with a coating of paint. The oak room affords a fine example of panelling. While the party were in the spacious long room, which is 99 ft. in length, Mr. Cochrane made some observations upon the parish.

## CONCRETE FLOORS.

SIR,—The communication of Mr. Frank Caws in your last issue [p. 141] contains the following:—"I have seen no instance supporting the theory that bending stress causes horizontal cleavage." Mr. Caws also quotes from the experience of "a contractor," in whose "many miles of street pavement and railway platforms" the cracks, when occurring, show "invariably, clean, square-edged fractures; exhibiting no shelliness nor the slightest indication of horizontal cleavage."

I assume that all the concrete work alluded to by Mr. Caws was made *without metallic tensile strength*: in which case, his observed facts were precisely what ought to have occurred, and what might have been reasonably expected. A crystalline material is a material tensionally weak, and a material tensionally weak (relatively) will be apt to exhibit no "shelliness," and break "with a clean, square-edged fracture." A widespread knowledge among architects and engineers of this quality in concrete, as in cast-iron, is, in my opinion, "the factor that intervenes," and not "prejudice," as suggested by Mr. Potter, in his very practical communication, the general tenor of which harmonises with the facts and conclusions of my own tedious and costly experiments and experience.

Mr. Potter's remarks about "specialists and patentees" touch me in tender spots, for I include myself in his category of "those who impart to the public knowledge gained by themselves at considerable"—(he might have said *enormous*)—"cost and time, *without any equivalent* but the consciousness," &c.; the last

(and smallest) item in my costs to gain this sweet "consciousness" being an expenditure of over 300*l*. for the publication, and *free distribution* among the architects of two hemispheres\* of my little work on "Concrete and Iron as a Building Material."

THADDEUS HYATT.

9, Farringdon-road.

## The Student's Column.

## WATER-SUPPLY.—IX.

## QUALITIES OF WATER.

THE engineer has no more important task in commencing a scheme for supplying water than to ascertain the quality of the water he proposes to utilise. Whenever a paper touching on this subject is read before an engineers' society, it is sure to provoke a great deal of discussion, and it is peculiarly interesting to hear the varied opinions of the greatest authorities on the subject. It is obvious that the actual methods of arriving at the qualities of potable water do not lie within the scope of the work of the engineer or architect. The usual method is to employ a duly qualified analyst to ascertain this, and he advises the parties interested as to its quality. But the designers of water-supply, whether it be on a large or small scale, have for many years seen the necessity of being able to understand the meaning of the analyses for themselves, apart from the interpretation put on them by the analyst, and for this reason:—

To chemically analyse water is an extremely difficult operation, requiring the greatest skill and experience. Of course, it is easy enough to ascertain how much lime, iron, or such-like mineral matter is present, and it is not difficult to give, as precisely as may be, the actual proportions of these foreign ingredients, or to arrive at the total amount of solid matters. In this way, the presence of lead or other similar metal poison, or objectionable mineral, would most infallibly be detected, and professional men would have no difficulty whatever in immediately discarding a source of supply containing anything of the kind. In the vast majority of cases, however, the problem presented for solution is not quite so simple. The water proposed for a town supply, or for the uses of a mansion only, is generally of that kind which in a small sample is colourless, without appreciable odour, of agreeable taste, and minus the objectionable mineral matter above alluded to; in other words, it *appears* to be very good. But we know very well, from actual experience, that water answering this description is frequently, nevertheless, of bad quality and extremely prejudicial to health.

The principal aim of the chemical analyst in dealing with water of this class, is to ascertain whether it is polluted with sewage, or other similar organic matter. It is in judging of the meaning of the results obtained by chemistry on this point, that the real difficulty commences. If ever there was a case where "doctors disagree" it is in discussing the best methods whereby the almost infinitesimal proportions of organic matter found in drinkable water may be determined, and in interpreting the meaning of the analysis, in regard to the effects of this matter (or rather the minute organisms which it feeds) on the human system, afterwards. Although an analysis may prove the existence of certain compounds, their origin and meaning are in many instances shrouded in doubt. Parts of the analysis, which, in the opinion of one chemist prove the existence of matter deleterious to health, are regarded by another, and equally good analyst, as harmless.

Yet another difficulty presents itself, which, within the past few years, has assumed formidable proportions. We allude to the "Bacteriological water-test," the object of which is to determine the presence of minute organisms of a deleterious nature in the fluid. Here we have another and distinct branch of science, whose exponents argue, with considerable force, that it is not wholly within the power of a chemical analysis to determine the quality of water in regard to its sewage contamination, that it cannot definitely state, in

\* Additional to the cost of the work and its distribution through the post to the architects of America, I was compelled, when I wrote the *Concrete and Iron*, to pay duties upon it—the United States Treasury, in the scandalous exercise of powers conferred on it by laws to "protect American industry," compelling me to pay on books given away to benefit its industries!—T. H.



many instances, whether the water is fit to drink or not.

In the meantime, the engineer or architect desires to satisfy himself as to the quality, and unconsciously arbitrates between the contending parties. To do this it is necessary for him to stand from afar and review the evidence brought forward by either side in a perfectly impartial spirit.

He must understand, at least, the main outline of the arguments, and the relative value of the conclusions advanced, or he will most certainly not be able to arrive at a sound judgment in the matter. With this end in view we now propose to give the student some details of the nature of the controversy, both from the chemical and biological sides, but it must be borne in mind that space necessarily precludes our giving particulars as to many minor issues involved. We shall not neglect anything, however, that is material.

In the first place, samples of the water must be taken from places judiciously selected; in the case of a supply from a river, for example, as near the site of the proposed intake as possible. The collecting vessel must be quite clean, not merely rinsed out with water before taken to the place, but chemically clean. Care should be taken to exclude from it any foreign matter not normally found in the river, for it might obviously prejudice the result.

We will suppose that the chemist now takes the vessel in hand and analyses the water. We cannot, of course, follow him through the subtle processes involved in this delicate operation, but will now proceed to examine the result. Let us take, as a type, the published analysis of London water, as issued by the Registrar-General in his monthly return. In it there are nine columns, viz:—1. *Temperature in centigrade degrees.* 2. *Total solid matter.* 3. *Organic carbon.* 4. *Organic nitrogen.* 5. *Ammonia.* 6. *Nitrogen as nitrates and nitrites.* 7. *Total combined nitrogen.* 8. *Chlorine.* 9. *Total hardness.* The results of the analysis are expressed in parts per 100,000.

The *total solid matter* consists of mineral and organic residue, and the less this is in amount the better.

The *organic carbon* and *organic nitrogen* represent unoxidised organic matter, though whether the whole is the product of sewage, or animal contamination is doubtful. It is highly probable that much of it is derived from this source; but, inasmuch as the origin of the organic carbon,—as to whether it be animal or vegetable,—cannot be ascertained by chemical means, it is impossible to state definitely the danger actually implied by the organic carbon column. There is very little doubt, however, that some of it is of vegetable origin, and this would not be so deleterious to health as the remaining portion, which would be of animal origin. It is generally believed that if much more than 0.1 part of organic carbon derived from animal sources is present in 100,000 parts of water that the consumer is exposed to infection. Now, this is an important point to remember in enabling us to arrive at some conclusion as to quality. The student will see how little the chemical analysis proves in regard to it. The organic nitrogen is rather more definite in its meaning, and the less the amount of it as compared with the organic carbon, the better the water is likely to be.

Turning now to *ammonia* and *nitrogen as nitrates and nitrites*, it may at once be stated that these are mineral products of doubtful origin; but they are assumed by some eminent chemists to be mostly derived from sewage, privies, cesspools, farmyard manure, &c. According to Dr. Frankland, these animal products undergo oxidation, and when it is complete, they are resolved into mineral compounds, their carbon is converted into carbonic acid, and their hydrogen into water products, which can no longer be identified in the aerated waters of a river or spring; but their nitrogen is transformed partly into ammonia, chiefly, however, into nitrous and nitric acid, which, combining with the bases contained in most streams, frequently remain dissolved in the water for a long time, and constitute a record of the sewage and other analogous contamination to which it has been subjected since its last descent to the earth as rain. Such previous sewage, or animal contamination, is conveniently expressed in so many parts of average filtered London sewage as would, if thus completely oxidised, yield a like amount of nitrogen in the form of nitrites, nitrates, and ammonia. For this purpose average filtered London sewage has been assumed to contain

ten parts of combined nitrogen in 100,000 parts.

According to this point of view, the column devoted to *total combined nitrogen* records, as well as the analysis is able to do, the amount of *previous sewage contamination*. Now, we may accept the truth of Dr. Frankland's remarks as to the oxidation of the animal products; but it may well be questioned whether any one can definitely state that the whole (or what part) of the total combined nitrogen is the result of previous sewage contamination. It has been long ago shown that springs may derive that nitrogen from the strata or rocks through which the water passes before issuing at the surface. It will be observed that there is considerable doubt in the matter of origin in either case.

If we accept the "previous sewage contamination" theory as it stands, we are led to the conclusion that the waters of many springs and wells at present used are open to grave suspicion on account of the high proportion of combined nitrogen found in them. We know, however, that in general, spring-water is very wholesome, and that it is very difficult to trace zymotic disease to it; whilst well-water (except in shallow or improperly-constructed wells), and especially that coming from limestones in the country, as a rule, is preferable in quality to the water of many rivers at present very largely drawn upon. For instance, the water of the Kent Company is of very good quality. Nevertheless, the monthly analyses show that this Company's water almost invariably contains a higher proportion of total combined nitrogen than that of the other water companies supplying the metropolis. The Kent Company's water is derived from wells in the chalk, and water which, like this, has undergone such elaborate filtration in soaking through rocks to such a depth is, as a rule, rendered exceedingly pure and wholesome, and that Company's water is certainly not an exception, in spite of the presence of so much combined nitrogen. In this connexion it should be noted that such spring and well water usually (we might say, naturally) contains a lesser quantity of organic carbon and organic nitrogen than ordinary river water (save in some exceptional cases, the causes of which are well known). Some doubt, therefore, may reasonably be raised as to whether its superior quality is not largely due to this circumstance, which might thus be presumed to outweigh, or at least tend to equalise, the injurious effects, if any, produced by the total combined nitrogen. If this be so, it very materially minimises the danger implied (following out the theory) by the total combined nitrogen. This leaves us to perceive that some knowledge of the history of the water is highly desirable, if not absolutely necessary, to assist us in arriving at our main conclusion. This is freely admitted, but is it not a sign of weakness in regard to the meaning to be attached to the chemical analysis? Does it not, at least, throw considerable doubt on the value of the column, "Total combined nitrogen?"

But let us pursue the subject further; for it is of great importance. We will admit, for the sake of argument, that the whole of the combined nitrogen is of animal origin. Now, what does it *prove*? Nothing, definitely. In itself it is, within reason, quite harmless, the supposed danger being that it is assumed to harbour the germs of disease. We say *assumed* advisedly, because it is not proven, and, what is more, there is no way of proving it. We are, therefore, led to perceive that so many assumptions, and so very few facts, lie at the bottom of this portion of the argument to guide us in forming an opinion as to the value of the seventh column; that we may well ask ourselves whether anything more than doubtful conclusions of extremely little value can be legitimately drawn from it.

In regard to *ammonia*, Prof. Wanklyn insists that water, to be of a sufficient degree of purity, should not contain more than '08 part of albuminoid ammonia in a million, or '0056 grain in a gallon.

The column *Total hardness* does not affect the controversy: it will be considered subsequently.

So much for the chemical side of the argument.

**Russian Railways.**—The earnings of the Russian State railways last year amounted to 13,950,000*l.*, being an increase upon the preceding year of about 1,450,000*l.*

## CHURCH-BUILDING NEWS.

**Stanton Drem, near Bristol.**—The fine old double-naved church of the above parish was reopened, after reseating, paving, and general restoration, on the 8th inst., by the Lord Bishop of Bath and Wells. Several interesting features were found during the work, which have been carefully preserved. The restoration has been carried out from the plans and under the superintendence of Messrs. Lingen Barker, & Cross, of Weston-super-Mare.

**Troon, Ayrshire.**—A new church, erected in St. Meddan's-road, Troon, for the United Presbyterian congregation, has just been opened by the Rev. Dr. Taylor, of New York. The church seats, in nave and gallery, over 600 persons, and there are also a hall, ladies' room, vestry, &c., in connexion. An organ, by Messrs. Mirrieles, of Glasgow, has been placed in the church, and was used in the opening services. The buildings are of dark red freestone, from Ballochmyle Quarries, the style of architecture being fourteenth century Gothic of a Scottish type, and the tower and spire, rising over 120 ft., forms a conspicuous feature. Mr. John B. Wilson, Glasgow, was architect for the work, the contractors being all local. The total cost, inclusive of organ, bell, &c., is under 4,000*l.*

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

12,676, Ventilating. F. Pennefather.

This specification relates to an amplification of a previous patent, 11,287 of 1887, and in the specification many devices adapting the general principle in ventilation to special uses are shown. Air-collectors are an essential feature of the invention, and these are used in connexion with tubes or nozzles which communicate with the space to be ventilated or exhausted. The apparatus is arranged as an upcast or downcast ventilator, according as the air-collectors are placed above or below the distributing tubes.

14,733, Stonemasons' Points and Chisels. A. Robb.

According to this invention, cast-steel holders are made like the top part of an ordinary chisel such as is used by stonemasons; the top end has a rounded head for the wood mallet, and in a socket in the holder two bits are inserted, which hold a chisel and point as required. A slight tap with the mallet will remove the bits at once. When tools of the ordinary pattern are worn too short for the hand, they may be fastened in these holders and used up.

10,013, Window-sash Fasteners. J. Redden.

This invention relates to an improvement in devices for fastening from the inside either the top or bottom sashes of a window at any point of their respective travels. This fastening secures them in any position. A plate or tumbler is pivoted on an horizontal axis supported on a base fixed on the top of the bottom sash, the heavier part next the sash. The noses of the tumblers are partly straight and partly curved. The straight portion is parallel with and rests evenly against the side of the sash-frame. The curved portion is above the straight, and is struck eccentrically to the axis of the tumblers. Any attempt to pull the top sash down or push the bottom sash up will tend to depress the tumbler noses, locking both sashes in the position in which they had been intentionally left. A suitable device is employed for moving the tumbler-noses away from the sash frame.

10,072, Nail or Tack Extractor. W. A. Jack.

This relates to an apparatus for quickly and easily withdrawing nails, which consists of a lower part formed at one end with a foot resting upon the article from which the nail is to be withdrawn. Opposite the foot is a hook-shaped projection placed so as to engage with the head of the nail when forced against it. A striking head causes the extractor to be forced into the wood or material, and then the hook acting as the fulcrum and the lever as the handle the nail is easily withdrawn.

6,860, Hinges with Stays or Plates for Ledge Doors. J. Tall.

According to this invention, hinges are constructed with stays, straps, or plates, so that the boards can be filleted or chamfered before or after the hinges are affixed to the door stiles. Iron the hinges are affixed to the door stiles, the stays are fixed to fold or to extend all across the door, in which case it is prevented from buckling or warping.

### NEW APPLICATIONS FOR PATENTS.

Aug. 12.—12,680, J. Judd, Expanding and Contracting Door, Window, Shop-front Guards, &c.—12,730, T. Hancock, Closing and Securing Gates and Doors.

Aug. 14.—12,803, D. Hoey, Trapping Soil-pipes, Drains, Sewers, &c.—12,829, T. Metham, Joiners'



Cramp.—12,886, W. Gordon, Water Cisterns or Tanks.

Aug. 15.—12,867, H. Whiteley, Draft and Dust Excluders for Doors, &c.—12,879, H. Lomot and W. Cotton, Fasteners for Doors and Windows.—12,889 and 12,890, T. Smith and R. Wager-Taylor, Cement or Artificial Stone.

Aug. 16.—12,932, J. Empson and J. Hewitt, Brackets for Cistern Pulls.—12,942, J. Howie, Siphon Flushing Cisterns.—12,949, J. Armstrong, Cisterns, Tanks, &c.

Aug. 17.—13,004, T. Routledge, Sash-fasteners.—13,007, H. Beaumont, Bolts for Doors, Gates, &c.—13,008, J. Wilson, Fire-resisting Flooring, Decking, &c.—13,009, J. Wilson and Others, Fire-resisting Partitions and Walls in Buildings.—13,028, H. Darby, Stoves for Warming or Heating Apartments, Buildings, &c.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

8,137, G. Wilkes and J. Bishop, Attaching Door-knobs to Spindles.—9,813, O. Elphick, Syphon Flushing Apparatus.—10,063, W. Bird, Holders for Fanlights, &c.—10,080, J. Kempe, Water-closets.—10,237, J. Deeley, Syphon Flushing Cisterns.—10,305, J. Preston, Composite Metal Sash-bars and Frames for Glazing.—10,479, W. Baughan, Soldering-iron.—10,486, G. Smith, Ventilators for Sash-frames.—10,986, C. Brown, Pivot-adjustment for Swing-frames.—11,310, A. Brown and H. Pruce, Spindling Door-knobs, &c.—11,517, G. Hopkins, Wood Planing-machine.—11,553, A. Ridout and W. Hanson, Balancing the Weight of Window-sashes, &c.—11,715, V. Broughton, Combination Square, Mitre, and Bevel.—11,771, S. Banner, Paints or Enamels.—11,985, De Pennesfather, Ventilating Rooms, &c.—12,179, J. Willcocks and J. Harrison, Bolt-fasteners for Sashes, Casements, Windows, &c.—12,180, J. Willcocks and J. Harrison, Sash-fasteners.—12,292, R. Condy, Compound to be used in Paint or Pigment.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to Opposition for Two Months.

12,258, T. Whittaker, Hinges for Folding Doors, &c.—14,830, W. Derriker, Ornamentation of Glass.—14,870, T. Kromer, Door-locks, &c.—14,956, A. Bremner, Combined Latch and Bolt.—15,251, S. Grossmith, Automatic Flushing Cisterns.—15,305, J. Preston, Composite Metal Sash Bars and Frames for Glazing, &c.—11,052, F. Träbert, Centring Supports for Arched Constructions.—11,190, T. Desoucy, Preventing Sliding Window-sashes from being opened from the outside beyond a given point.—11,221, R. Davies, Brick-presses.

#### RECENT SALES OF PROPERTY:

##### ESTATE EXCHANGE REPORT.

Aug. 19.—By BENNINGFIELD & TIDY.  
Islington—67, 68, and 69, Roman-rd., u.t. 69 yrs., g.r. 210, r. 238 p.s. 4295  
Enfield—Bickes-hill, "The Willow" and a plot of land, f. 510  
By NOKES & NOKES.  
Islington—5, 6, & 7, St. George's-yd., u.t. 62 yrs., g.r. 218 300  
West Kensington—19, Wilton-rd., f. r. 245 p.s. 620

Aug. 20.—By B. H. Evans.  
Holloway—21 and 23, Schofield-rd., u.t. 65 yrs., g.r. 210 195  
Bancroft—6 and 7, Everdale-st., u.t. 64 yrs., g.r. 217, r. 238 p.s. 625  
Caledonian-rd.—45, Pembroke-st., u.t. 60 yrs., g.r. 215, 56, r. 250 p.s. 490  
47, Pembroke-st., u.t. 60 yrs., g.r. 215, 56, r. 250 p.s. 285  
I.g.r. of 210, 108, u.t. 60 yrs., at g.r. of 22 180  
I.g.r. of 215, 156, u.t. 60 yrs., at g.r. of 23 p.s. 238  
62, 73, and 75, Binglefield-st., u.t. 60 yrs., g.r. 215, subject to an annuity of £10 p.a. 760  
75, Pembroke-st., u.t. 60 yrs., g.r. 215, r. 253 p.s. 453

By WALTON & LEE.  
Dushey-heath—"The Holmstead" and 2a, Ir. 12p., f. 1,050

Aug. 21.—By WYATT & SON.  
Portfield, Sussex—Six f. houses in Florence-lane ... 615  
Six f. houses in Sottle-lane 425

Aug. 22.—By DYER, SON, & HILTON.  
Plumstead—The Plumstead Tabernacle and house adjoining, u.t. 79 yrs., g.r. 215, 12a p.s. 450  
By C. C. & T. MOORE.

Dow—26, Cardigan-rd., f. r. 230 p.s. 320  
Mile End—1, 3, and 6, Hunt-st., 1 to 11, John's-pl., u.t. 44 yrs., g.r. 242, r. 2193, 14a p.s. 100  
Mile End-rd.—No. 453, u.t. 13 yrs., g.r. 27, r. 242 p.s. 300  
East India-rd.—80, 82, and 84, Tetley-st., u.t. 63 yrs., g.r. 219 510  
Stoke Newington—79, Alham-rd., u.t. 92 yrs., g.r. 23, r. 243 300

By T. C. KING.  
Greenwich—1 to 4, Fry's-court, u.t. 64 yrs., g.r. 211 50  
North Kensington—1, 3, and 6, Adair-rd., u.t. 76 yrs., g.r. 221, r. 2101 755  
Zalting—The residence "Blythelme," u.t. 80 yrs., g.r. 215, 56, r. 240 425  
The residence "Rose Lodge," f. r. 236 p.s. 500  
Villa-residence in Chapel-rd., u.t. 87 yrs., g.r. 24, r. 240 430

By NEWSON & HARDING.  
Kentish Town—16, Victoria-rd., u.t. 49 yrs., no g.r., r. 242 483

Camden Town—47, James-st., u.t. 88 yrs., g.r. 25, r. 232 p.s. 190  
6, Stucley-pl., u.t. 40 yrs., g.r. 23, 58, r. 236, 58, 1, 2, & 3, Stammer-pl., u.t. 34 yrs., g.r. 213, r. 230, 58, 400  
6, Great College-st., u.t. 18 yrs., g.r. 25, r. 245 p.s. 275  
New Cross—72 and 74, Beeson-st., u.t. 85 yrs., g.r. 28, r. 232 160  
Commercial-rd.—45, Clarke-st., u.t. 11 yrs., g.r. 24 p.s. 240  
17, Wellesey-st., u.t. 34 yrs., g.r. 23, 10a, r. 228 195  
84, Rutland-st., u.t. 9 yrs., g.r. 23, 10a, r. 228 70  
Fentonville—25 and 29, Fentonville-rd., u.t. 20 yrs., g.r. 222, 13a, 4d. 455

[Contractions used in this list.—E.g.r. for freehold ground-rent; L.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.s. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

#### MEETINGS.

##### MONDAY, SEPTEMBER 2.

Clerks of Works' Association (Carpenters' Hall).—Monthly Meeting. 8 p.m.

##### TUESDAY, SEPTEMBER 3.

Glasgow Architectural Association.—Mr. W. Beaton on "The Decorated Style of English Gothic."

##### WEDNESDAY, SEPTEMBER 4.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting. 8.30 p.m.  
Association of Public Sanitary Inspectors.—Summer Meeting at Folkestone.

#### Miscellaneous.

##### Technical Education and Registration of Plumbers.

A course of instruction has been arranged for apprentice plumbers, at the Merchant Venturers' School, Bristol, between October 1 and the end of April. The course will comprise subjects specified in a special syllabus prepared by the Plumbers' Company, among them being elementary geometry in its various relations to plumbers' work; the elements of descriptive geometry, with special reference to the reading of working drawings; freehand drawing, including dimensioned sketches; hydrostatics and hydraulics as far as necessary to make pupils understand the action of simple appliances; chemistry and metallurgy. Workshop practice will be conducted on two nights in the week. The course of instruction will be assisted by demonstrations in the chemical laboratory, and will be followed by examinations, at which prizes will be awarded by the Company.—At the Examinations of Plumbers for Registration, held on Saturday last at the Guild's Institute, applicants were present from various parts of London, as well as Salisbury, Oxford, Worcester, Reading, Gosport, Swansea, and Derby. The examinations embraced tests in lead-laying, joint-making, &c., and a set of questions relating to the qualities of materials, the construction of various forms of house-fittings, and the principles of sanitation. The examiners were Messrs. Charles Hudson, J. C. Ashdown, C. T. Mills, G. Davis, and L. F. Gilbert, representing the United Operative Plumbers' Association of Great Britain and Ireland. Nearly two-thirds of the applicants succeeded in passing the examinations, one half of these being masters and the other half operatives.

**St Alban's Abbey.**—The preliminary steps in the proceedings between Mr. Henry Hucks Gibbs and Lord Grimthorpe as to the right of the former to restore the high altar screen and the Lady Chapel in St. Alban's Cathedral, took place on the 15th inst., before Mr. F. H. Jeune, Q.C., the Chancellor of the diocese. Lord Grimthorpe was represented by Mr. Knight, and Mr. Gibbs by Sir Walter Phillimore. The Chancellor gave directions as to the mode in which the evidence should be taken, and appointed November 9 for the hearing of the case.

**Building Trade Wages in Providence, New York.**—According to a recent report of the British Consul at New York, the prevailing rates at Providence are as follow:—Bricklayers, 14s. 7d. per day; carpenters, 9s. 4½d.; gasfitters, 12s. 6d.; masons, 11s. 5½d.; painters, 10s. 5d.; paviors, 9s. 4½d.; plasterers, 14s. 7d.; plumbers, 12s. 6d.; labourers, 6s. 5d. Intending emigrants from England should take into account the higher cost of living, and that the wages quoted may be paid only to experienced and skilled workmen.

**The Manchester Ship Canal.**—The half-yearly meeting of the Manchester Ship Canal Company was held at Manchester on Monday. The chairman of the directors, Lord Egerton of Tatton, presided, and moved the adoption of the report. He said no unforeseen difficulties had arisen in the actual work of the canal with regard to the physical nature of the obstacles they had to encounter. Two large docks were very nearly finished at Salford, and the river had been successfully diverted to form a third arm of the Manchester and Salford Docks. The works at Pomona-gardens were advanced. At Eastham very good progress had been made with the large locks at the entrance to the canal. Out of the 44,143,284 cubic yards which were estimated as the quantity of excavation required, there were only 25,080,666 cubic yards remaining to be excavated. At the present rate of progress the whole of the excavations would be carried out within three years from the commencement of the canal. Sir J. Lee, in seconding the motion, said the neighbouring railway companies were now disposed to converge to the ship canal docks and wharves. Parliament would have to be asked to authorise the required works, and at a future meeting in October particulars of the necessary capital would be submitted. Mr. Brown, a resident on the Bridgewater Canal, complained of the abominable stench arising from the canal during the summer months. The Chairman said the people to complain of were the local authorities who polluted the Medlock. The report was adopted. —Times.

**"Gransorbien."**—This, according to the *Liverpool Journal of Commerce*, is the name of a photo-graining paper which has been designed to effect a reduction in cost to the extent of 75 per cent. as compared with the usual method of graining. The paper is made in continuous rolls, and presents the appearance of a wooden block cut for printing purposes. It is prepared for a variety of woods, and in each instance the pattern is made 6 ft. 6 in., without a repeat. It is available for either oil or distemper graining with equal facility of manipulation. The process is exceedingly simple, and, therefore, easily acquired. Four pieces of paper are cut to the size of the door-panels, and another piece for the lock rail. The graining colour, of half oil and half turp., is mixed with the other ingredients in the usual proportion, and the door is rubbed in. Other arrangements having been made, the "Gransorbien" is laid against the top panel directly, as the absorbent properties of the paper are so great that wherever it touches it lifts the colour, and therefore it is a necessity that it should touch only the place where it is wanted. Precautions are also taken that the grain is pressed equally over every part of the surface, an essential consideration being that the paper does not move, and the operation is completed in a very limited space of time.

**Civil and Mechanical Engineers' Society.**—The following is the list of officers and members of Council of this Society for the ensuing session:—*President*, Mr. Henry Adams, M.I.C.E., M.I.M.E.; *Vice-Presidents*, Messrs. B. Nelson Boyd, M.I.C.E., F.R.G.S., and John Coates, A.M.I.C.E., F.G.S.; *Members of Council*, Messrs. W. Lee Beardmore, A.M.I.C.E., E. H. G. Brewster, A.M.I.C.E., George C. Child, A.M.I.C.E., Thomas Cole, A.M.I.C.E., B. Houghton, C.E., H. Ellis Hill, A.M.I.C.E., T. B. Lightfoot, M.I.C.E., R. E. Middleton, M.I.C.E., M.I.M.E., Ambrose A. Myall, A.M.I.C.E., G. W. Thompson, A.M.I.C.E., R. H. Twigg, M.I.C.E., F.M.S., A. T. Walmisley, A.K.C., M.I.C.E., and J. B. Walton, M.I.C.E.; *Auditors*, Messrs. J. H. Turner, A.M.I.C.E., and E. S. Mansergh; *Hon. Solicitor*, Mr. Roger H. Willcocks, LL.B.; *Hon. Treasurer*, Mr. William C. Street, A.R.I.B.A.; and *Hon. Secretary*, E. L. W. Haskett-Smith, A.K.C., A.M.I.C.E.

**Removing Old Paint.**—The ordinary process of scraping old paint, or burning it off, is hardly expeditious enough for general purposes, and is also laborious. The *Scientific American* says that soda and quicklime are far more thorough, and the paint is more quickly removed. A solution of half soda and half quicklime is made by first dissolving the soda in water, and then adding the lime, when the solution is ready for application with an old brush. A few minutes are sufficient to remove the coats of paint, which may be washed off with hot water. A coating of vinegar or acid should be applied to cleanse the surface before repainting.



**The West-end Fever "Scare."**—We must confess that we have considerable sympathy with those who are regarded as having indulged in the so-called "fever scare" in the West-end. It is true that the outbreak has been limited, that it has been mild in character, and that it has not cost many lives, but the mere fact of a number of houses scattered over a wide area being simultaneously attacked with this disease is in itself a matter for anxiety; and the circumstance that the houses attacked were of a sort to make it practically impossible that the disease was due to any ordinary sanitary defects attaching to the drains or otherwise is the reverse of reassuring. For our part, we think that the circumstances of the outbreak justify a strong suspicion against milk as the vehicle of the infection, and this aspect of the question will doubtless be thoroughly looked into. Indeed, the President of the Local Government Board has promised that the inquiry made into the outbreak by Dr. Corfield shall now be supplemented by further investigation of the circumstances by one of the medical inspectors of his department. In the meantime, we would, as we have often done before, urge that safety in the consumption of milk cannot be expected unless the consumers boil or otherwise cook all milk used in their households. There is, in all probability, no article of food which is so apt a vehicle of the contagion of disease as milk in its natural state.—*The Lancet.*

**Progress of Vancouver, British Columbia.**—According to a recent issue of the United States Army and Navy Journal, Vancouver has had a wonderful revival since its partial destruction by fire in 1886. Brick buildings have taken the place of dilapidated shanties, a City-hall, a hospital, and two fire stations (all substantial buildings), have been erected, also three fine bridges. Twenty miles of streets have been laid out, a system of sewage commenced, tubular tanks built for protection from fire, and a magnificent road nine miles in length constructed round the 950 acres of the natural park called Stanley Park. The city is lighted by electricity, supplied with abundance of pure water under high pressure from the neighbouring mountains, and is a model of cleanliness, comfort, and health.

**The English Iron Trade.**—The English iron market is only moderately active, but has grown stronger since last week. Pig-iron has recovered from the slight reaction which we noted a week ago, and where prices have not advanced they are held very stiffly. The most notable rise has taken place in Scotch makers' iron, nearly all brands of which are 1s. a ton dearer. Scotch iron would be much higher if it were not for the heavy stocks. The finished iron market keeps fairly active, and very firm. The orders for steel are still abundant, which state of affairs contributes to the buoyancy of prices. Steel rails are quoted 2s. 6d. a ton more. Shipbuilders are still booking fresh work, and the prospect for the winter is most cheering. The position of engineers continues equally satisfactory.—*Iron.*

**Association of Public Sanitary Inspectors of Great Britain.**—The annual summer meeting of this Association will be held at Folkestone on Wednesday next, September 4. The Mayor of Folkestone will receive the Association in the Exhibition at 11 a.m., and will open the proceedings. Addresses will be delivered by Dr. W. Bateman, J.P., Medical Officer of Health, on "Sanitation in Folkestone," and by Dr. C. E. Fitzgerald, M.D., on "Sanitary Advantages of Folkestone." After luncheon at the Town Hall, the party will proceed to view the Folkestone Gas Works, and will afterwards visit the Water Works.

**German Enterprise in Greece.**—The Belgian Consul at Athens, in a recent report to his Government, draws attention to the great increase of German manufactures imported into Greece. It appears that some enterprising German industrial firms have established an agency in Athens, where drawings and models of Greek industrial requirements are shown, and every other information given. German manufacturers are reported to have benefited largely through this agency.

**Walworth Wesleyan Chapel** and school premises have been re-opened after renovation and interior decoration in colour. The work has been executed by Mr. Charles Goad, of Camberwell-road, from the designs and under the direction of Mr. T. E. Lidard James, architect, London.

**The Howard Estates.**—The Earl of Carlisle has resolved to sell, either by auction or by private contract, various portions of his estates situated in the counties of Northumberland and Cumberland. For purposes of sale these are divided into nine divisions, whilst several of the divisions can be sub-divided into a large number of lots, to meet the convenience of purchasers. The tale of the properties is a long one: we will mention the most important. In Cumberland: Irthington, — Morrel Hill and Breakstock farm, 833 acres; estimated rental, 314*l.* per annum; Lanercost, — Butterburn (2,240 acres) and Rediske (1,370 acres), two sporting properties on the Irthing, lying north of Gilsland; and Ainstable, — Low Hall, on the Eden, near to Ullswater, a residential estate of about 235 acres, rented at 222*l.* 19s. a year, together with Dale Mills, on Croghin Water. In Northumberland, being the Morpeth Estates: Mifford and Morpeth, — Benridge, comprising five farms with other holdings, 1,067 acres, and 80 acres of woodland, having an annual rental value calculated at 950*l.*; Morpeth, Stanington, Nuford, and Bedlington, — the Stanington, Tramwell, and Netherton estates, comprising 100 lots, which include all the villages of Stanington, Hepscott, and Netherton, together with Netherton Hall, — 8,512 acres in all, 10,360*l.* annual rental; Ugham, the manor and village of that name, five miles distant from Morpeth, with the advowson and next and perpetual right of presentation to St. John's vicarage, representing seventeen lots, which include Ugham Park (571 acres) and Northwood House, — 2,198 acres in all, which yield about 2,123*l.* a year; Knaresdale, — Softley, a residential and sporting property, on the South Tyne, of 1,300 acres; and Morpeth, — Cottingwood Farm and the long-established tiler, with the plantations known as How Burn Wood, West Nursery, and Windmill Nursery, 216 acres, let for 240*l.* per annum. The sales will thus cover an aggregate of 18,559 acres, producing a total income of, say, 16,000*l.* a year.

**Porous Earthenwares.**—We have received a circular issued by the "International Terra-Cotta Lumber Company" of Chicago, setting forth the character and uses of their porous earthenwares, which are patented as "Terra-cotta Lumber," "Brickwood," "Cellular Pottery," and "Holstein" or "Woodstone," a class of material which, making every allowance for a manufacturer's predilections, seems to have qualities which claim the attention of architects and builders on this side of the water. As described by the makers, these materials "are the burned products of compositions of earthy and vegetable matters, such as clay or clayey loams, sawdust and cut straw, first made plastic by the addition of water, in machine-mixing processes, and subsequently pressed into desired forms by heavy power, and finally dried and burned as bricks are dried and burned. The vegetable matters in the dried compound,—proportioned to the clay as three parts, or more, by measure, to two,—serve as fuel for burning the clay, none other being needed after ignition is once effected, and when eliminated from the compound by combustion, leave a bricken residue so porous that its weight is less than half the weight of common building brick, and which can be nailed and nailed with carpenter's tools with the facility afforded by soft pine lumber." The proof of course is in the using; but if the above description is a fair one, there ought to be a field for the material in practical building work. It is specially recommended we observe, among other things as a fireproof jacketing for iron columns.

**The Nordenham Dock and Harbour Project.**—The *Frankfurter Zeitung* states that the project formed by an English syndicate of constructing a large harbour and extensive docks at Nordenham, in Oldenburg, at the mouth of the Weser, to which we referred some while ago, has fallen through, the promoters being unable to raise the funds required, although the Duchy of Oldenburg guaranteed 5 per cent. interest for seven years.

**Upsala Cathedral.**—The restoration of the Cathedral of Upsala, the most ancient in Sweden, which has been in progress for the last three years, is now more than half-finished, the interior being particularly advanced. The cost up to the present has been 25,000*l.*

**Norwegian Tramways.**—The Christianian tramways appear to be profitable, a dividend of 5½ per cent. being paid for last year.

**Proposed Technical Museum for the Potteries.**—The *Staffordshire Sentinel* says that the proposed provision of a well-established Technical Museum for the Staffordshire Potteries, to be located in Hanley, in accordance with the unanimous decision of the Chamber of Commerce and the Iron and Steel Institute of North Staffordshire, at length seems to be within measurable distance of realisation, and the prospects of the addition of this desideratum to the district have latterly grown very bright and encouraging. The arrangements of those bodies have proceeded most satisfactorily, and now appear to be rapidly approaching completion. On Wednesday, Sir Philip Cunliffe Owen paid an unexpected visit to Hanley, and examined the old Mechanics' Hall, which has been placed at the disposal of the Museum Committee by the Town Council of the borough. He was accompanied by John Ridgway (representing the Chamber of Commerce), Mr. Alderman Cooke (representing the School of Art), and Messrs. Alderman Powell and Hammersley. Sir Philip carefully considered the plans for the alteration and improvement of the building, as suggested by Mr. Sugden, the architect employed by the Chamber of Commerce, and he expressed himself highly pleased both with the capacity of the room and the architect's proposals. He most generously promised to expedite, as far as he possibly could, the establishment of a museum for the district, and made some suggestions as to the manner in which the room could be best fitted for the purpose.

**Termination of the Bricklayers' Strike in Dublin.**—The *Freeman's Journal* reports that on Monday morning a large number of the Dublin bricklayers who went out on strike for higher wages some weeks ago, returned to their work under the arrangement entered into by his Grace the Archbishop of Dublin and the arbitrators selected by the trade society and the employers. However, a considerable number of the men having left the city after the strike began, were not able to avail themselves of the arrangement, but the majority of them were expected to be back in their places before the end of the week. A very largely attended meeting of the bricklayers was held on Monday night in the Bricklayers' Hall, Cuffe-street, when the decision of the arbitrators was unanimously approved of.

**The Southwark Foundry Company.**—The new and extensive premises of the Southwark Foundry Company, Limited, in Orange-street, Southwark, have been opened. They have been erected by Messrs. Holloway Bros., under the superintendence of Messrs. Ford & Hesketh, architects, and are replete with every facility for the carrying on of a very extensive business. The company's works adjoin those of Messrs. Hayward Bros. & Eckstein, of Union-street, Borough, the manufacturers of semi-prism pavement lights.

**Re-opening of the Victoria Hall as the First People's Palace for South London.**—The Victoria Hall, Waterloo-road, will re-open this Saturday, Aug. 31, with a variety of entertainment. On Tuesday, Sept. 10, Professor Malden will lecture on the "Paris Exhibition," with specially-prepared views. This will be an opportunity for the poorest to obtain some idea of the Exhibition.

# PRICES CURRENT OF MATERIALS.

		£.	s.	d.	£.	s.	d.
TIMBER.							
Greenheart, B.G.	.....ton	7	0	7	15	0	
Teak, E.I.	.....load	12	0	14	0		
Sapota, U.S.	.....foot cube	0	2	0	3	0	
As, Canada	.....load	3	10	0	5	0	
Birch	.....	3	10	0	6	0	
Elm	.....	4	0	0	5	0	
Spruce, &c.	.....	2	0	3	10	0	
Oak	.....	2	10	0	4	10	
Canada	.....	5	10	0	7	10	
Pine, Canada red	.....	3	0	0	4	0	
Lath, Dantia	.....yellow	3	10	0	5	5	
St. Petersburg	.....	4	10	0	6	10	
Wainscot, Riga, &c.	.....log	2	15	0	4	5	
Deals, Finland, 2nd 1st	.....std. 100	7	0	0	11	0	
" 4th and 3rd	.....	7	0	0	8	15	
Riga	.....	7	0	0	9	0	
St. Petersburg, 1st yellow	.....	11	0	15	0	0	
" 2nd	.....	10	0	11	0	0	
" white	.....	7	0	10	0	0	
Swedish	.....	8	0	18	0	0	
White Sea	.....	9	0	17	0	0	
Canada, Pine, 1st	.....	16	0	16	0	0	
" 2nd	.....	11	0	17	0	0	
" 3rd, &c.	.....	8	0	10	0	0	
" Spruce, 1st	.....	9	0	11	0	0	
" 3rd and 2nd	.....	7	0	9	0	0	
New Brunswick, &c.	.....	6	10	0	8	10	
Battens, all kinds	.....	6	0	18	0	0	
Flooring Boards, sq., 1 in., prepared, first	.....	0	11	0	0	14	0



TIMBER (continued).	£. s. d.	£. s. d.
Flooring Boards, sq. lin., prepared (contd.)	0 8 0	0 10 8
Second .....	0 6 8	0 7 9
Other qualities .....	0 6 0	0 7 5
Cedar, Cuba .....	0 0 4	0 0 4
Honduras, " .....	0 0 4	0 0 4
Mahogany, Cuba .....	0 0 4	0 0 4
St. Domingo, cargo average .....	0 0 4	0 0 4
Mexican .....	0 0 4	0 0 4
Tobacco .....	0 0 4	0 0 4
Honduras .....	0 0 4	0 0 4
Box, Turkey .....	4 0 0	13 0 0
Rose, Rio .....	15 0 0	20 0 0
Balis .....	0 0 0	19 0 0
Satin, St. Domingo .....	0 0 0	1 0 0
Porto Rico .....	0 0 0	1 0 0
Walnut, Italian .....	0 0 4	0 0 4

IRON—	£. s. d.	£. s. d.
Pig, in Scotland .....	45 15 0	0 0 0
Bar, Welsh, in London .....	8 6 0	8 10 0
" at works in Wales .....	4 15 0	6 0 0
" Staffordshire, in London .....	6 10 0	6 10 0
CORRUG—		
British, cake and ingot .....	47 10 0	0 0 0
Best selected .....	48 10 0	0 0 0

METALS (continued).	£. s. d.	£. s. d.
COPPER (contd.)		
Sheets, strong .....	56 0 0	0 0 0
Chill, bars .....	43 15 0	0 0 0
Yellow Metal .....	0 0 0	0 0 0
Lead—		
Pig, Spanish .....	12 12 6	12 13 9
English, com. brands .....	12 12 6	0 0 0
Strait .....	0 0 0	0 0 0
Australian .....	91 15 0	0 0 0
English Ingots .....	95 0 0	0 0 0
Zinc—English sheet .....	21 0 0	22 0 0

OILS.	£. s. d.	£. s. d.
Linseed .....	21 17 6	22 2 6
Cocanut, Ceylon .....	26 15 0	27 10 0
Ceylon .....	23 10 0	0 0 0
Palm, Lagos .....	25 10 0	26 0 0
Rapeseed, English pure .....	31 15 0	0 0 0
" brown .....	30 5 0	0 0 0
Cottonseed, refined .....	27 0 0	28 0 0
Tallow and Oleine .....	21 0 0	40 0 0
Lubricating, U.S. .....	5 0 0	6 0 0
Tax—refined .....	7 0 0	12 0 0
Archangel .....	1 4 3	1 4 6
" .....	0 15 9	0 16 0

GATSFIELD (Sussex).—For the erection of hunting stables, for Lord Brassey. Mr. Arthur Wells, architect, 26, Havelock road, Hastings:—  
 Taylor Bros., Hastings .....

Staines & Son .....

COLCHESTER.—For new water-closets, &c., at the workhouse, for the Board of Guardians of the Colchester Union. J. W. Start, architect, Colchester:—  
 C. Mills .....

CONGLETON.—For new hot-water heating apparatus, new galleries and screens, oak block and concrete flooring, &c., for the Corporation. Quantities by the architects, Messrs. W. Bugden & Son, Leek:—  
 Congleton; Roger Lowe, Farworth .....

COVENTRY.—For building factory, Spon-street, for the Coventry Watch Movement Manufacturing Company, Limited. Mr. Herbert W. Chastaway, architect, Trinity-churchyard, Coventry:—  
 C. Gray Hill, Much Park-street .....

EAST GRINSTEAD (Sussex).—For new Guest-house, St. Margaret's Convent, East Grinstead. Mr. Arthur Edmund Street, architect, London. Quantities by Mr. Charles F. A. Poland, London:—  
 J. W. Bunting & Son, 3, Talford-Place, Cambridge, S.E. ....

EPPING.—For erecting a pair of semi-detached houses and boundary walls on the Kendal Lodge Estate. Mr. W. H. Pertwee, architect, 14, Clifford's Inn, E.C.1:—  
 J. W. Falkner .....

HPPING.—For erecting residence and boundary walls on the Kendal Lodge Estate. Mr. W. H. Pertwee, architect, 14, Clifford's Inn, E.C.1:—  
 John Beale .....

FOREST-GATE.—For making sundry alterations and improvements to the "Princess Alice" public-house, Romford-road, Forest-gate, E.C., for Mr. Charles John Knowler. Mr. James F. Wesley, architect, Forest-gate:—  
 F. Sage & Co. ....

HANWELL.—For the erection of temporary wards and school for Ophthalmic Children, Hanwell, for the managers of the Central London School District. Messrs. H. Jarvis & Son, architects, 29, Trinity-square:—  
 Ferry & Co. ....

HORNSEY.—For making-up Elm Grove, Crouch-end, for the Hornsey Local Board. Mr. T. de Courcy Meade, Engineer:—  
 Mowlem & Co., Westminster .....

HORNSEY.—For new storm-water sewer, Campsbourne Estate, Hornsey, for the Hornsey Local Board. Mr. T. de Courcy Meade, Engineer:—  
 Mowlem & Co., Westminster .....

LONDON.—For repairs, &c., to No. 98, Strand, W.C., for the Middlesex Acrated Bread and Restaurant Company, Limited. Mr. Lawton R. Ford, architect, 82, Dunstan's-chambers, 24, Railway-approach, London Bridge, S.E.:—  
 F. Britton .....

## COMPETITION, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

### COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Municipal Buildings .....	Sheffield Corporation ..	600L.	Dec. 2nd i.	

### CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Broken Granite .....	Barnet Local Board .....	Official .....	Sept. 2nd ii.	
Drainage, &c., Works .....	Poplar Union .....	Clarkson .....	Sept. 4th x.	
Broken Granite and Flints .....	County of Sussex .....	C. Adcock .....	Sept. 6th ii.	
Making-up Roads and Laying Par-paving .....	Walthamstow Loc. Bd. ..	Official .....	do. x.	
Falling Down and Removing Buildings .....	GloUCESTER Municipal Buildings Committee ..	do. .....	do. ii.	
Erection and Furnishing of School .....	Hamnamet School Bd. ..	Rees Llewelyn .....	Sept. 9th x.	
Granite Kerb .....	East Ham Local Board ..	W. H. Savage .....	Sept. 10th x.	
Broken Granite .....	do. .....	do. .....	do. x.	
Paving Footpaths .....	do. .....	do. .....	do. x.	
Leveling and Making-up Streets .....	do. .....	do. .....	do. x.	
Roadmaking and Paving Works .....	Hammersmith Vestry .....	H. Mair .....	Sept. 11th x.	
General Sewer Works .....	Lambeth Vestry .....	Hugh McIntosh .....	Sept. 12th x.	
New Schools .....	Fenny Stratford Sch. Bd. ..	W. Hull .....	Sept. 14th x.	
Sewerage Works .....	Beddington Local Board ..	H. York .....	Sept. 16th x.	
Underground Conveyance .....	Paddington Vestry .....	Official .....	do. x.	
Enlargement of P. O., Holloway .....	Comm. of H. M. Works .....	F. & J. Flowman .....	Sept. 17th x.	
Construction of Tunnel, &c. .....	Hastings Life Co., Lim. ..	do. .....	Sept. 18th ii.	
New Vestry Hall and Office .....	St. Martin-in-the-Fields Vestry .....	R. Walker .....	Sept. 19th x.	
Erection of Board School .....	Tilbury School Board .....	F. W. Albany .....	Sept. 21st x.	
New Coastguard Station, Deal .....	Admiralty .....	Official .....	Sept. 27th x.	
Superstructure of Lunatic Asylum .....	London County Council ..	G. T. Hine .....	Sept. 28th x.	
Enlargement of Lunatic Asylum, Coudon .....	do. .....	C. H. Howell .....	Sept. 30th ii.	

### PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Borough Surveyor's Assistant .....	Reading Town Council ..	100L.	Sept. 9th xvi.	
District Surveyors (3) .....	Leicestershire C. C. ....	500L. each .....	Sept. 17th xvi.	

### TENDERS.

[Communications for insertion under this heading must reach us not later than 12 Noon on Thursdays.]

ABBOT'S LANGLEY (Herts).—For general repairs to the Manor House, for the President and Fellows of Trinity College, Oxford, and Sydney Sussex College, Cambridge. Mr. C. P. Ayres, architect, Watford:—  
 J. Stone, Watford .....

ACTON W.—For the erection of six shops in High-street. Mr. Edward Monson, jun., architect, Grosvenor House, The Vale, Acton, W.:—  
 T. Anthony, Brentford, W. ....

ACTON.—For the erection of laundry in Bello Bridge-road, South Acton. Mr. Edward Monson, jun., architect, Grosvenor House, The Vale, Acton, W.:—  
 James Hedges, Acton (accepted) .....

BISHOP'S STORTFORD.—For new kilns at Bishop's Stortford, for Messrs. Barclay, Perkins, & Co., Messrs. Inskip & Mackenzie, architects, No. 6, Bedford-row, W.C. Quantities by Messrs. R. L. Curtis & Sons, 119 & 120, London-wall, E.C.:—  
 Glasscock .....

BISHOP'S STORTFORD.—For new kilns, &c., at Bishop's Stortford, for Messrs. John Taylor & Sons, architects, Inskip & Mackenzie, architects, No. 6, Bedford-row, W.C. Quantities by Messrs. R. L. Curtis & Sons, 119 & 120, London-wall, E.C.:—  
 Bitch .....

BOXMOOR (Herts).—For rebuilding Two Waters Mill, for the Grand Junction Canal Company. Mr. C. P. Ayres, architect, Watford:—  
 W. B. Neal, Watford .....

CAMBRIDGE.—For roadways bridge (over the river Cam) and approaches, for the Cambridge Corporation and the Local Board of Chesterton. Mr. John J. Webster, M.Inst.C.E., 67, Lord-street, Liverpool, and Mr. Frank Waters, 1, Sidney-street, Cambridge, engineers:—

No. 1.	No. 2.	No. 3.	Total.
£. s. d.	£. s. d.	£. s. d.	£. s. d.
Renshaw .....	4,775 0 0	—	—
Page & Co. ....	—	4,799 0 0	—
Heeman & Jackson .....	—	4,832 0 6	—
J. J. Yeaght .....	—	4,676 0 0	—
Handyside & Co. P. A. Mills .....	—	3,904 15 2	—
J. Bush .....	—	3,350 17 8	—
J. Cook .....	—	2,680 19 8	—
Thoday & Son .....	—	2,458 15 0	—
Cochrane & Sons .....	—	1,922 12 2	—
T. Gibson .....	4,402 6 10	4,308 9 0	8,710 19 7
G. Double .....	4,480 14 2	4,504 18 2	8,984 12 5
Holme & King .....	5,105 13 0	5,745 17 0	10,850 13 0
Pickhall & Son .....	4,683 6 4	4,381 10 0	9,064 16 4
J. Mackay .....	4,564 19 3	4,044 15 2	8,608 11 5
J. Mackay .....	3,902 13 0	3,639 6 2	7,541 9 2

\* Contract No. 1.—Earthwork, masonry, &c.  
 † Contract No. 2.—Steel and ironwork.  
 ‡ Contract No. 3.—New roadway.  
 § Forham-road, Bury St. Edmund.  
 ¶ Accepted.



LONDON.—For alterations, &c., to "The Globe," 13, Finsbury-pavement, Moorgate-street, E.C., for Messrs. Showell & Probyn. Mr. H. J. Newton, architect, 49, Victoria-street, Westminster, S.W.

Kirk & Randall, Woolwich .....	£2,160	0	0
W. Downes, Walworth .....	2,157	0	0
H. Burman & Sons, Kennington- park .....	2,121	0	0
S. R. Lambie, Kentish-town .....	2,118	0	0
S. Godden, Bryanstone-square .....	2,095	0	0
J. Beale, Westminster Bridge-road*	2,015	0	0

\* Accepted.

LONDON.—For alterations and additions to No. 81, Avenue-road, Regent's Park, N.W. Mr. Richard J. Lovell, architect. Quantities by Mr. James Kennedy:—

Colts & Son .....	£1,190	0	0
Simpson & Son .....	1,172	0	0
G. H. & A. Bywaters .....	1,130	0	0
Roberts .....	988	0	0
J. Ivory .....	980	0	0
C. W. Boris & Co. ....	857	0	0

LONDON.—For new water-closets, and roofs to corridors at the workhouse, Renfrew-road, S.E., for the Guardians of the Poor of the Parish of St. Mary, Lambeth. Mr. Thomas W. Aldwinckle, architect, 2 East India-avenue, Leadenhall-street, E.C. Quantities supplied:—

W. Smith.....	21,459	0	0
Staines & Son .....	1,347	0	0
W. Johnson.....	1,320	0	0
L. Whitehead & Co. ....	1,295	0	0
F. J. Wicks.....	1,249	0	0
J. R. Hunt.....	1,232	0	0
A. & W. Garner.....	1,209	0	0
J. Mills.....	1,200	0	0
..... & H. Castle.....	1,185	0	0
J. Monck.....	1,180	0	0
M. Marsland.....	1,143	0	0
A. M. Descon & Co. (accepted).....	1,125	0	0

LONDON.—For alterations to the "British Oak" tavern, Westbourne-park-road, for Mr. Ascott. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster:—

J. Beale .....	£1,520	0	0
Godden .....	1,500	0	0
Lamble .....	1,475	0	0
Burman .....	1,458	0	0
Marks .....	994	0	0

LONDON.—For alterations at the "Globe Tavern,"  
Finbury-pavement, for Messrs. Showell & Probyn. Mr. H. I. Newton, architect, 49, Victoria-street, West-  
minster:—

Kirk & Randall.....	£2,160	0	0
Down .....	2,157	0	0
Burman & Sons .....	2,121	0	0
Lamble .....	2,118	0	0
Goddon .....	2,095	0	0
J. Boale, Westminster-bread-road*	2,015	0	0

\* Accepted.

LONDON.—For alterations at No. 8, Clapham-road, for Mr. Hunnex. Mr. J. A. J. Woodward, architect, 10, Crown Villas, Kennington Oval:—

Hooper .....	£188 10 0
J. Beale, Westminster-bridge-road*...	183 0 0

\* Accepted.

LONDON.—For alterations to the "White Hart," St. Thomas's-street, S.E., for Mr. Brown. Messrs. Treacher & Fisher, architects, 30, Coleman-street, E.C. :—

Burman & Sons .....	£999	0	0
Spencer & Co. ....	975	0	0
Turtle & Appleton .....	890	0	0
J. Walker .....	887	0	0
Allen & Son .....	881	0	0
J. Beale (amended tender) (accepted) .....	664	0	0

NOTTINGHAM.—For alterations to shop, Lister Gate, Nottingham. Messrs. F. Jackson & Son, architects, 18, Low-pavement, Nottingham. Quantities supplied by the

Gilbert & Gabbitase .....	£400	0	0
Hodson & Son .....	3	7	0
G. Bell & Sons .....	374	0	0
John Cooper .....	373	0	0
A. B. Clarke .....	350	0	0
James Wright .....	345	0	0
S. & J. Cargill, Duke-street, New Bas- ford (accepted) .....	328	14	0
[All of Nottingham].			

PLUMSTEAD.—For erecting detached dwelling-house  
on Herbert-road, for Mr. George Bryceson. Mr. H. H.  
Church, architect, Woolwich :—

Jerrard .....	£1,015	0	0
Proctor .....	950	0	0
Covil (accepted) .....	750	0	0

**PLUMSTEAD.**—For erecting additional walling and entrance gates at the Plumstead Cemetery, Wickhampton, Mr. H. H. Church, architect, Woolwich. Quantities applied:—

Bridle .....	£1,148	0	0
Proctor .....	810	0	0
Rackham & Bentham .....	580	0	0
Battley (accepted) .....	514	0	0

TOTTENHAM.—For erecting an addition to cellars,  
c., at the Lager Beer Brewery, Portland-road, Totten-  
ham, for the Tottenham Lager Beer and Ice Factory  
company, Limited. Mr. Charles Dunch, architect.  
quantities by Mr. James F. Wesley, Forest-gate:—

Mowlem & Co.	£11,958	0	0
Higgs & Hill	11,500	0	0

Grover & Son .....	11,019	0	0
Dowda & Son .....	11,0	0	0
J. & J. Greenwood .....	11,000	0	0
J. Morter .....	10,990	0	0
Harris & Wardrop .....	10,980	0	0
Mark Gentry .....	9,888	0	0
Peto Bros. ....	9,686	0	0
E. Lawrence & Sons .....	9,390	0	0
J. T. Chappell .....	9,319	0	0



WATFORD (Herts).—For alterations to Eastbrook House, Queen's-road, for Mr. C. Saville. Mr. C. P. Ayres, architect, Watford.—

T. Turner, Limited.....	£288	0	0
W. B. Neal .....	278	0	0
Judge & Eames .....	255	0	0
G. Wiles .....	246	0	0
Andrews & Sons .....	244	0	0
C. Brightman .....	210	0	0
Clifford & Gough .....	219	0	0
G. & J. Waterman .....	212	0	0
H. M. Dove (accepted) .....	205	0	0

[All of Watford.]

WOODFORD (Essex).—For additions and alterations to existing schools, at Woodford-green, to accommodate 750 children, for the Woodford School Board. Mr. Edward Tidman, C.E., architect, 34, Victoria-street, Westminster. Quantities by the architect:—

Langley & Co., Crawley, Sussex .....	£3,600	0	0
Barrett & Power, Hackney .....	3,698	0	0
W. R. T. Kelland, Stoke Newington .....	3,400	0	0
W. Grear, Stratford, E. ....	3,330	0	0
F. Ranger, Woodford, Essex .....	3,298	0	0
Everett & Co., Colchester .....	3,277	0	0
Guifrey & Son .....	3,165	0	0
C. Simmonds, Buckingham-road, Har-lesden .....	3,147	0	0
S. Hipwell, Wisbech .....	3,129	0	0
D. Ellwood & Son, Sandy, Beds .....	3,075	0	0
R. Edwards, Cambridge-road, E. ....	3,073	0	0
J. Egan & Co., Backhurst-hill .....	2,958	0	0
H. Wells, Woodford, Essex .....	2,935	0	0
Loth & Oliver, New Southgate, N. ....	2,900	0	0
F. J. Corhead, Leytonstone, Essex .....	2,698	0	0

WOOLWICH.—For erecting forage store for Messrs. C. & C. Taft, on their wharf at Woolwich. Mr. H. H. Church, architect, Woolwich. Quantities supplied:—

H. L. Holloway .....	£1,479	0	0
Jerrard .....	1,379	0	0
Kirk & Randall .....	1,337	0	0
Proctor .....	1,325	0	0
Staines & Son .....	1,268	0	0
Martin .....	1,220	0	0
Woodward & Co. ....	1,200	0	0
J. James Holloway .....	1,161	0	0
R. & E. Evans .....	1,120	0	0
Martin, Wells, & Co. ....	1,038	0	0
Multon & Wallis .....	988	0	0
Wall & Sons .....	903	0	0
Kemp .....	895	0	0
Battley .....	957	0	0
Girling (accepted) .....	839	0	0

WOOLWICH.—For alterations and additions at Nos. 125 and 126, High street, for Mr. Robt. Webb. Mr. H. H. Church, architect, Woolwich.—

E. G. Corill (accepted) .....

WOOLWICH.—For erecting Wesleyan Schools and Soldiers' Institute, William-street. Mr. H. H. Church, architect, Woolwich. Quantities by Mr. W. H. Strudwick.

E. G. Corill .....	£3,209	0	0
Wallis & Sons .....	2,987	0	0
Staines & Son .....	2,839	0	0
Battley .....	2,828	0	0
James Holloway .....	2,800	0	0
Proctor .....	2,780	0	0
Woodward & Co. ....	2,700	0	0
H. L. Holloway .....	2,687	0	0
Martin, Wells, & Co. ....	2,450	0	0
Kemp .....	2,039	0	0
Multon & Wallis (accepted) .....	2,576	0	0

WOOLWICH.—For erecting drill shed for the 3rd Kent Rifle Volunteers (Royal Arsenal), in Beresford-street. Mr. H. H. Church, architect, Woolwich. Quantities supplied

Outhwaite & Sons .....	£2,990	0	0
Kemp .....	2,933	0	0
Girling .....	2,936	0	0
Wallis & Sons .....	2,930	0	0
Woodward & Co. ....	2,900	0	0
R. & E. Evans .....	2,879	0	0
James Holloway .....	2,878	0	0
Staines & Son .....	2,830	0	0
Jerrard .....	2,800	0	0
Multon & Wallis .....	2,798	0	0
G. B. Battley .....	2,787	0	0
H. L. Holloway .....	2,763	0	0
Kirk & Randall .....	2,786	0	0
Martin, Wells, & Co. ....	2,762	0	0
Proctor (accepted) .....	2,650	0	0

WOOLWICH.—For rebuilding "The Shakespeare" tavern, Powis-street, for Mr. G. H. Campbell. Mr. H. H. Church, architect, Woolwich. Quantities by Mr. W. H. Strudwick:—

Kirk & Randall .....	£3,730	0	0
Proctor .....	3,730	0	0
Staines & Son .....	3,686	0	0
Multon & Wallis .....	3,454	0	0
James Holloway .....	3,451	0	0
Wallis & Sons .....	3,437	0	0
Jerrard .....	3,333	0	0
R. & E. Evans .....	3,055	0	0
Martin, Wells & Co. ....	3,250	0	0
Kemp .....	3,249	0	0
Battley (accepted) .....	3,047	0	0
H. L. Holloway (too late) .....	3,047	0	0

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#### TO CORRESPONDENTS.

C. R. G. H. (your letter is not adequate to the importance of the subject, and both the actual suggestions made are undesirable. District Surveyors, when capable men, should have as much power as possible: they require all they can get, in order to act effectively against incompetent and dishonest men.—G. J. F. (invited too late for consideration this week).—G. S. F. H. (too late).—H. T. B. (too late).—W. (next week). All statements of facts, lists of tenders, &c. must be accompanied by the names and addresses of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications. Letters or communications (beyond mere news items) which have been duplicated for other journals, are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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# The Builder.

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### The Picturesque of Cottage Architecture.



THIS is one of the most difficult tasks to analyse the elements that go to make up what is felt to be picturesque, whether in the abstract or the concrete. There is no doubt that age has a good deal to do with the impression of picturesqueness in a building, not only from what is called association, but from the colour and surface texture given by weathering. It is only just now that architects and decorative artists are beginning to recognise the full importance of texture or surface in the effect of architecture and decoration. A few days ago we passed a house three or four years old, in a seaside district, which we recognised as one of which we had seen a pen-and-ink drawing by the architect in the Architectural Room at the Royal Academy, about the time when the house must have been in course of erection. The drawing, a rough powerful pen-and-ink one of a portion only of the house, gave the impression of an almost wild picturesqueness, though, as we observed at the time, it did not look in the least like a new or modern dwelling-house. The same features in the actual house were quite recognisable, but where was the wild picturesqueness gone? The actual house looks thoroughly modern, and presents no very picturesque appearance; yet its features were correctly represented in the drawing—all except the smooth hard texture of the new brickwork. That was masked by the rough and effective drawing of "the inspired penman" (we believe in this case the architect himself). Here was no colour even, but simply the roughened texture implied in the drawing, aided by a rather powerful artificial effect of light and shadow, imparting a highly picturesque expression to a building which, as it stands at present, would never attract the notice of any sketcher in this respect, though it may do so when two hundred years are past.

That is one element, and certainly an important one, in the picturesque effect of old buildings. If, however, we endeavour to put this effect of age out of sight, to "think it away" (to borrow an expression from metaphysics), and picture the old cottage as it was when first built, we shall still find in many cases an element of architectural and pic-

turesque interest which is not often found in the country cottage of to-day, except in the cases where an architectural designer has specially aimed at such an effect; an aim which not infrequently defeats itself: nothing is so far from the real thing as an elaborately contrived picturesque. On the other hand, it must not be too easily accepted that a very simple new building will look picturesque because some very simple old ones appear so. Mr. Nevill seems to have rather overlooked this in the introduction to his book on Surrey Cottage Architecture, recently published,\* the main portion of which appeared first in our pages. He says, "The great lesson to be learned from the study of these old examples is, I take it, the extreme value of simplicity. It is a lesson peculiarly needed, since even when an architect is anxious to work on such lines, it is seldom that his client is content to let him. There is far more beauty in a cottage of some of the simpler forms shown, with its roof bright with lichen and its front covered with creepers, than we shall ever get from modern examples, tortured as they are into fantastic shapes where all repose and simplicity are lost." Very likely; but then lichens and creepers cannot be put on a new cottage to order; and possibly the cottage which now looks picturesque, with these additions of nature, would have looked rather bald and bare when new. The author, indeed, admits that he has been told that some of his examples are not architecture at all, but "barns." This would be true of some of them, regarded as new buildings; as old ones they all have a certain interest. But when the author speaks of these examples as intended to enforce the importance of "the perfectly simple treatment of simple buildings," we must perceive on consideration that this principle cannot be pushed too far, and that the mere carrying out of this recommendation in its full sense would result in the abandonment of everything that can properly be called architecture. The modern estate agent's brick cottage, with a slated roof in one span and a square sash window on each side of a central door, is "a perfectly simple treatment of a simple building," but it is neither picturesque nor architectural. Nor does Mr. Nevill himself carry out this theory in designs of his own for cottages, some of which have been exhibited at the Royal Academy and illustrated in our pages. Some of these, we

\* "Old Cottage and Domestic Architecture in South-West Surrey, and Notes on the Early History of the Division." By Ralph Nevill, F.S.A., F.R.I.B.A. Guildford: Billing & Sons, 1889.

should say, show a decided intention to produce a picturesque effect.\*

Granting, however, that there is a considerable degree of picturesque character in a majority of the old cottages illustrated in this work, and that this is mostly attained along with simplicity and an absence of any obvious attempt at ornamental effect, it is useful to notice in what it is that this picturesque expression resides, so much of it as would still be left if we could go back to the days when these cottages were just newly built. A very great proportion of the effect undoubtedly results from the employment of half-timber construction. This, when filled in with plaster or rough-cast, gives so much variety of effect and surface to a small house, and is so completely in keeping with our ideas of rural architecture, so much in harmony with rural landscape, that a house or cottage thus built can hardly help being more or less picturesque; though there is no doubt considerable scope for "more" or "less" in the matter. In the first place, as the author truly remarks, the filling-in of the panels with ornamental quarterings was much more picturesque in effect when curved pieces were used, "cut out of the angles of crooked boughs and limbs of trees that would have been useless for ordinary building," than when, at a later date, straight struts were used. But a more important element in the effect of this method of building appears to us to lie in the partial use of it in contrast with masses of more solid wall. Whether this was done with any kind of intention of effect by the original builders of these cottages it is difficult to decide; but it almost seems as if it must have been so. We find one gable of a house half timber, the other half brick, or tile-hung; or we find, as in the author's sketch of a cottage at Burningfold (page 86) the two end gables plain and the upper story of the intermediate portion treated in half-timber work of a simply decorative character, stopping against the two slightly projecting wings. This is certainly what may be called architectural design; nor is the whole, which is very picturesque, an example of extreme simplicity; on the contrary, we rather question whether the author, if he found a modern architect designing this cottage, would not accuse him of making an effort to be picturesque. It must be admitted, however, that the modern picturesque-maker

\* See illustrations in the *Builder* for August 4, 1889; and March 2, 1889.



would probably not have been content to leave the gables so plain; he would very likely have defeated his own end by ornamenting them with the same elaboration as the centre. The same kind of contrast arises, in a manner purely spontaneous and practical, in cases where, the bulk of the walls being of timber-work, the outside chimney forms a bold mass of brickwork running up through the more frail construction, and presenting a solid unbroken mass in contrast to it. This is so effective that it has been frequently artificially imitated in modern houses of late years; but in the old examples it was a piece of effect arising purely out of practical conditions; it was convenient and economical to build the cottage generally of half timber; it was impossible to build chimneys so; hence an effective contrast. This comes out even in plan, as in the plan Mr. Nevill gives of the homestead of Havlands (p. 13), where the mass of solid wall forming the fire-places and carrying the chimney-stacks stands by itself in the middle of a series of thin timber partitions.

Contrast of this kind is, therefore, no doubt, one of the sources of picturesque effect, and it is obtained very easily when there is a joint employment of solid brick or stonework with post-and-pan work; and even without this element of contrast the post-and-pan work is, as before observed, in itself one of the most picturesque methods of building. But whether it is worth while, or in accordance with architectural common sense, to revive this method of building arbitrarily and merely for the sake of picturesque effect, seems more than questionable. In most English towns it is now forbidden by building by-laws; and for country cottages, though there are not the same objections to it on the score of danger from fire, it does not make either so comfortable or so durable a house, and there are few neighbourhoods now where it is cheaper than brick or stone. It appears to us, therefore, that, except where it does constitute an economy, there is no excuse now for building the walls of the habitable portions of cottages in this manner; it is, in fact, not such good building for its purpose as a brick wall, and Mr. Nevill admits that even the herring-bone brick filling, in place of plaster, which is more solid and looks very well, is by no means adapted for any wall exposed to a rainy quarter. Where "black and white" work may suitably and legitimately be used now, without putting the picturesque before the practical, is perhaps in the gable ends of roofs, which close in nothing but a roof space, and have not a habitable room behind the partition. Here the timber and plaster work forms part of the roof merely, and can be used with economy, perhaps,—at all events with suitability, and with some addition to picturesque effect.

Another source of effect or of character in these old cottages consists undoubtedly in the unsophisticated manner in which windows and other openings are placed just where they are wanted, and just the size it happened to be convenient to make them at the moment, without considerations of symmetry. This kind of naive irregularity is not, properly speaking, architectural design, nor is it suitable to houses of any size or pretension to dignity; but it is exceedingly suitable to the character of a humble country dwelling, in which the most must be made of the space, and the windows must be got in where they will least interfere with the use of the wall-space within the room. In many old cottages these windows, in the upstairs rooms especially, are a great deal smaller than the proper observance of sanitary conditions would demand; too small also for the proper and convenient amount of light; and it is impossible to recommend any imitation of such practical deficiencies for the mere purpose of effect. Yet there can be no doubt that it is to these small windows, oddly and heedlessly disposed, that much of the character of these old cottages is due. In the originals this was no doubt a form of simplicity; to deliberately imitate it now would be, however, the reverse of "simplicity." But

the example of the old cottages in this respect may at all events teach us that it is not necessary or even advisable to aim at symmetrical spacing and size of windows in a simple cottage building. Let the windows be large enough for all purposes of light and air, but leave them to fall in as they will most conveniently with each room: they will tell the story of the house, and relieve it from all pretence of aspiring to be more than a cottage.

The corbelling-out of the upper stories of old cottages is also, no doubt, a great source of picturesque effect; but in general any modern imitation of this must be merely a made-up effect for the sake of picturesqueness. There is no practical reason or excuse for it in country cottages with plenty of ground around them; and it is difficult to understand the motive for it in the case of the old buildings. The probable explanation is that the habit arose out of the conditions of building in walled towns, where it was an object at once to keep as much roadway as possible on the ground level, and to get as much interior space as possible by over-sailing the upper stories; and that then this practice was carried out in the country, merely as an acquired habit of building, though the practical reason for it did not exist. It was not done consciously for effect, we may be pretty sure; it had come to be a commonly accepted way of building a house. There is one of Mr. Nevill's old cottages, that at Milford (page 64), in which this over-sailing construction is very effectively used, being applied only to the two projecting gabled wings at each end of the house, which over-sail in two successive tiers, while the recessed portion between is left vertical; this looks like design, but no doubt the real reason for this arrangement is that the flooring-joists run different ways in the two portions of the house, and present facility for over-sailing in one portion more than in the other; and so far the treatment is to some degree the expression of the construction. But except where there is some special reason for reducing area on the ground-floor of a house, the building of houses with over-sailing upper stories in the present day is only a piece of artificial picturesqueness, which does not improve the house for its practical purposes, though it undoubtedly does add to its effect from the picturesque point of view.

Another thing that is noteworthy in this collection of old cottages and country houses is the entire absence in them of any exaggerated elaboration of roof-line, or bargeboards, or finials, or any of those gimcracks which modern builders, and occasionally modern architects (in France certainly, if not in England), consider essential to the picturesque. In this sense these old pieces of rural architecture do no doubt convey the lesson of simplicity to which the author has referred; though, as already observed, there is no need to push this idea of simplicity so far as to depend for all the picturesque interest that a cottage can have on Nature's future additions of lichens and creepers. These, no doubt, furnish a picturesque element, but it is not the picturesque of architecture.

The author observes in the preface that the sketches are intended mainly to show the facts of the architecture, and is good enough to add that "the drawings were originally published in the *Builder*, and the process of lithography employed for the purpose has its limits." It might be supposed from this that we were the special employers of an inferior system of production which had prevented Mr. Nevill's artistic powers from having full scope. Line-drawing has its limits, no doubt, in regard to effect, and its facsimile reproduction by photo-lithography has the one further limit that it makes no distinction of tone except by thickness or thinness of line. But it does not seem to have occurred to Mr. Nevill that there may be another kind of limit, that of the power of the draughtsman. Many architectural illustrations of the highest class have been produced in this journal by precisely the

same means as were at Mr. Nevill's disposal. His drawings are quite adequate for their purpose as illustrations, but they are not remarkable for artistic power; we did not publish them as such, but as apparently correct representations of an interesting series of old buildings; and considering the terms under which they were first published by us were such as must have rendered very material assistance towards their publication as a book, we should have expected from the author a somewhat different kind of reference to our part in the matter than an attempt to make us, in the eyes of the reader, responsible for a weakness in the style of the illustrations which is entirely the result of the "limits" of his own powers as an artist.

#### TURBINES.

THE author's purpose in writing this book\* has been, as he states at the outset, "to give in as elementary a manner as is consistent with accuracy and thoroughness, an explanation of the principles underlying the action of turbines and pressure engines;" also to deal with the applications of these principles to the design of various manufactured motors, giving descriptions of the best distinctive types, but omitting the most obsolete forms; adding accounts of the results derived from experiment and a comparison of the same with theoretical investigation. So far, the author has attained his object. It is the best English work upon the subject which has yet been placed before the public. With the exception of the reference to the *Mechanics Magazine* dated December, 1838, describing Armstrong's (now Lord Armstrong) rotary motor, historical matter is avoided. The author makes no claim to an exhaustive treatment of the subject, and has taken great pains to collect the dimensions of turbines actually made. In some cases the dimensions are given in Prussian feet; but the relation to English measurement is given on page 344, by which it will be seen that for purposes of comparison by an English reader, the record of the actual measurements in this way is sufficient. The illustrations and tabular statements are worthy of the highest commendation. The summary of rules and formulae, in four folding plates, followed by numerical examples, and a record of the results obtained by various experimenters in dealing with the flow of water over weirs, are all carefully prepared, suitably introduced, and are placed before the reader in a very intelligent manner.

A turbine is defined as "a motor for utilising the energy of water by causing it to flow through curved buckets or channels, in which it exerts a reactionary pressure constituting the motive force." In the design of a turbine the ratio of the guide outflow area to the bucket outflow area is considered as a starting point. Turbines are divided by the author into two classes,—reaction and impulse turbines. He shows that in a reaction turbine it is essential that there should be continuity of flow of the water in every part of the motor and of the apparatus connected with it; while in an impulse turbine the construction is such that the buckets are only partially occupied by the water passing through them, thus allowing the atmosphere to contribute its influence in the operation. Care must be taken in the construction of a turbine to round off all corners of the apparatus, as sudden turns increase the hydraulic resistance to be overcome. A section-tube will improve the efficiency of a turbine by relatively reducing the velocity with which the water finally leaves the motor, as the loss from unutilised energy is mainly due to this cause. In a reaction turbine the actual velocity may be found in practice to exceed the theoretical velocity, but, as the author remarks, "it must not be supposed on this account that there is any violation of the ordinary laws of mechanics,

\* "Hydraulic Motors, Turbines, and Pressure Engines," by George R. Bodmer, Assoc.-M.Inst.C.E. London Whittaker & Co.



from which perpetual motion might be deduced!"

In dealing with the design of an impulse turbine, the author shows that the same assumptions are made with respect to the maximum efficiency of the wheel as for reaction turbines, namely, that the highest results are attained by a combination of entry without impact and radial exit, as there is always a loss of efficiency attending a shock of water. One striking characteristic of American turbines is that, as a rule, they are designed so as to leave the water to follow as far as practicable its own course, thereby considerably reducing the element of frictional resistance. In the design of an impulse turbine this is an essential condition, the water after quitting the guide passages following in one direction its own course, and during its transit through the wheel being at all times under atmospheric pressure only. In comparing an inward flow with an outward flow turbine, the author reminds us that as a particle of water flows outwards in a radial wheel, the successive parts of the vane surface with which it comes into contact have an increasing speed, and the deflection of the stream produced by any given curvature of the vane becomes less the greater the distance from the axis. With an inward flow turbine the reverse of this takes place, and, as the author states, "the same vane curve referred to a line normal to the direction of rotation will cause a greater absolute deflection of the stream, in an inward flow wheel, than in an axial wheel, and in the latter again a greater deflection than in an outward flow turbine." The guide vanes can be of wrought iron or steel plate cast in with the casing, and the wheel vanes of cast-iron, with their edges tapered off. These vanes, offering less resistance to the passage of the water, are preferable from a theoretical point of view, but more substantial vanes are not so soon affected by rust. Certain relations exist in every turbine between the angle of the vanes, the velocity of the flow, and the speed of the wheel; but the author adds that, with given proportions and angles, the form of the vane curves is not of so much importance as the thickness. The distinctive features of American as compared with European practices appear to consist in providing a comparatively smaller number of guide and wheel vanes, a greater relative width of buckets, both at the inflow and outflow ends, and means for regulation by pivoted guide vanes or circular sluices between the guide passages and the wheel. Modern axial impulse turbines are constructed in such a manner that, in flowing over a vane, the stream of water can spread itself out so as to increase its width to a certain extent.


The author says in his introductory remarks that "when coal becomes dearer, as it undoubtedly will, more attention must be paid to the hydraulic resources of the country." We agree with him, so far as pressure engines are concerned. Arthur Rigg's patent revolving engine, which is described among others by the author, is performing useful work at one of the pumping stations connected with the East London Waterworks, and numerous lifts are at work in this country, worked by hydraulic pressure accumulated at a central station. We doubt very much, however, whether turbines can ever be much in demand in this country. Our waterfalls are not generally situated in districts where the machinery is required to work; and where, in a manufacturing and hilly locality, there exists sufficient water-power to work a turbine, the horse-power is very limited. Hence expensive and sometimes complicated gear, attended with slow results, is needed to produce increased power. In America they possess greater facilities for utilising water-power, and many of the turbines at work in that country can lay claim to extraordinary efficiency. At Holyoke, in Massachusetts, in the United States, there is a large permanent installation for testing the effective power of turbines.

Hydraulic pressure-engines are suited for utilising comparatively small quantities of water at higher pressures than are generally

advantageous with turbines. The author proves that whereas the speed of a turbine is determined by the velocity of the flow, which in its turn depends upon the head, irrespective of the quantity of water supplied, in a hydraulic-pressure engine with a given supply and head the speed may, within reasonable limits, be made high or low, as desirable, by giving the piston a smaller or greater diameter and an inversely corresponding stroke. Efficiency is promoted by a low piston velocity, but, of course, with high pressures, the speed may for a given efficiency be greater than with lower pressures.

In comparing mathematical formulæ with experiment, it is possible to obtain expressions containing coefficients the values of which, for average purposes, furnish results sufficiently accurate to be used in designing various classes of hydraulic machines; but it is to be observed, as the author shows, that unless the workmanship of two or more turbines of different kinds under test is of the same quality, the comparative results will be unreliable.

#### NOTES.

N the last number of the *Semaine des Constructeurs* is an interesting letter from M. Métivier, Architect of the Department of Gers, on the often vexed question as between the architect and the engineer. In the course of his letter he says:—"The architect and engineer have, for the most part, two distinct methods of conceiving and drawing out a design. The former thinks at first exclusively of the form, and does not pass to the question of stability until, having got his design into shape, he says, 'how will it stand?' The engineer, on the other hand, occupies himself first with the question of stability, and adds to it such form as his natural aptitudes and his general comparative inability in the use of the pencil will enable him to add. Of these two systems of procedure it seems to me that the architect's is much the superior. One ought to design first and calculate afterwards: in other words, architecture is both an art and a science, but before all an art."

M. Métivier goes on to say that the general deficiency of an architect is that he does not know enough about calculation, and of an engineer that he does not know enough about designing; but the balance is not to be adjusted by rolling an architect and an engineer into one, or rather associating them together, to make up each other's deficiencies, as was done in the case of the Trocadéro, where M. Davidoud did the designing and M. Bourdais the engineering. The result of this, he thinks, that there is no longer the unity of conception of one mind. Give the architect, while retaining his artistic training and genius, such a scientific training as will enable him to dispense with the assistance of the engineer; in short, says M. Métivier to the editor of the *Semaine*, before "Hautes Etudes" let us think a little more of "Etudes" and their improvement. The most important point in M. Métivier's letter is his way of putting the matter as between designing and merely constructing, that the first is the higher intellectual effort; which is perfectly true, though of course even in the initiatory stages of designing the idea of the ultimate construction must be present to the mind.

TO the current number of the *Portfolio* its accomplished editor, Mr. P. G. Hamerton, contributes a curiously perverse article on "the Eiffel Tower, from an artistic point of view." Mr. Hamerton is rather tolerant to the Tower in an artistic sense, describing it as "a kind of land lighthouse, made to resist the wind and not the waves," and says it cannot be denied that it seems to exercise a kind of increasing fascination on spectators; "they resist it at first for reasons of art-criticism, but it attracts and subjugates them in course of time." We presume Mr. Hamerton has experienced this feeling, as he says; our experience has been

the reverse. But the oddest thing in Mr. Hamerton's article, and what makes us apply the epithet "perverse" to it, is his remark that "a concession to ideas of beauty has been made by the introduction of four unnecessary arches beneath the first and largest platform" (1). This is really an extraordinary example of the manner in which art-critics trip up when they come to talk about construction. Not only are the "unnecessary arches" an important portion of the tie of the base, and therefore of the security of the whole, but (as Mr. Hamerton would find out if he read M. Eiffel's own article on the Tower in a recent magazine) they form precisely the constructional feature which M. Eiffel specially prides himself on, and which he has applied in the bridges of which drawings are given in the Eiffel pavilion, of one of which we gave a sketch elevation in a "Note" in our last issue. It is extraordinary how 'people who know nothing about construction think themselves competent to settle these points.

THE above slip about construction, however, odd as it is, is venial compared with the extraordinary ignorance displayed in an article in the current number of the *Art-Journal*, in which a lady whose name is unknown to us as a writer on art has been allowed to enlighten the public on the use of "the acanthus, the lotus, and the honeysuckle" in architectural ornament. Not only have we seriously brought out again the old and long-ago discarded fables about the derivation of the Corinthian capital from a basket of flowers with a tile on the top, and of the Ionic volute "from the curls worn on each side of the human face," a derivation which, we are told, "seems to have been very generally accepted" (has it?); but Miss Laura Dyer also exhibits her knowledge of architectural detail by informing her readers that "the Doric pillars of the Parthenon at Athens, built in the time of Pericles, had no more elaboration to show than the ruins of the tomb of Beni Hassan in Middle Egypt, built 1,400 years before the earliest known Greek examples." Hadn't they? Miss Dyer had better refer to Penrose's "Athenian Architecture" or some other authoritative work, and learn what a Doric column and capital was really like, and how it was designed, and then compare it with a photograph of the Beni-Hassan post (for it is no more). Miss Dyer further illustrates her knowledge of architectural history and the development of ornament by informing us that "the Ionic scroll or volute was the step between the simple Doric and the ornate Corinthian styles" (11). The three features have no relation in historical development whatever. The Ionic and Doric capitals came from different sources, and were used simultaneously at Athens side by side. The very fact that the Greeks were capable of developing and perfecting two independent types side by side (they did not perfect the Corinthian) by an effort of æsthetic perception, is exactly what separates their work by such a distance from the spontaneous evolution of ornament by the Mediæval architects. It is too bad that such ignorant nonsense should be admitted into a periodical specially professing to instruct its readers on artistic subjects.

WE have received a pamphlet (no publisher's name) giving a description, with illustrations, of a form of bath which is called "spray baths for the million," the invention of Mr. David Grove, the engineer to the German Imperial Court, whose elaborate scheme for heating and ventilating the German Houses of Parliament we described and illustrated some time ago. Mr. Grove's system was elaborated when he was commissioned a few years ago to plan a bathing-house for the barracks of one of the regiments of the German army. The problem was to enable several companies of men to bathe in the shortest time and at the minimum of expense; and the essential feature of the system consists in the employment of a number of spray baths operating from nozzles or roses placed at



regular intervals on a long pipe emitting tepid water under pressure sufficient for the purpose; the fall from a cistern placed at a higher level being sufficient for this, or the ordinary pressure of the town water-supply. The floor-space under the spray-nozzles is divided off into compartments or stalls, one for each person. The floor is of course formed of a material that will readily carry off water, and laid with a fall for the purpose, the bathers standing on lath frames. A short extract from Mr. Grove's description of the process of regimental bathing at the barracks referred to will best explain the advantages of the system for wholesale bathing:—

"At the commencement of bathing, three detachments, each led by their non-commissioned officers, march at one and the same time through the prescribed door into the bath-room, and each man takes the seat corresponding with his number.

Detachments 1 and 2 will then begin to undress, and as soon as detachment 1 is ready, each man, at the command of the non-commissioned officer "Enter" will step into the compartment bearing the number of his seat. This having been done, the divisional officer will report to the bath superintendent "Compartments filled," whereupon the latter, by pulling the chain of the valve, will set all the sprays in action. The bathers standing under the sprays will then let the water shower on the front and back of their body, rub themselves with the soap which they must always take with them, and see that it is well rinsed off; proper attention must also be paid to cleaning the feet.

In about three minutes the bath superintendent commands, after closing the valve: "Leave the compartments!" whereupon each man will repair to his appointed place, in which, under the superintendence of the detachment-subaltern, he will wipe and dress as quickly as possible.

While the first detachment is bathing, the second will undress entirely, and the third commence to undress, so that as soon as the first has left the bathing compartments, the second at once enters, and the procedure described above is repeated."

Mr. Grove states that when strictly carried on 100 men can be bathed in about twenty minutes from a pipe with nine double sprays, with compartments on each side, the bathers standing back to back. He proceeds to strongly recommend it for adoption for public baths at a very cheap rate, which would bring a daily bath within the reach of the very poor. That would be a great blessing if the very poor could only be induced to make use of it; it might be worth while to give it *gratis* at the expense of the rates, as a matter of public hygiene. But Mr. Grove forgets that the efficiency and economy of the system depend to a great extent on the precision of drill which he describes in regard to its regimental use; and this can never be applied in the same way with the general public, especially those of the lower orders. Probably two of the things that the lower orders (in England at any rate) dislike most are washing and any kind of drill or methodical action. But for schools, where boys are under control, the system might prove very advantageous indeed, in giving opportunity for wholesale and thoroughly efficient ablution daily with the least possible loss of time; and it is worth the attention of those who are concerned in the planning and fitting up of schools.\*

**THE** Archaeological Institute of America has just published the "Seventh Annual Report of the Managing Committee of the American School of Classical Studies at Athens," together with the Reports of the Annual Directors, Professor Martin L. D'Ooge, Ph.D., and Professor Augustus C. Merriam, Ph.D. Professor D'Ooge's report consists chiefly of an account of educational tours made and meetings held at the school. Professor Merriam's is of unique interest, as it contains the fullest account as yet accessible of the now famous excavations at Dionuso. We have constantly noted the progress of these excavations, and so need only refer our readers to Professor Merriam's excellent practical summary. The text is illustrated by a map of the district round

\*The manufacturing agent for England is Mr. G. Jennings. In connection with the subject of this "Note," we would refer our readers to an article in the *Builder* for December 8, 1888, giving a description and plan of a public douche bath in Frankfurt.

Ikakra, and three photographic views of the beautiful site of the excavations. The American School at Athens adopts advisedly a somewhat different standpoint from, e.g., the German Archaeological Institute. Its object is professedly more popular. Though it does not neglect to excavate, its chief *raison d'être* is advisedly to afford to American scholars opportunity to visit Classical lands and study Classical antiquities *in situ*. Hence one of its principles is that there should be two directors, one permanent,—who is to be, when they can secure him as a permanency,—Dr. Waldstein, the other annual, to be chosen from some American school or college. This system of a second annual directorship obviously tends, as the report states, not to the education "of trained specialists" for the present, though it is certain for the future, but to the "animation of Classical studies in America."

**A**MONG the minor buildings of the Paris Exhibition, few are more successful and more original in design than the pavilion built for the Argentine Republic from the designs of M. Albert Ballu. There is a plinth with a very bold moulding running round the whole and connecting it; the centre feature of the principal facade has a central and two side arches which abut against square turrets of iron framing filled in with terra-cotta in panels, having in the centre of each panel a large pyramid-shaped boss of coloured glass; these are in reality glass shades capable of being lighted beneath for illumination effects. The arched arches are treated with a concave moulding with ornaments in red and gold on a blue ground, and the deeply-sunk soffits of the arches are decorated with large rosettes in square panels, of Classic fashion. The large angle turrets of the building are also framed in iron, with a great deal of decorative filling in coloured tiles and terra-cotta. The central doors, in a kind of trellis-work pattern, are well designed and in keeping with the whole character of the building; these doors are also ornamented in the lower portion with coloured glass bosses, red and blue. The intermediate portion of the building, between the centre and the angle turrets, is divided into three bays on each side by pilasters (which are too thin in proportion, and spoil the effect), the space between them being filled in the lower part with terra-cotta decorative panels with coloured centres of blue and white tiles, above which is a light arcade, while a modillion cornice crowns the whole, stopping against the centre and angle turrets. The whole effect, in regard to colour and design, is gay, bright, and picturesque, and at the same time truly architectural in character and quite free from eccentricity or vulgarity. As an example of architecture for a temporary exhibition pavilion it has great merit. Among the contents of the pavilion, which are mostly purely industrial in character (including, however, a large collection of specimens of timber), is a large-scale relief map of South America, about 20 ft. long, executed on a true section of the curve of the earth's surface; a form of model which presents in a very realistic manner to the eye the actual facts of the configuration of the earth, and suggests a very practical form of geographical lesson for children.

**THE** Cathedral of Worms is to be restored. The question has been locally discussed for the last three years, and although experts who were consulted agreed that there was serious mischief going on which was endangering the structure, they differed as to the cause. Thereupon the Dean, Mr. Fehr, took the matter in hand by causing a number of faulty places to be uncovered, and then published the result and his opinion in a pamphlet. His arguments appearing unanswerable, the building committee have determined to go to work at once, and have called in Professor Freiherr von Schmidt, of Munich, the architect of the recently-restored Church of St. Catherine, in the neighbouring little town of Oppenheim, also on the Rhine. Professor von Schmidt

has been requested to submit by May 15 next a complete set of plans of the Cathedral in its present state, along with another set showing his suggestions for the completion of the structure, together with estimates of cost. Most of our readers need not be reminded that the building is one of the most interesting cathedrals on the Rhine. It is mostly in the Romanesque style of the twelfth century, the dimensions being 423 ft. by 87 ft. by a height of 105 ft. in the nave; it has four towers, two domes, and a double choir, and abounds with rich carving. It is to be hoped that any work done on the existing portions will be confined to necessary repairs, or Worms will cease to be "a Romanesque Cathedral."

**I**N a report to the Local Government Board (July 9) on Diphtheria in the Halstead Registration District, Dr. Bruce Low observes that as far as regards insanitary circumstances, he could not find any trace of their influence in the production of the grave character of the disease. This is rather contrary to general belief and experience, and seems also somewhat at variance with a statement on another page of the same report, in regard to the St. Andrew's Infant School:—

"The St. Andrew's schools were built in 1876. They are of more modern construction than the other schools in the town. The boys' and girls' departments are in one block, side by side, but the infants have a separate building. This consists of a large and well-lighted class-room, 50 ft. by 20 ft., and a smaller room 20 ft. by 18 ft., entered from the larger. The height to the beam in both classrooms is 13 ft. 6 in. The smaller room, when I visited it, was the scene of the children during the dinner-hour, felt cold and smelt 'stuffy,' although the windows were open at the time. The ventilation of this smaller class-room is effected by opening the two windows on its north side, and the ventilator which is fixed between them. The fireplace is on the east side, while there are no openings on the west and south walls except the door in the latter at the angle where the east and south walls meet, and which door gives access to the larger room. So that unless the wind is blowing from the north, and the class-room door is open, there is no through ventilation of the smaller room. To this circumstance I attributed the closeness of the apartment when I entered it. [The contagion of diphtheria has been thought to cling with great tenacity to the walls and woodwork of infected rooms, and if the vigour of this poison can be enhanced by closeness of the atmosphere in which it is suspended, there is the more need that schoolrooms should be freely ventilated.] Cases of diphtheria kept cropping up during 1888, in connection with this infant school, up to the harvest holidays. Advantage was taken of the recess to have the woodwork repainted, the walls coloured, washed, and the ceiling whitewashed; though not with a view to destroy contagion, since connection between the school and the cases had not then been recognised. After the 'doing up' of the school, not a single case of diphtheria occurred in Halstead subsequent to its re-opening, so far at least as I have heard up to the present date."

This seems, at all events, a pretty clear case of connexion between "insanitary circumstances" and diphtheria.

**A**S a matter of course, everyone of our readers knows something of the battle of Prestonpans, where the "Young Cavalier" won his first battle, so graphically described in the pages of "Waverley." It is there recorded that General Gardiner (a prototype of General Gordon) fell mortally wounded, within sight of his family mansion-house, which still exists, and in front of which there was recently erected a monument to his memory, which may be seen by any passenger travelling by the North British Railway. This monument is open and visible to all; but within a few hundred yards of it there is another, more ancient and of vastly greater æsthetic interest, which is hidden within what is now claimed as private property. The market-cross of Preston (or, as it is called in ancient writs, *Salt Preston*) originally stood in the centre of the village common. Some of the houses of the square surrounding the common were, it is said, demolished during the present century, but all traces of the square have now disappeared, although some outlying portions of the village still remain which possess distinctive architectural character, and indicate that



the village was one of some importance. The market cross now stands within a walled garden, and until lately free access has been given to it, but it appears from letters in the *Scotsman* that the right of the public to be admitted to inspect the cross is now disputed by the parties in possession. The market cross in question is the most interesting of its class in Scotland, bearing a family likeness to the erased market cross of Edinburgh, a copy of which was a few years ago erected at the cost of Mr. Gladstone. The question as to how this interesting relic came to be claimed as private property is worthy of investigation. It may possibly have been erected by the feudal superior on his own lands, but it would be well that the matter were made clear and beyond doubt.

WE much regret to learn, from a paragraph in a local paper, as well as from an architectural correspondent in the neighbourhood, that the Office of Works has been carrying out a scraping-down and renovating of the Lion Gate at Hampton Court, to make it look "as good as new." There may be some necessary repairs to be executed; but unless this is the case, and if the operations have been directed, as we are informed, to the scraping-off the weathered surface and giving a new raw surface, nothing could be more stupid both in an æsthetic and practical sense. The tones arising from age form part of the beauty of an old structure; and not only so, but the weathered surface is a preservative, and the scraping of it is often the prelude to further decay. If the Office of Works does not know this, it is only one more proof how exceedingly unfit an authority it is to be entrusted with the care of national buildings.

AN architect writes to complain to us, in regard to the competition for a new Market Hall at Swansea, that five sets of drawings, out of fifty-one sent in, were selected to go before a professional adjudicator recommended by the Institute of Architects. Our correspondent, who was a competitor, asks who selected the five, and what is the value of a professional adjudication on a small selection only of the drawings sent in. We do not know the details of this particular case, but as a matter of general principle we certainly think that the assistance of a professional referee is a mere farce if he is only to express an opinion on a few designs picked out for him, instead of seeing the whole. This criticism does not, at all events, lose point from the fact (as given in a local paper) that among the five designs selected by the local authorities to go before the adjudicator, four were by Swansea architects! The adjudicator was Mr. Alexander Graham, whose probity and ability in such an office are equally beyond question. Did he know the facts?

#### LETTER FROM PARIS.

THE holiday time has brought a greater number of visitors than ever to the Exhibition, but the closing-in of the days has led to an alteration of hours, and the buildings, from September 1, are closed at 5.30 and the grounds at 10.30; while the luminous fountain show commences at 8 instead of 9. Nothing has been definitely said as yet about the closing of the Exhibition, but it is expected it will be at the end of October: indeed the weather would probably not admit of a longer duration.

A new Buddhist pagoda has recently been erected on the Esplanade des Invalides, a construction in carved wood, executed at Hanoi, and rebuilt here under the direction of M. Lichtenfelder, architect. This small edifice, made of iron-wood from the forests of Annam, has a façade with some admirably-carved panels. The interior, which is extremely simple, is ornamented with figures of idols arranged pyramid fashion, and with some paintings executed by Annamite artists. Its general aspect is very original, and it effectively completes the little collection of exotic constructions in the Colonial Exhibition.

In the Champ de Mars the only novelty is the erection of M. Chipiez's restored model of the Parthenon, in the Palais des Arts Libéraux, which

has been executed after the design and under the direction of M. Chipiez by a clever decorative sculptor, M. Jolly, who has been commissioned by the Municipality to produce models of several of the principal buildings erected in Paris during the last ten years. The model is intended for the Art Museum of New York.

M. Meissonier has been appointed president of the International Jury of Awards in Group I. (Beaux-Arts); M. Rohmann, president of the Russian Committee, and M. Henrique Melida, president of the Spanish Committee, are appointed vice-presidents in the same group. The general secretary is M. Eugène Guillaume, sculptor and member of the Institut. Another piece of news is that the general catalogue of the retrospective exhibition of French art has at last appeared; late enough in the day, certainly, but it is a rather valuable document now that it has appeared.

The official inauguration of the new Sorbonne took place early in August. We gave a view of one façade in the *Builder* for June 26, 1886. The completed façade looks exceedingly well, but unfortunately cannot be advantageously seen, owing to the narrowness of the street which it faces. There are now eight statues decorating this façade, representing Chemistry, Natural History, Physical Science, Mathematics, History, Geography, Philosophy, and Archaeology. The statues flanking the entrance, representing Science and Literature, are respectively the work of M. Mercié and M. Chapu. The gateway of this façade opens on a large vestibule, in which stands on the left the statue of Archimedes by M. Falguère, and on the right that of Homer by M. Delaplanche. Four staircases lead from this vestibule; the end ones lead to the study rooms and the official apartments of the Sorbonne. Those which rise from the centre are state staircases, of monumental character and with balustrades of wrought iron with ornaments in repoussé brass-work. Like those of the Opera House, they describe a double circuit before landing in a large atrium, which is decorated by MM. Chartran and Flameng with the large compositions which have been exhibited in recent Salons.

From this atrium opens the large council room, decorated with the design by M. Benjamin Constant, which was illustrated in the *Builder* for September 1, 1888. Between the two staircases is the entrance to the grand lecture-hall, which, in regard both to its plan and decoration, is the most interesting portion of the interior. It seats 3,000 persons, and forms a semi-circle, with five tribunes, each in two stages. Opposite the semi-circle, and behind the chair, is the immense composition by M. Pavis de Chavannes exhibited in 1887, and illustrated in the *Builder* for July 2 of the same year. Above this picture the wall is divided into panels adorned with escutcheons and palms. The ceiling is decorated by M. Galland, with allegorical figures in medallions, and in niches between the tribunes are six statues representing Descartes, Richelieu, Pascal, Lavoisier, Rollin, and Robert Sorbon. That of Lavoisier, a very remarkable work, is by M. Dalou. The hall is lighted from a cupola filled with stained-glass, and in the evening by lights with powerful reflectors in the ceiling: the whole is warmed by steam-pipes, which also assist the circulation of the air for ventilation.

This portion of the Sorbonne, of which the first stone was laid in 1885, has cost seven millions of francs. It represents about one-third of the total reconstruction, and it remains now to complete the building for the Faculté des Sciences (commenced about a year ago), and to execute that for the Faculté des Lettres, which will enclose the Church of the Sorbonne on its site. The architect has determined to preserve intact this interesting monument, containing the tomb of Richelieu, surmounted by the remarkable group in marble, representing the Cardinal in the arms of Religion, a group sculptured by Girardon from the designs of Lebrun.

On the occasion of the inauguration, M. Pavis de Chavannes received the degree of Commander in the Legion of Honour, a distinction which might be regarded with satisfaction by every one as a well-deserved honour, after a long career, to a painter who is certainly one of the most original geniuses in modern French art. However, like some other distinguished artists, M. de Chavannes has his detractors as well as his admirers, who lose no opportunity of testifying against him, and have reproached the Government with neglecting to have this honour

to the artist ratified by the superior jury of the Exposition des Beaux-Arts:—a merely formal objection made to do duty for the occasion.

The inauguration is announced to take place very shortly of the new Bourse de Commerce, which is in reality an enlargement and transformation of the old Halle aux Blés. It is M. Blondel, the architect of the Hôtel Continental, who has effected this metamorphosis, to the regret of all archaeologists and lovers of old Paris, but which has had at all events one excellent result in leading to the sanitary improvement of one of the most crowded quarters of Paris, and giving new and better approaches to the Halles Centrales. As to the building itself, of which the purely architectural portion offers little for remark, the interior decoration is somewhat incomprehensible. Generally, in the case of a Municipal edifice, the architect has to submit a programme to a Commission des Beaux-Arts, who give it their approval and sanction the selection of artists suggested. M. Blondel, however, set at naught this custom, and himself entrusted the decoration to MM. Lemaire, Lucas, Langée, and Clairin. This has resulted in a decoration complicated and out of keeping, fatiguing to the eye, which symbolises nothing and has no relation to the objects of the building. In fact, it is a complete failure both in idea and decorative effect.

The official inauguration of M. Dalou's monument of the Triumph of the Republic (an illustration of which was published some years ago in the *Builder*), on the Place de la Nation, is fixed for the 21st of this month, the anniversary of the proclamation of the Republic in 1792. M. Carnot will preside on the occasion, when it is expected that some special mark of distinction will be conferred on the artist.

There has just been completed on the Place de Fontenoy, behind the École Militaire, a monument raised by subscription to the memory of officers and soldiers who have fallen in battle. The monument is simply a pyramid, very lofty and very massive, with nothing but a few mouldings for ornament, and bearing various commemorative inscriptions. It is surrounded by a grille executed in wrought iron. On the Place de St. Augustin the pedestal has been commenced for the monument to Alfred de Musset mentioned in our last letter, and of which the sculptural portion is to be executed by M. Falguère and M. Mercié. Lastly, in virtue of a recent authorisation of the Municipal Council, the statue to the memory of Alphonse de Neuville is to be erected in the square situated at the angle of the Boulevard Péreire and the Rue Brémontier. This posthumous homage is due to a subscription organised among the numerous artists inhabiting the quarter of the Plaine Monceau.

M. Fremiet's second statue of Joan of Arc, of which the *Builder* recently gave an illustration, has been the object of a great deal of contention. Philadelphia wished to acquire it for her museum; Lorraine desires to possess it, and two committees for this purpose have been formed, one at Nancy, the other at Paris. The latter committee, which includes some leading artistic and scientific notabilities, proposes to open a subscription for the casting of the work and its presentation to the town of Nancy.

We mentioned last month the result of the competition in painting for the Prix de Rome. That in architecture has since been settled. The subject, "A Casino at the Seaside," is purely modern, and certainly not academical in its suggestions. The jury, after examining the designs of ten competitors, declined to award the prize. They awarded, however, a "second grand prix" to M. Despradelle, pupil of M. Pascal, and a "deuxième second" to M. Morice, pupil of M. Blondel.

M. Casimir Echemier, architect at Lyons, has been named Chevalier of the Legion of Honour. He is a member of the Société Centrale des Architectes, and president of the Société Académique d'Architecture of Lyons. For the last two years M. Echemier has been nominated to preside at some of the meetings of the congress of architects at Paris, in which capacity he gave undoubted evidence of his ability and learning.

**New English Church at Bergen.**—A fund is being raised by the leading English residents at Bergen for the building of an English church in that city, the want of which is much felt during the tourist season. There is at present only one Anglican church in Norway,—viz., at Christiania.



# THE CAMBRIAN ARCHEOLOGICAL ASSOCIATION IN BRITANNY.\*

Thursday, Aug. 15.—Excursion No. 1.

It was intended at first that the excursion to Locmariaker should have been made by carriage from Auray, but it was found more convenient to hire a steamer to take the party by water from Vannes and land it at Auray in the evening. A glance at the map will show that the Gulf of the Morbihan is a sort of inland lake studded with innumerable islands. The gulf divides itself into two arms, the smaller one, on the west, running up towards Auray, and the larger one, on the east, towards Vannes. The two arms meet near Locmariaker, where the whole of the water from the interior discharges itself through a narrow opening into the Bay of Quiberon. This peculiar configuration of the land and sea causes very strong currents to generate between the various islands as the tide ebbs and flows.

The members of the Cambrian Archaeological Association proceeded to the Quay at Vannes at nine o'clock in the morning, where, under the guidance of their President, M. le Dr. de Closmadeuc, they at once embarked on board a small steamer and commenced their voyage down the Gulf of the Morbihan. Coasting along the northern side of the gulf, and passing between the Ile aux Moines and the mainland, the island called Gavr' Inis (or Goat's Island) was reached shortly before eleven o'clock. Here it was necessary to land in small boats six or seven at a time, there being no pier of any kind. The run of the tide between Gavr' Inis and a small rock called the Ile des Tisserands was very strong, reminding many of us of the race between St. David's Head and Ramsey Island, in Pembrokeshire, with its green sea and lines of white foam. Gavr' Inis is the property of M. le Dr. de Closmadeuc, so that it was with no small pride that he conducted the members to the foot of the tumulus to which the island owes its celebrity, and there discoursed upon the prehistoric sculptures of its chamber and gallery, to the great edification of his hearers. Candles having been procured, the party were enabled to examine the interior. The only prehistoric monuments of the kind in Great Britain which are at all comparable with the chambered cairn on Gavr' Inis are the Hill of Dowth, in Ireland, or Maeshowe, in Orkney. Unfortunately, all three of these tombs attracted the cupidity of treasure-seekers, probably at the time of the Viking invasions, so that when re-opened at a later period their contents was found to have been entirely removed. The tumulus on Gavr' Inis is the third largest in the Morbihan district, being exceeded in size only by the Butte de Tumiac, which was seen as a prominent object on the horizon on the voyage from Vannes, and Mont St. Michel at Carnac, visited on the following day. Its chief interest lies, however, not so much in the size of the mound as in the extraordinary nature of the sculpture with which the interior is decorated. The sides, roof, and floor chamber and passage are composed of separate slabs of granite, fifty-one in number. The total length of the passage and chamber is 15 mètres 45 centimètres. The slabs forming the sides of the passage and chamber and one of the slabs of the floor are sculptured, the roof and the rest of the floor being plain. The carving consists of a series of incised lines close together, having the general appearance of tattooing, or of the fine lines on the inside of the palm of the hand. Amongst the confusing labyrinth of lines, however, certain definite forms which occur on the other dolmens in the neighbourhood may be distinguished. In several cases sculptures of stone axe-heads may be seen. A curious and hitherto unexplained feature is a sort of double holdfast, or pair of stone loops, cut in the slab forming one side of the chamber. M. le Dr. de Closmadeuc exhibited a twelfth-century crucifix of bronze that had been found on the island. The sculptures at Gavr' Inis are engraved in the "Dictionnaire Archéologique de la Gaule," and a complete series of casts are deposited in the Museum at St. Germain, near Paris.

Having spent an hour on the island, the members returned to the steamer by aid of the small rowing-boat in which they had landed, and were not sorry to find that M. Rosignol, of the Hôtel du Dauphin, at Vannes, had provided a most excellent luncheon to fortify them for the labours of the rest of the day. At the con-

clusion of the luncheon, the President's health was proposed by the Venerable Archdeacon Thomas, and the toast responded to most enthusiastically. The steamer disembarked its passengers at the pier at Locmariaker, about two miles west of Gavr' Inis, at half-past twelve. The first object inspected was the chambered cairn of Mané-er-Hroëk (Mound of the Witch), also called the "Butte de César," which lies about a quarter of a mile south of the village. The chamber was opened in 1863 by M. René Galle, and in it were found the splendid series of polished stone axes, the stone ring, and "callais" or green turquoise necklaces that had been seen in the museum at Vannes the day before. Near the entrance was discovered a very remarkable sculptured slab, now placed within the chamber for greater security. It has upon it representations of ten stone axes with their handles, three figures shaped like a cattle-yoke, and a figure which M. le Dr. de Closmadeuc calls "scutiforme," somewhat resembling a bell in outline. This slab is particularly valuable as giving examples of three of the figures that occur most frequently on the other dolmens in the same district, and the meaning of which must have had some significance beyond mere ornament. The chamber of Mané-er-Hroëk measures 12 ft. by 9 ft., and is 4 ft. high. The side walls are of dry rubble, but the roof and floor composed of slabs of granite.

The next visit was paid to the dolmen of Men-er-Réthual, also called Bê-er-Groah (or the Tomb of the Fairy), lying a short distance to the west of the village of Locmariaker. Its principal feature is the gigantic cap-stone of the chamber, measuring 27 ft. by 14 ft. 6 in., on the under surface of which is sculptured the "scutiforme" figure already seen on the slab at Mané-er-Hroëk. The scale of the sculpture may be gathered from the fact that the incised groove forming the outline is nearly 4 in. wide. This dolmen is surrounded by a low stone wall for protection, and the inscription cut on a small pillar proclaims it to be "La Propriété de l'Etat." Whilst examining the Men-er-Réthual a long procession in honour of the Fête of the Assumption of the Virgin (August 15), led by priests in full vestments, passed by, chanting hymns and carrying banners and images. The whole ceremony was most impressive, and fully in character with the surroundings.

Skirting the west side of the village, and crossing over the road to Kerisper, the party reached a group of megalithic monuments about a quarter of a mile to the north of Locmariaker, that has probably not its equal anywhere else in Europe. In the centre of the group, on the west side of the road to Auray, is the Dolmen des Marchands, or Table de César, with the cap-stone and the tops of the supports showing above the ground, in consequence of the upper part of the mound having been removed. On the underside of the cap-stone is a beautifully-carved representation of a stone axe, with its handle complete, and on the end support is again to be seen the "scutiforme" figure already twice noticed, elaborately sculptured all over with rows of hook-like objects. The passage leading to the chamber or dolmen has been cleared out, and a stone post erected to show that it belongs to the State. A good deal of the ancient appearance of the rude stone monuments at Locmariaker has been destroyed by the cleaning up they have received at the hands of the French Government, but it is to be hoped that neither restorers or destroyers will be allowed to mar their beauty any further. Lying to the south of the Dolmen des Marchands, between it and the road to Kerisper, is a fallen menhir broken into three pieces. As the added lengths of the fragments amount to 67 ft. it must have been when erect the tallest menhir in France. The last monument examined was the Mané-Lud (or Mound of Cinders). It is an oval tumulus 260 ft. long by 160 ft. wide, containing a chamber, which was opened in 1864 by M. René Galle, but which is now inaccessible. At the west end of the tumulus and partially buried in it is a very fine dolmen, the largest cover stone of which measures 28 ft. by 16 ft. Eight of the supports are sculptured with figures similar to those already described, including the "scutiforme" object and the bearded axe.

Returning through the village to the pier, two slabs were noticed in the churchyard, one with an early cross on it, and the other having an illegible inscription, apparently of late date. There is nothing in the architecture of the church deserving of special mention.

The party left Locmariaker by the steamer at 4 p.m., and after a two hours' run up the river, arrived at Auray at 6 o'clock, in time to discuss the adventures of one of the most successful excursions of the meeting over the dinner-table.

Friday, Aug. 16.—Excursion No. 2.

On the preceding day ample opportunity was afforded at Gavr' Inis and Locmariaker for becoming acquainted with the decorative features of the dolmens, if the very rude attempts at sculptured ornament which they present can be so called. During this day's excursion the methods of construction and general arrangement of almost every type of megalithic monument were made clear by an examination of the prehistoric remains in the neighbourhood of Carnac. The carriages conveying the party left the Hôtel du Pavillon d'Enbaud at Auray at 10 a.m., taking the road to Plouharnel in a south-westerly direction. Nothing of any note was observed until reaching the point where the road from Ploemel to Carnac crosses the one from Auray to Plouharnel, at a distance of five miles from the former place. Not far beyond the cross-roads the members left the carriages, and walked across the fields a few hundred yards to the west to see the tumulus of Crucunny, which is surmounted by a menhir. It has never been properly opened. A fine view of the surrounding country was obtained from the summit.

To the north-east was observed the little village church of Coetatonx, to the south-east the great mound of Le Moustoir, and to the south that of Mont St. Michel at Carnac. The landscape is flat, but pleasantly varied by fir-trees, furze-bushes, and masses of purple heather. Whilst the archaeologists were contemplating the memorials of the far distant past, the photographers of our party were busily engaged in taking a group of peasants winnowing corn by means of the slight breeze obtained by the increased altitude of the top of the mound above the surrounding plain. Professor Rhys, of Oxford, also took advantage of the opportunity to verify the oft-repeated statement that the Bretons can understand Welsh from its similarity to their own language, but his efforts were not altogether crowned with success. The next object examined was the dolmen of Kerlaval, lying on the same side of the road as the tumulus of Crucunny, a little further on. It differed from those structures that had been seen previously in having a more complicated ground-plan, consisting of a passage with end and side chambers opening out of it. This dolmen was explored by M. le Dr. de Closmadeuc in 1866, and found to contain "callais" beads, flints, and fragments of seven urns.

Before getting into the carriages the party proceeded to the Mané-Kerioned, or Grottes de Grionec, a short distance beyond the dolmen of Kerlaval, but on the opposite or north-west side of the road. There are three sepulchral chambers, which were originally covered by one mound, but the cover-stones are now laid bare. The grouping of the whole made it one of the best subjects of the kind from an artistic point of view that had been seen, so that cameras and sketch books were put into requisition without delay. Rubbings were also taken of the sculptures with which several of the supports of one of the chambers are adorned. The practice of outlining the incised lines of the carved figures with black chalk is much to be deprecated, although the eye of faith is often required to see them otherwise. These chambers were explored by M. le Dr. de Closmadeuc, in 1866, and, as in other cases, the contents deposited in the Museum at Vannes. Some notion of the extent of what M. F. Gaillard in his guide-book calls a "Très remarquable acquisition et restauration splendide de l'Etat," may be gathered from the fact that the mound now contains not three chambers, but four, the fourth having been transported bodily from a position 300 metres to the north-east. After passing the point where the road branches off to Carnac, a short stop was made to look at the dolmen of Runesto, on the north-west side, which, like the last two mentioned, was cleared out in 1866, and has some cup markings on the under side of the cap-stone. Plouharnel, which is eight miles from Auray, was reached at a little before one o'clock, and an hour spent in admiring the exceedingly good museum of local antiquities at the Hôtel du Commerce. The collection contains a large number of stone celts, pottery from the dolmens, and two gold collars found in 1849 in one of the

\* Concluded from p. 168, ante.



chambers of the Grottes de Roch Guyon, close to Plouharnel on the north-west.

At Plouharnel was also seen a form of Christian monument, called a "lech," of which there are other examples at Erdevén and elsewhere in Brittany. It consisted of a pillar of wrought granite, of octagonal cross section, with convex curved sides and tapering towards the top. Two of the faces bore incised crosses with arms having expanded ends. Opinions differed as to the date to be assigned to this pillar, some thinking it might be as early as the eighth century, and others that it was not more than two or three hundred years old. From Plouharnel the carriages took the party as far as the village of Le Menneac, half way to Carnac, passing the dolmen of Kergavay on the north-east side of the road. At Le Menneac every one got out to walk along the celebrated alignments of standing stones which commence at this point and run in a north-east direction for nearly two miles. The sight which burst upon the view on reaching the rising ground was certainly a very wonderful one. It is difficult to convey an adequate idea of the effect produced by finding oneself suddenly in the midst of a forest of upright stones of every conceivable shape and size, an experience quite novel to most of us, and it will be well to avoid the example of the reporter who began by saying that a particular scene baffled description, and then calmly sat down to write several pages of copy on the subject. It would be out of place here to discuss the various theories that have been advanced to account for the origin of the Carnac alignments. The late Mr. James Fergusson believed them to have been erected to represent lines of warriors in battle array. Whatever may have been the reasons that influenced the designers of these avenues, the result is most impressive to the beholder, notwithstanding the restorations of the French Government, which were to be seen in "full blast." All the prostrate monoliths have been set up again, and the heather and loose stones removed from the area occupied by the alignments, entirely changing the whole aspect of the place from what it was some years ago,—most people will think for the worse. It was noticed, as a curious fact, how every one is naturally inclined, on taking a general *coup d'œil*, to over-estimate the actual number, of the upright stones, as ascertained by counting. The alignments of Carnac are composed of three separate sets of standing stones, those of Le Menneac, of Kermario, and of Kerlescan.

After traversing the first two of these on foot, and noticing the dolmen of Kermario on the south of the second avenue, the members followed a path across the fields, in a south-east direction, to the chambered cairn of Kercado, lying in a fir wood on a hill-side. The key of the door and candles having been procured, the interior of the chamber and passage was examined. On the underside of the cover-stone of the chamber the sculpture of an axe in its handle was to be seen. This monument was particularly instructive as showing the way in which the chambers and galleries were composed of single slabs of granite, and the interstices filled in with rubble walling. The chamber is exceptionally large, especially with regard to its height, which is as much as 8 ft. It was opened by M. René Gallies in 1863, and found to contain stone axes, pendants, flints, and pottery. The party now turned back towards Carnac, passing on the way the Roman villa of Bosseno, explored by Mr. Miln in 1875, and the great tumulus of Mont St. Michel, surmounted by a small chapel and a sculptured granite cross. The last visit was to Mr. Miln's valuable museum at Carnac, in which are deposited all the Gallo-Roman and Celtic antiquities discovered by him in his numerous explorations in the neighbourhood. The party reached Auray by carriage shortly after 7 p.m.

Saturday, Aug. 17.—Excursion No. 3.

Carriages were ready at 10 a.m. to convey the party to Erdevén, eight miles west of Auray. On the way several wayside crosses were passed, but none of them appeared to be of any great antiquity. The Château de Kerio, with a circular turret corbelled out at one of the angles of the building, as the Scotch castles, received some attention. Many granite well-heads of curious design were observed, which would have been put down as Medieval had not some of them a date within the present century inscribed on the top. Granite in this district assumes the appearance of age very rapidly. Just before entering the village of Erdevén at

the east corner of the cemetery was seen a tapering octagonal granite pillars similar to the one at Plouharnel, but without any cross upon it.

Passing through Erdevén and taking the road south-east towards Plouharnel, the party soon arrived at the alignments of Kerzéro, which, although in tolerably good preservation at the west end of the avenues of upright stones, are not nearly so well worth seeing as those near Carnac. The next object on the programme was the dolmen of Crucuno, lying about a quarter of a mile to the east of the road to Plouharnel, at a distance of two miles from Erdevén. This was by far the largest dolmen that had been seen, the chamber measuring 25 ft. by 15 ft. and 9 ft. high, one of the capstones being 27 ft. by 16 ft., and 2 ft. thick. It had served the purpose at one time of a stable, and had even been inhabited by man, like the cromlech described in Baring Gould's novel of "John Herring." The dolmen of Crucuno is surrounded by farm-houses, and from the back of these were seen a remarkable series of standing stones arranged in a rectangular form, and on the rising ground in the distance the dolmen of Mané-Groh. After walking to the road the party were taken in the carriages back again through Erdevén and on through Belz to the village of St. Cado, near the mouth of the Etel River, which is crossed a little lower down by a suspension bridge. It would be difficult to imagine anything more primitive than this quaint little Breton fishing village, with its low granite houses built on the solid rock and seeming to form part and parcel of it. As we approached troops of children, arrayed in blue cotton frocks and brightly coloured handkerchiefs tied over their heads, came trooping out, making a merry clatter with their wooden sabots, to the great delight of our photographers, whose cameras were soon at work. The village is built on a point of land running out into the estuary of the Etel River, and it is connected with the island of St. Cado by a rude causeway of rubble masonry, said in Bradshaw's "Handbook" to be of Roman origin, but probably it is of much later date. A local tradition relates that the causeway was the work of the devil, who built it in one night for St. Cado, stipulating that he should receive as his reward the soul of the first pilgrim who crossed it. St. Cado cheated the fiend by sending his cat over as the first passenger, and a contest ensued, the marks of which are still visible on the rocks of the island. The members spent a couple of hours in looking at the chapel of St. Cado. The chancel arch and circular apse at the east end are Romanesque. To Welshmen the chief interest of the place lay in its association with St. Cado. On each side of the nave were seen two pictures, representing incidents in the life of the saint of late date, but extremely curious as showing in what veneration he is still held. Over each picture there is an explanatory inscription painted on the wall. In the first of these he is styled "Anglois de Nation, Prince de Glamorgant." There is a statue of St. Cado in the chapel covered with votive offerings in wax of arms, legs, &c., and wooden crutches. His tomb was also seen; and two wooden money-boxes, heavily clamped with iron, showed that the veneration of the saint was turned to practical account by his successors.

The day's excursion concluded with a visit to an early inscribed stone standing on the low ground close to the bridge half-way between Locool and Mendon. The fine south doorway of Mendon Church was seen in passing. The inscribed stone is 7 ft. 6 in. high, round in cross section, and tapering towards the top. The letters are minuscules of the ninth or tenth century, similar to those found in the Saxon MSS. of the period. The inscription reads:—

CROUX PROSTION  
(The Cross of Prostion).

There are crosses incised on two faces, and bands of key-pattern ornament on the other two. This monument has been much disfigured by the inscription and other carving having been picked out with yellow paint. Close to the inscribed pillar there is a cross of much later date. Auray was reached at 6 p.m. The excursion was, perhaps, not of such absorbing interest as the two previous ones, but the objects seen were of a more varied nature.

The party left Auray on Saturday evening after the excursion and proceeded by train to Quimper, where comfortable quarters were obtained at the Hôtel de l'Épée.

Sunday, August 18.

The morning was spent in wandering through the picturesque streets of Quimper and admiring the views of the fine twin spires of the cathedral, which are seen to great advantage from almost any point, but more especially from the west with a foreground of over-hanging half-timbered houses. These spires are one of the most successful pieces of work executed from the designs of the late M. Viollet-le-Duc. The head-dresses and embroidered costumes of the peasantry are to be seen in greater perfection at Quimper than anywhere else in Brittany, and afford endless subjects for the artist's pencil.

In the afternoon a visit was paid by special invitation to the Château de Kernuz, near Pont l'Abbé, in order to inspect the extensive collection of antiquities belonging to the owner, M. du Chatellier, who is well known to archaeologists as the author of "Les Époques Préhistoriques et Gauloises dans le Finistère," as well as of numerous valuable contributions to "Matériaux pour l'Histoire Primitive et Naturelle de l'Homme." M. du Chatellier's museum is admirably arranged in three large rooms of his château, and is one of the best private collections in France. It contains a vast number of polished stone implements and pottery discovered in excavating the dolmens in the neighbourhood. The objects which attracted most attention were a magnificent gold torque, from the Ganalish cemetery of Kervilré; an artistically ornamented cinerary urn from Kérouen-en-Plouhinec; some exquisitely-formed arrowheads, one of rock crystal from the tumulus of Ker-huë-Bras; and a quern with a stone spindle and bar to carry the upper stone. In the garden of the château was seen a unique conical pillar, sculptured on four sides with figures of Mercury, &c., probably of the Gallo-Roman period. It was dug up at Kervadel-en-Plabennec. There were also in the grounds cup-marked stones from St. Urnel and Rengouat-en-Plovan.

The members were hospitably entertained to supper by M. du Chatellier, at the conclusion of which a speech of welcome to the Cambrian Archaeological Association was made by the host. This was responded to by the President, M. le Docteur de Closmadec, and the health of the host proposed by the Venerable Archdeacon Thomas.

The Church of Pont l'Abbé was examined on the way to Kernuz. It has a fine rose window at the east end and a curious slated spire.

On returning to Quimper it was found that a sort of fair was going on in the town. Amongst the various shows was one entitled "Grand voyage à l'enfer, aller et retour sans fatigue et sans brûlures." The entertainment turned out to be a puppet-show representing the doom of the wicked as depicted in medieval MSS. The mouth of hell was a cauldron into which the various characters were thrown and forced down by a devil with a three-pronged fork, after their sins had been recapitulated and the doom of each pronounced at the sounding of a gong. The last character put into the cauldron was a lady of the demi-monde, who was stripped of each of her different articles of dress, one by one, amidst the jeers of the audience. A puff of flame arose from the cauldron, and she was gone to her just reward. The whole scene was almost an exact reproduction of the principal features of the "Doom" on the wall-painting at Cheldon Church, in Surrey, with the devils sawing a sinner in two in the foreground. This survival of the Medieval mystery play was followed by the "Temptation of St. Anthony," also performed by marionettes, at the conclusion of which both the saint and his pig were taken up to heaven. The whole thing was intended to be perfectly serious, and nothing in the nature of buffoonery was introduced. The conventional methods of portraying the more important Scripture scenes seem to have been handed down even to the present century by means of the miracle plays, and the Breton Calvaries, to be subsequently noticed on the excursions from Morlaix, are nothing more than representations in stone of the various episodes of the Christian drama made familiar to the popular mind by seeing them acted on the stage.

Monday, August 19.

The morning of this day was occupied by the railway journey to Morlaix, but there was sufficient time left in the afternoon to see some of the old houses in the town. Two very beautifully carved spiral staircases of the fifteenth century were visited, one in the Rue des Nobles,



No. 21, opposite the market, and the other in the Grand Rue, No. 22. The carving is well executed, consisting of flamboyant ornament and panelling, and several figures of saints. The interior of the house in the Rue des Nobles is in a most disreputable and dirty condition, being let out in floors. It might with advantage be purchased by the municipal authorities and kept in proper repair. Some of the houses in the Grand Rue have figures of saints carved on the brackets supporting the overhanging stories. The fronts of the houses in the Rue des Halles are all slated and in their way quite as picturesque as the half-timbered ones. The water-pipes standing out a long way beyond the faces of the houses and inclined in all sorts of directions have a peculiar effect. One of the finest of the half-timbered houses is opposite the market. The bottom stories of most of these houses are of stone, with unglazed windows for the display of goods in the shops, taking one back in imagination to the state of things that existed in London before the Great Fire.

*Tuesday, Aug. 20.—Excursion No. 4.*

This day's excursion was made by train, the party leaving Morlaix at 8.54 a.m., and arriving at St. Pol de Léon, fifteen miles north, at 9.38. Here the party was placed under the guidance of M. Pol de Courcy, who led the way first to the Cathedral. He pointed out some twelfth-century walling on the outside of the south transept, as being the oldest part of the building now remaining, and drew attention to a gallery high up above the rose window where excommunicated persons were banished in former times, through a small door. The west front was then looked at from the market-place. It is flanked by two towers of the thirteenth century, with lancet windows, and surmounted by tall granite spires. Entering the Cathedral by the west door a good view was obtained of the interior, which is one of the finest in Brittany. The nave arcades and triforium are of white Caen stone. This part of the Cathedral is of the thirteenth century, and the details are worthy of careful study by the architect. Against the wall of the south aisle of the nave is a remarkable granite coffin, now used as a holy water vessel. The cover has disappeared, but, according to a writer of the seventeenth century, it bore the following inscription in ancient characters,—

"HIC JACET CONANUS BRITONUM REX."

The style of the ornament on the sarcophagus is that of the eleventh or twelfth century, so that it cannot possibly be the tomb of Conan Méridée, the first king of the Bretons, who is supposed to have lived in the fourth century. Even the very existence of Conan Méridée is doubted. As a work of art, however, this stone coffin is deserving of notice. It is 7 ft. 8 in. long, by 2 ft. 5 in. wide, by 2 ft. deep, outside measurement. The two sides are ornamented with arcades of five round arches springing from stepped capitals, like those seen in Saxon churches in England. On the east end is a cross, and on the west end a conventional tree. The carving is in very low relief, but well executed. After the reputed tomb of Conan Méridée, the most interesting thing seen in the cathedral from an archaeological point of view, was the Bell of King Marc. "Bradshaw's Guide" refers to it somewhat contemptuously as "a sort of old sheep bell," and even the photographer of our party said he would not throw away a plate upon it. This ancient relic is a quadrangular ecclesiastical bell of a type only found in districts where the Celtic church once held its sway. According to a legend, St. Pol had in vain asked King Marc to give him a bell he had in his palace, but one day the head of a great fish, caught off the Ile de Batz, was brought to the saint with the very same bell in its mouth. Like other relics of the Celtic Church, it is supposed to possess, even at the present day, the miraculous property of curing diseases of the head and ears. The bell is of yellow bronze, with a loop-handle at the top, fixed with two rivets at each side. The handle is ornamented with leaf-like terminations where it joins the bell, and has traces of silver plating and rows of small circles stamped on it. The relic is kept under a stone canopy near an altar on the south side of the cathedral.

The next place visited was the Church of Notre Dame de Kreizker, a building of the fourteenth century, with a good south porch and a splendid spire 80 metres high, which Vauban said was one of the boldest pieces of architecture he had ever seen. Like Boston Stump,

in Lincolnshire, it forms a prominent landmark in a flat country. It was gratifying to our national pride to learn that the design of the Kreizker is attributed to an Englishman, brought over by Mary of England, the first wife of Duc Jean IV., in 1362. The interior presents no special feature of interest.

Before adjourning to lunch at the Hôtel de France, a short time was spent in walking through the cemetery. Here were seen several curious little boxes, looking like diminutive dog-kennels, in which the skulls of deceased persons are placed a certain time after their deaths, when the bodies are exhumed. These boxes do not open, but are pierced with a heart-shaped hole in the front, and bear an inscription such as the following:—

"ICI GIT JEANNET PRIGENT MORTE 1868."

The gables of the boxes are usually surmounted by a small cross.

In the afternoon the party took the train to Roscoff, a pretty little watering-place three miles to the north of St. Pol de Léon. Here were seen a large allée couverte, the ruined chapel dedicated to St. Ninian, by Mary Queen of Scots, in 1548; some interesting fourteenth-century alabaster carvings of Scripture subjects in the church; and several old houses with granite carvings. Morlaix was reached at 8 p.m. by train.

*Wednesday, Aug. 21.—Excursion No. 5.*

The members left the Hôtel de Provence at Morlaix, in carriages, at 10 a.m., and, after a drive of about eight miles south-west, reached St. Thégonnec. The country in the neighbourhood of Morlaix, although not mountainous, is intersected by steep ravines in many places, giving the French engineers ample opportunity for displaying their skill in the lofty granite viaducts, by which the railway crosses these obstacles, and the well-planned course of the roads ascending out of or descending into the hollows at a uniform easy incline. The viaduct over the valley in which Morlaix is situated is a splendid piece of work, executed from the designs of M. Fenoux. It is 280 metres long and 64 metres high, constructed with two tiers of semi-circular arches one above the other. Mr. Ruskin would be probably gratified to learn that in this particular instance the railway has added to the beauty of the place, instead of destroying it.

An hour or more was devoted to seeing the Church and Calvary of St. Thégonnec. The Calvary is in the churchyard, on the south side. The base is rectangular, 10 ft. 7 in. long, by 4 ft. 7 in. wide, and 6 ft. high. On the west side of the pedestal is a niche containing an image of St. Thégonnec, who is represented with a small cart drawn by a pair of oxen, at his feet, to indicate his being the patron of cattle. Below this figure is an altar, supported on a bracket. On the top of the pedestal, going the whole way round, are a large number of figures arranged in groups, each representing a different scene from the Passion of our Lord, after the ancient conventional fashion of the Medieval MSS., but with costumes of the seventeenth century. From the centre of the pedestal rises a lofty crucifix, the lower part of which is carved to look like the stem of a tree, and on each side is a shorter cross with the Two Thieves. Two pairs of brackets project from the central crucifix, the upper ones supporting two soldiers on horseback, and the lower ones, St. Peter and another Saint. Below the crucified Saviour is the Virgin and Child, and the date, 1610. The whole is carved in Kersanton stone, which is of a dark olive-green colour, and takes a beautifully smooth surface, when dressed with the sculptor's chisel. The quarries whence this material is obtained are near Brest. It is a volcanic rock, like the serpentine at the Lizard in Cornwall. The art of the sculpture is not particularly good, the size of the heads being out of proportion with the bodies, but the grouping of the figures and the general conception is to be admired. The great interest of these curious calvaries is, however, that they show to what a late period the Medieval religious ideas that found their expression in the illuminated pages of the early MSS., and which were afterwards popularised by the miracle plays, and such books as the "Speculum Humane Salvationis," have survived in Brittany. Those who would pursue this subject further should consult Miss Stokes's edition of Didron's "Christian Iconography."

The Church of St. Thégonnec is chiefly in the Renaissance style of the seventeenth century. Some Queen Anne enthusiasts might see hidden beauties in its monstrous details and it

is not impossible that he might feel inclined to reproduce portions of the exterior in pink terra-cotta, as the façade of a club in Northumberland-avenue, or a music-hall in the Strand; but to a refined taste it seemed to be architecture run mad. A silver-gilt processional cross of considerable merit, of the same date and style as the Calvary, was shown in the inside of the church.

The afternoon was devoted to an inspection of the church and Calvary of Guimiliau, five miles south-west of St. Thégonnec. The base of this Calvary, instead of being rectangular, like the last, is octagonal, with four rectangular projections. The crucifix is lower, and, in addition to the statues on the top of the pedestal, there is a frieze of sculptured subjects in high relief running round the whole just below the cornice. The scenes are taken from the early portion of the life of Christ and the Passion. At the four corners are the Evangelists with their symbols. There are two dates on this Calvary,—1581 and 1588. At the south-west angle is a very extraordinary subject, which is explained by the local legend of the Catel Gallet. The sculpture shows the nude figure of a woman being dragged down into the open mouth of hell by three demons. The legend relates that Catel Gallet was a woman of dissolute life, who was condemned to this terrible doom for having concealed a mortal sin at confession.

The chief feature of interest in the Church is the south porch, with an ossuary containing skull-boxes at the west side of it.

The porch is ornamented with a very archaic series of sculptures of scenes from the Old and New Testament, executed in low relief in Kersanton stone. The style of the architecture is Renaissance, but the feeling of the carving is Gothic. Amongst other subjects depicted are the Drunkenness of Noah, and Adam at work with a very primitive form of spade. Inside the porch, on the west side, are two curious carved plaques, one representing the Creation, with Eve coming out of Adam's side, and the other the Casting-out of an Evil Spirit, which is seen coming out of the top of the head of the possessed.

The date given on the outside of the porch is 1611 and on the inside 1606. Altogether, this is a very marvellous piece of work, worthy of being fully illustrated. The church has a good bell-gable at the west-end, combined with a tower.

*Thursday, August 22nd.—Excursion No. 6.*

The members left Morlaix for Lannion by an early train, going via Ploareat, and arriving at their destination shortly before 11 a.m. A few old houses were seen driving up from the railway station to the Hôtel de L'Europe, one in the market-place with an elaborately slated front being rather out of the common. Carriages were ready at one o'clock to convey the party to Perros Guirec, seven miles north. Some of the members walked up a steep hill opposite the town of Lannion to examine the Church of Brélévénec, joining the carriages further down the road. The church has a twelfth-century apse at the end, and a south porch of the same date. The holy-water stoup on the west side of the south door, inside, has an inscription in Lombardic letters upon it, showing that the original purpose for which it had been intended was a corn measure, used when collecting the ecclesiastical tithes.

At Perros Guirec a visit was paid, by special invitation, to the house of M. Renan (the author of "La Vie de Jésus"), where the members of the Cambrian Archaeological Association were introduced to their host by Professor J. Rhys, of Oxford. M. Renan then delivered an address of welcome, in which he touched upon the intimate connexion formerly existing between Brittany and Wales. He mentioned that his own name was connected with that of St. Ronan, and he chaffed the Roman Catholic Church good humouredly for trying to boycott the Celtic saints in Brittany whenever a chance occurred. He said that the statue of St. Buez was a case in point, as it had quite recently been replaced by an image of the Virgin from Lourdes. M. Renan referred to the law of Edward the Confessor, which enjoined Englishmen always to treat a Briton as a citizen worthy of all respect on account of his kinship with the Welsh, and he expressed a hope that this excellent statute had never been repealed.

M. Renan hospitably entertained the members to afternoon tea, and accompanied them after-



wards to the churches of Perros Guirec and Notre Dame de la Clarté. The former is one of the oldest and most interesting of all the churches that had been seen during the different excursions. It is Romanesque in style, with some late insertions. The south doorway is of the twelfth century, very much like those in some of the village churches in England. The tympanum and the capitals of the three columns on each side of the doorway are sculptured with figure subjects. On the tympanum is Christ in Glory giving the benediction, within an aureole, and with the lion of St. Mark on one side and the eagle of St. John on the other. On the capitals are two warriors, one armed with a sword and kite-shaped shield, fighting a dragon; a beast swallowing a man; a bishop with his crozier; St. Peter with his key; a man playing a stringed instrument with a bow, and a woman dancing head downwards in front of him; and a man with a bird. In the interior the nave has an arcade on the north and south sides of six round-headed arches, supported on five cylindrical pillars, with capitals sculptured with figure subjects. The meaning of these subjects is rather obscure, but the well-known Christian symbol of a pair of doves drinking out of a vase occurs on one of the capitals. There is in the church a quaint holy water vessel, the bowl of which is grasped by three grotesque figures of men.

Leaving Perros Guirec, the carriages took the road to Ploumanac'h, the members enjoying the magnificent sea views on the way.

A short stop was made at the top of the hill overlooking Ploumanac'h to inspect the church of Notre Dame de la Clarté. The square tower is placed diagonally with regard to the nave. It is of red granite, and has a spire. The building is of the fifteenth century, and not particularly remarkable in any way. M. Renan here kindly submitted to have his portrait taken, by the two photographers of the party. He was taken standing against the church, much to the apparent disgust of some Roman Catholic priests, who were passing at the time.

From the hill on which the church stands an extensive tract of country lying along the sea-coast was to be seen strewn in all directions with high boulders of red granite, piled up one above the other, as on Dartmoor, the whole aspect of the landscape being exceedingly sombre and melancholy. The village of Ploumanac'h lay below close to the sea. A short drive brought the party into the midst of an extraordinary jumble of rocks and houses mixed together indiscriminately, just beyond which, on the edge of a sandy bay, was the shrine of St. Guirec, a structure of the twelfth century, supported on four Romanesque columns, and built up at the back so as to look like a boat placed on end. The wooden image of the saint within is covered with holes made by pins stuck into his body for superstitious purposes. This shrine was engraved some time back in the *English Illustrated Magazine*, and the accompanying letterpress gave an excellent idea of the surrounding scenery.

This was the last object visited, and Lannion was reached at about 7 p.m.

On the following day (Friday, Aug. 23) the party returned, via St. Malo, to England.

In concluding the account of this most successful gathering, a word of praise must be given to Messrs. Thomas Cook & Son, and their agent, M. Dossé, for the very creditable way in which the whole of the arrangements connected with the hotels, railway journeys, and carriage excursions were carried out, without a hitch of any kind.

#### THE HERALDRY OF THE CRUSADES.

In heraldry does not owe its very origin to the Crusades (and the question is an open one), it is undoubtedly indebted to that source for a great development, and for many bearings of vast interest. In fact, there are few of our ancient families who do not show in their shields some evidence of an ancestor having taken part in the Holy Wars or a pilgrimage.

In those superstitious ages the soldiers of the Cross were led to believe that if they died while fighting for the faith the gates of Paradise were open to them. The survivors who should succeed in slaying "a Saracen gentleman" became thenceforth of gentle blood, and allowed to bear a coat of arms.

Palestine was almost an unknown land, and marvellous tales were told of the country by warriors and pilgrims alike, and it is considered

that many of the mythical monsters of heraldry arose from the wondrous accounts brought home by these veracious travellers.

But our present purpose is not to deal with this strange menagerie of "fearful wild fowl," but with well-authenticated figures of Eastern birth.

Sir Walter Raleigh, in his "Remaines," says:—

"Give me my scallop-shell of quiet,  
My staff of faith to walk upon;  
My scrip of joy, immortal diet;  
My bottle of salvation;  
My gown of glory (hope's true gage),  
And thus I'll make my pilgrimage."

The scallop-shell was the badge of the pilgrim, who generally carried it in his hat; nor was it a mere distinguishing mark for the wearer, for as a cup, a dish, and a spoon at times it became an article of great utility on the way. So highly esteemed did this shell become that it is recorded the use of it was forbidden by Pope Alexander IV. to any pilgrim who was not of noble birth, and that he issued a bull to that effect.

From Moulé we learn that the scallop is to be found in the arms of the Dukes of Bedford, Marlborough, and Montrose; in the arms of the Earls of Jersey, Spencer, Clarendone, Albermarle, and Bandon, the Marquis Townshend, and Viscount Sidney; and in those of many others of high rank. As an allusive bearing it is used by the families of Pilgrim and Dishington, and as a punning one by the baronial house of Scales, or De Eschailes, of Middleton Castle, Norfolk, and also as the crest of this latter.

The scallop is also known as the shell of Saint James, it being his emblem or cognisance. The badge of this order is a red cross forming a sword, charged with a white scallop-shell; the motto is "Rubet ensis sanguine Arabum," meaning that the blade is red with Moorish blood, and has reference to the legend of the saint appearing at the battle of Clavijo on a white horse, and assisting at the slaughter of 60,000 Moors who fell on that occasion. So powerful did this order of knighthood become that it was able to exercise great influence in Spain, and at one time could bring a hundred thousand men-at-arms into the field.

But a still greater honour was destined for the shell, according to Fuller, who, in his "History of the Holy War," says:—"I find an order of knights called equites cochleares, wearing belike cockle or scallop shells, belonging to them who had done good sea service, especially in the Holy War." Many Hollanders who took part in the siege of Damietta were admitted into this order.

The staff, or bourdon, is found in the arms of Palmer of Lincolnshire, and is borne with a hook at the head. The Tasboroughs of Suffolk bear staves with pouches hanging on them.

The scrip, or pilgrim's pouch, is charged on the shield of the Palmers of Kent.

By the bottle we may conclude Sir Walter Raleigh refers to the water bouget or bucket, a leathern utensil for carrying water over the dry, sandy deserts of the East. This forms a very interesting charge in heraldry, and is, perhaps, best known as the Bourchier badge, whose arms are thoroughly Eastern in their origin, viz., "Argent, a cross engrailed gules, between four water-bougets sable. Crest, the bust of a Saracen king, with a long cap and coronet all proper." Ellen J. Millington says the combat which this crest is designed to commemorate formed the subject of a painting once to be seen in the Manor House of Newton, at Little Dunmow, Essex.

The form of the bouget varies greatly, and Lower gives us six examples in his "Curiosities of Heraldry" (some of them are very grotesque), and Planché mentions that on the Norman font in Hook Norton Church, Oxfordshire, is a rude sculpture showing the manner in which it was carried.

In the Temple Church, on the shield of a crossed-legged effigy of a knight of the period of Edward I., three water-bougets are plainly sculptured. The figure is supposed to represent a De Ros, from this being the cognisance of that family; and thus, as Fuller quaintly observes, "many a dumb monument, which through time or sacrilege hath lost its tongue,—the epitaph,—yet hath made such signs by the escutcheons about it, that antiquaries have understood who lay there intombed."

According to Planché, the Trusbutts, Barons of Wartre in Holderness, introduced the water-bouget into English armoury; they bore "Trois boutz d'eau," three bouts or bougets of water, thereby symbolising both their family name

and their baronial estate. A De Ros married the heiress of the Trusbutts, and took their arms, as was usual, and they are now more generally known as the coat of De Ros.

The star and crescent was one of the badges assumed by Cour-de-Lion, doubtless to symbolise the ascendancy of the Star of Bethlehem over the horned moon or crescent of the Mahomedans, and this device appears on his first great seal, but it is also to be found on ancient Grecian coins, where it could have had no such significance. Among the symbols on the vaulting of the Temple Church is a cross standing on a crescent, and a star appears on each side of the former with doubtless the same meaning.

The Saracens' head is one of the best-known devices derived from the Crusades, being a favourite public-house sign. It is borne both black and red on the shield and as a crest, and is generally depicted as the head of a savage old man. The Morions of Fife have three Saracens' heads on one neck. The head is naturally considered the most honourable part of the human frame that can be borne in heraldry, and some of our Welsh neighbours have Englishmen's heads on the family escutcheon. Blackamoors' heads, satyrs' heads, and even fiends' heads are not unknown in heraldry.

The crowned head of the Douglas family comes within the scope of this paper, for it was assumed by an ancestor of the house who had undertaken the perilous task of conveying the heart of Robert Bruce to the Holy Land, for burial there, in 1328. The crown is generally considered to be a later addition.

The bezant represents a gold coin of Byzantium of great value, and was probably introduced into heraldry from the Crusades. Richard Plantagenet, King of the Romans and Earl of Cornwall (son of King John), had for arms a lion rampant gules (on a field argent) crowned or, within a border sable bezanty. (From the "Oxford Glossary.")

Planché was of opinion that the border of this shield was charged with peas (*pois*) of gold, being the arms of *Poitiers* or *Poictou*. Many Cornish families incorporated the bezants or golden peas into their arms because Richard was the earl of their county.

Amongst the arms of Queen's College, Cambridge, we find an interesting charge,—that of the Cross of Jerusalem borne in commemoration of Margaret of Anjou, its founder. The cross is derived from the Queen's father, who was titular King of Sicily and Jerusalem.

The term "chequy," "checky," or "chequer" bearing is applied to a shield or bearing divided into squares resembling a draught or chess-board, and is borne or *azure* by Warren, the ancient Earls of Surrey. The idea may have been derived from this game of chess, which was revived by the Crusaders on their return to Europe, although they were not the original introducers of it. The Stewards of Scotland bear or, a fesse chequy argent and *azure*; this is a coat of an allusive nature, the fesse represents the steward's board. The "Oxford Glossary" says that the chequers still frequently seen at the doors of taverns have the same origin, but Planché reminds us that such a device is to be found in all countries, and at all periods, and may be regarded as a mere fanciful ornament.

The term *gules* (signifying red) is said to be derived from the Arabic *gula*, a rose, and to have been introduced by the Crusaders, but another probable derivation is from *gula*, the Latin for throat.

The wreath on which the crest usually appears was doubtless copied at the Crusades from the twisted turbans of the Saracens. Sir John de Harsich used this in 1384.

In 1380 an order of knighthood was founded by Richard II. of England and Charles VI. of France. It was called the Passion of Jesus Christ, and was instituted for the recovery of the Holy Land. The badge was a plain red cross edged with gold and charged with an Agnus Dei. The garment was white. The order was to have consisted of one thousand knights, each attended by an esquire and three men-at-arms.

#### The Swedish Building Stone Industry.

—Prices of hewn Swedish granite and other building stones being now very good abroad, a new company has been started to work the valuable quarries at Norrtelge, with a capital of 4,600*l*. The stone is to be cut by machinery, the foreign market being a special object of attention.





Monument to the late Mr. George Godwin, F.R.S., F.S.A.,  
Editor of "The Builder" from 1841 to 1883.

#### MONUMENT TO THE LATE MR. GEORGE GODWIN.

THE monument of which the accompanying illustration is given has been recently erected, by the relatives of the late Mr. George Godwin, over his burial-place in Brompton Cemetery.

The monument was designed and executed by Mr. Jas. Forsyth. It is, as will be seen, an endeavour to give to the monument a rather more special and definite meaning than is usually found in cemetery monuments. The

figures on either side represent Literature and Architecture; the books and lamp on the top of the pedestal, and the pen and drawing instruments sculptured at the foot, are accessory to the same idea.

We should have given an illustration of the monument sooner, but the photograph first taken from it after erection was unavailable for reproducing from, owing to the light being partially intercepted by trees; and in the end Mr. Forsyth kindly undertook to finish up his original model completely for the purpose, and from this the illustration is taken.

#### Illustrations.

##### THE LIBRARY OF "THE PEOPLE'S PALACE."

IT is seldom that the *motif* of a modern and Classic building is supplied by an ancient and Gothic one. But such, we are informed, has been the case with the library of the People's Palace at the East End of London, of which we give an illustration. The old kitchen at Durham, erected by Prior Forcer, A.D. 1368-1370, is an octagon of 36 ft. 8½ in. in diameter, and its singularity consists in the fact that the groin ribs embrace three bays of the octagon instead of four in each case, and produce at their intersection an excellent shape for the base of a lantern or top light. In his library at the People's Palace, which is much larger, being an octagon of 76 ft. 6 in., Mr. Robson has adopted the principle of the Durham kitchen, but translated the whole into the style of his building, giving broad flat panelled groin ribs instead of narrow chamfered ones, and throwing up against the vault large windows on each of the eight sides. The treatment has the advantage of giving excellent light and ventilation, and of leaving all the wall space available for books. The construction, of course, is of iron. The cost was 10,000l. The eight busts are the work of Mr. Verheyden. Mr. Softly was clerk of the works.

The drawing from which our illustration is reproduced was exhibited at the Royal Academy this year.

##### RATHFERN-ROAD BOARD SCHOOLS, CATFORD, S.E.

THESE schools were erected in 1887-8 by the School Board for London, from the designs of their Architect, Mr. Thomas J. Bailey, the contractor being Mr. Charles Wall, of Chelsea. They contain accommodation for a total number of 800 children, viz., 240 boys, 240 girls, 320 infants, with a "Centre" for instruction in cookery, as well as a caretaker's house, &c.

The school buildings proper consist of three distinct buildings, viz., a one-story block for infants, a two-story block for boys and girls, and a third block, containing cookery centre, with caretaker's apartments over.

The total cost of the whole was 9,132l. 11s. 7d. The original drawing from which the illustration is taken was in the recent exhibition of the Royal Academy.

##### STAPLEFIELD PLACE, SUSSEX.

THIS house has been erected for the occasional occupation of the owner (Mr. A. S. Bicknell), at a cost of between three and four thousand pounds. The lower part of the walls is faced with rough-cast, and the upper part with local bright red tiles. The roofs are covered with brown Broseley tiles. Mr. F. T. Baggallay is the architect, and the contractors were Messrs. Longley & Co., of Crawley.

##### HOUSE AT SUDBURY.

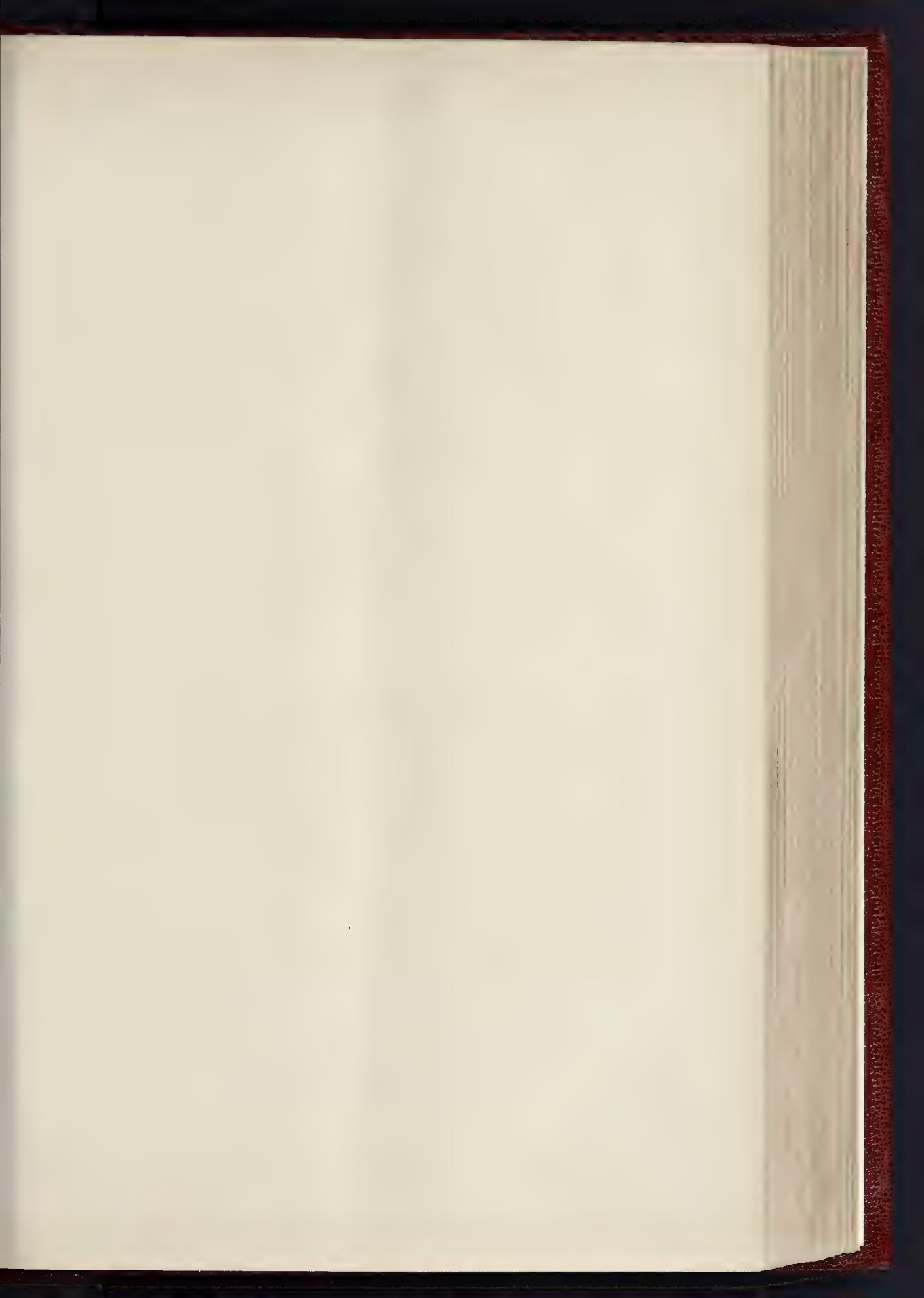
IN addition to the accommodation shown on the ground-floor plan of this house, there are six bedrooms, three dressing-rooms and two servants' bedrooms on first-floor; and two bedrooms and a lumber-room in the attics.

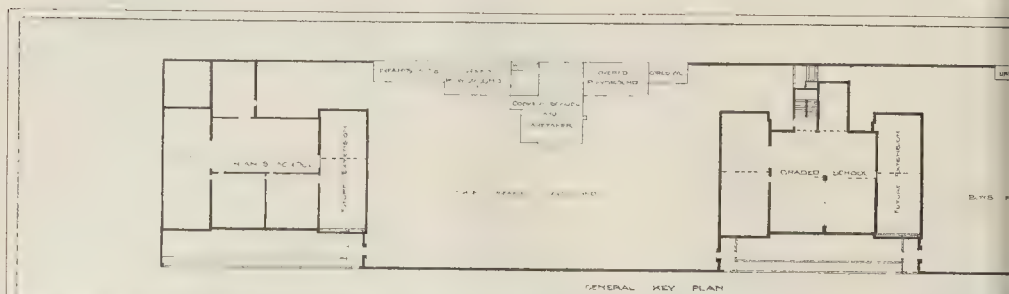
The materials used are red bricks for the walls, with Corsham Down stone dressings, parts of the walls being tile-hung and the roofs tiled. The enriched gables are executed in cement. All internal finishings are very plain. The cost is 3,000l. The drawing was exhibited in this year's exhibition of the Royal Academy.

##### WINDOW, NEW JERUSALEM CHURCH, KENSINGTON.

THIS window, representing the incident in the walk to Emmaus given in St. Luke's Gospel, when the disciples said to Christ, "Abide with us, for it is toward evening and the day is far spent," has been designed by Mr. Camm, for execution by Messrs. Winfield as a memorial window for the New Jerusalem Church, South Kensington. The pictorial portion is after a painting by Hoffmann.









ER 7, 1889.

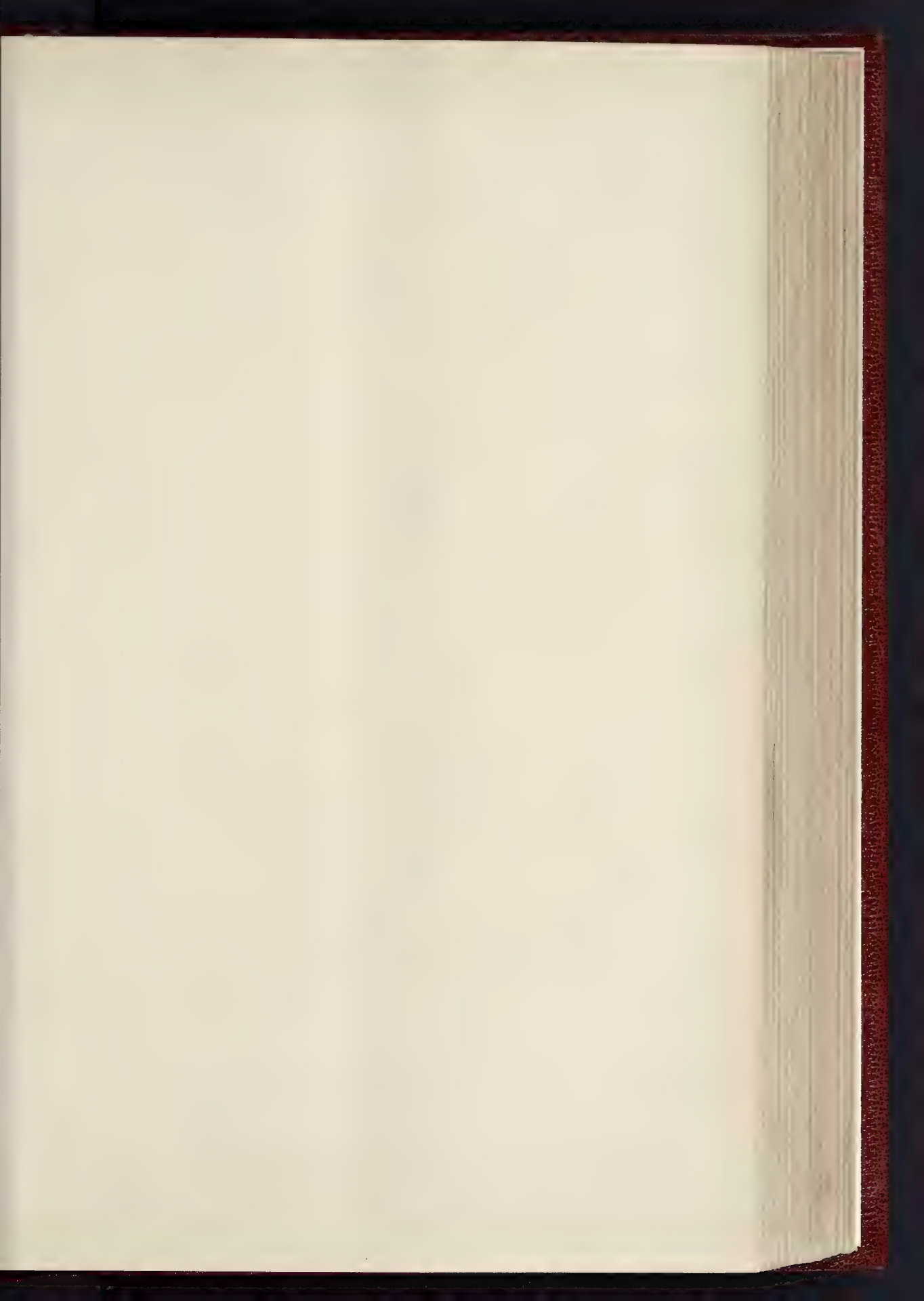
SCHOOL BOARD OF LONDON  
RATHFERN ROAD SCHOOLS  
CATFORD.  
THOMAS J. BAILEY, ARCHT.

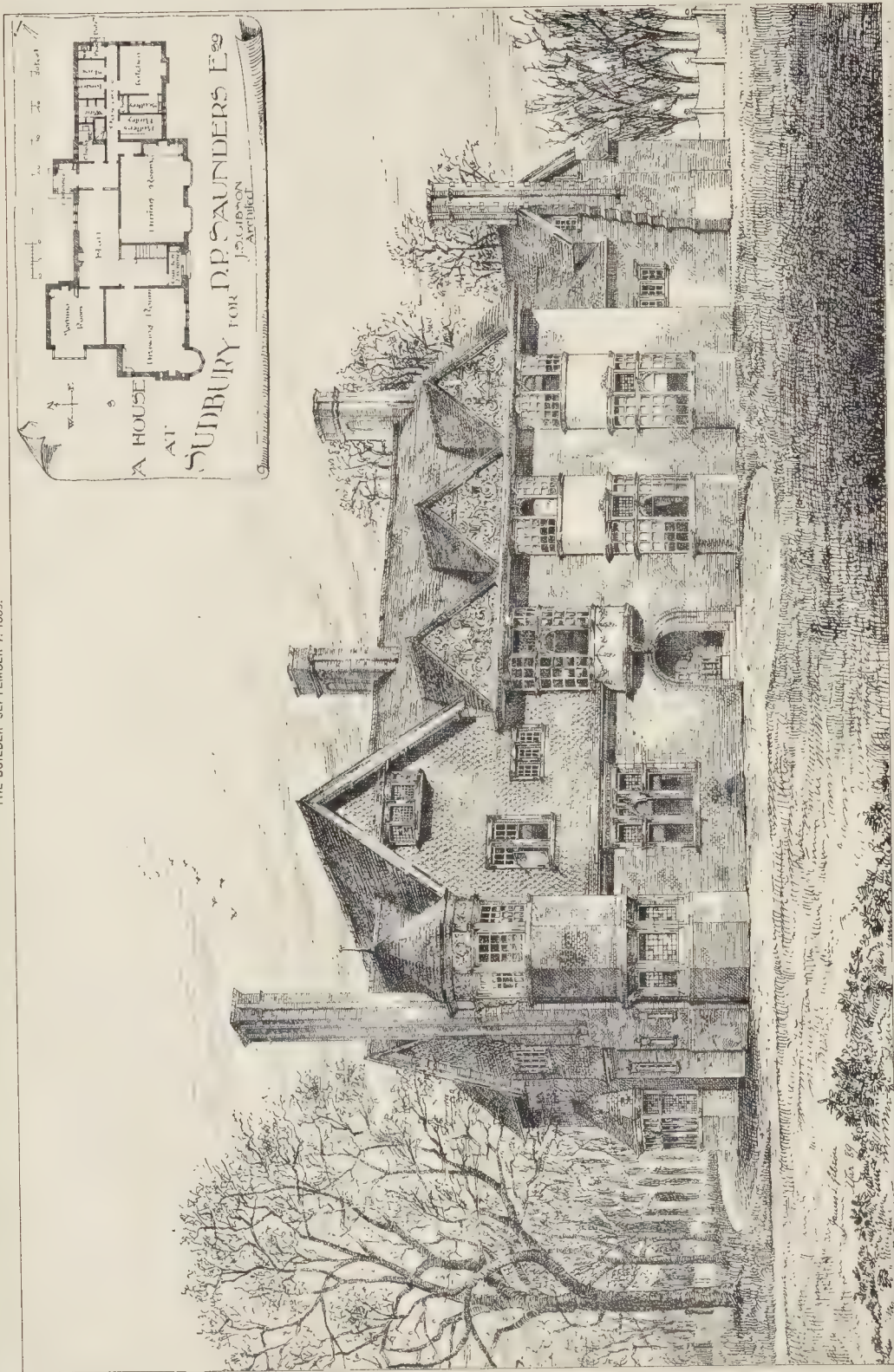


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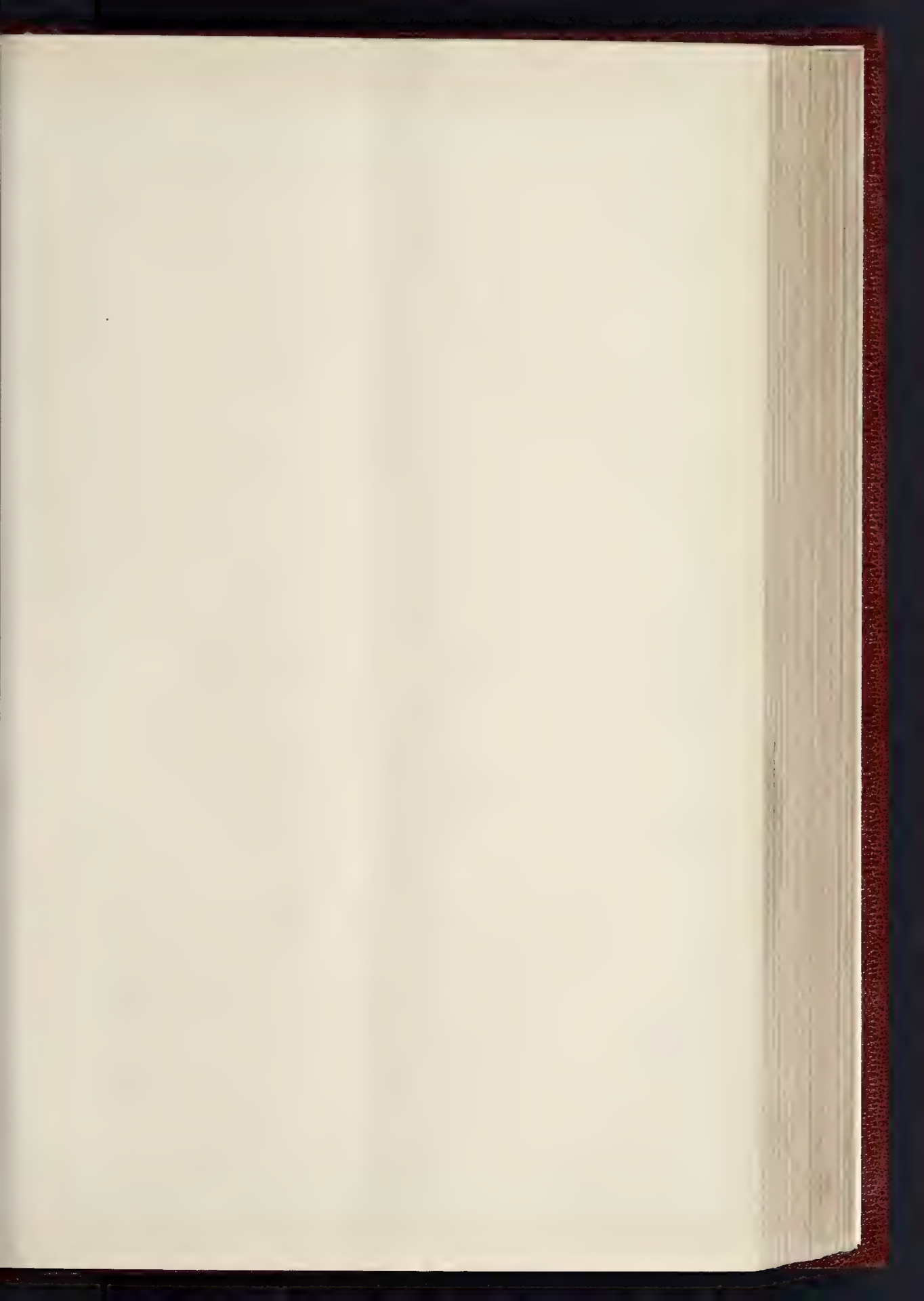




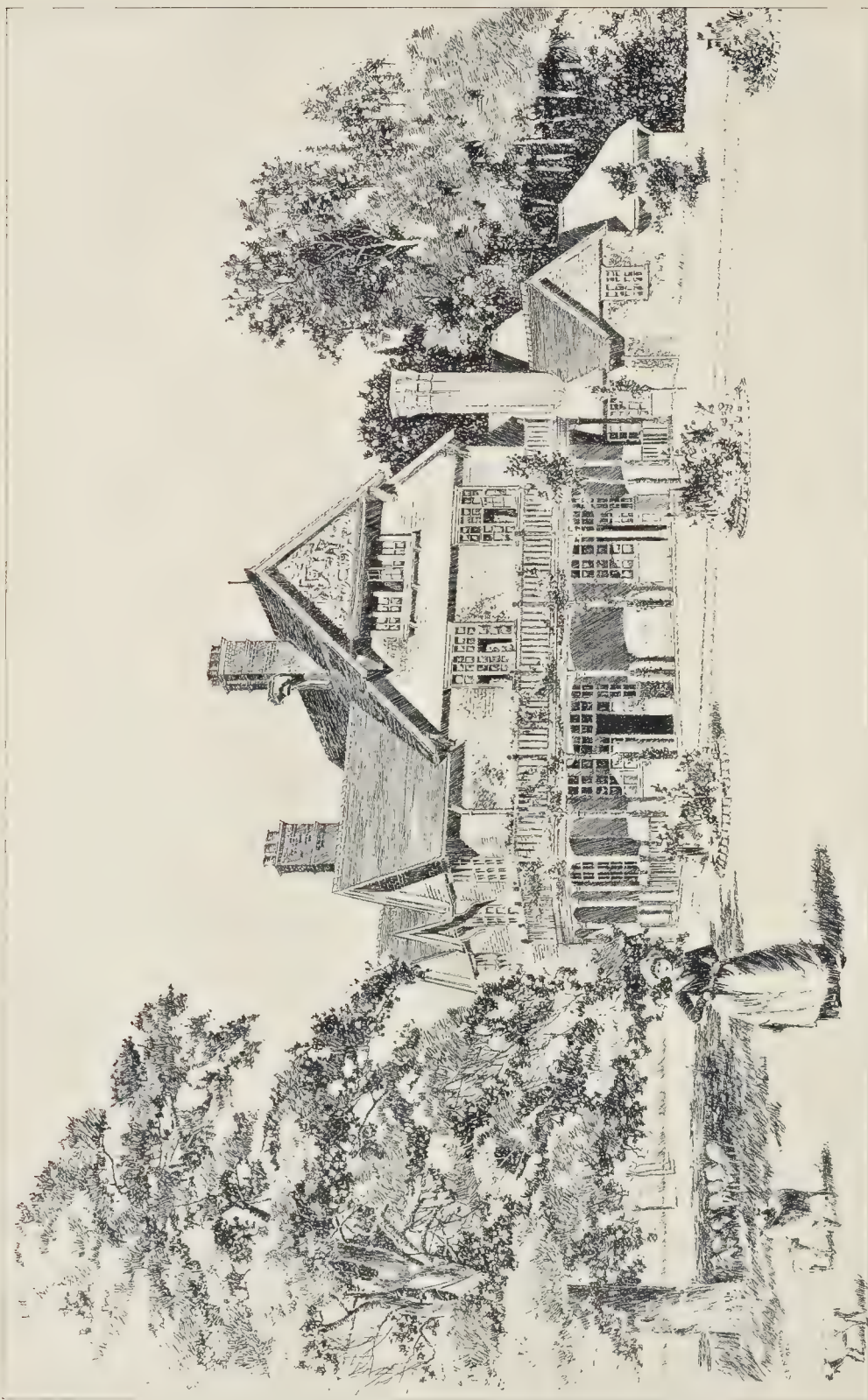






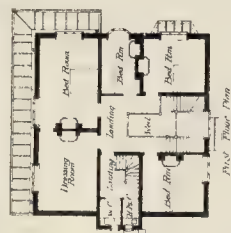
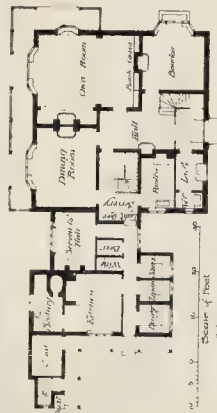


THE BUILDER, SEPTEMBER 7, 1889



HOUSE, STAPLEFIELD, SUSSEX.—MR. F. T. BAGGALLAY, F.R.I.B.A., ARCHITECT.





HOUSE, STAPLEFIELD, SUSSEX.—MR F. T. BAGGALLAY, F.R.I.B.A., ARCHITECT.



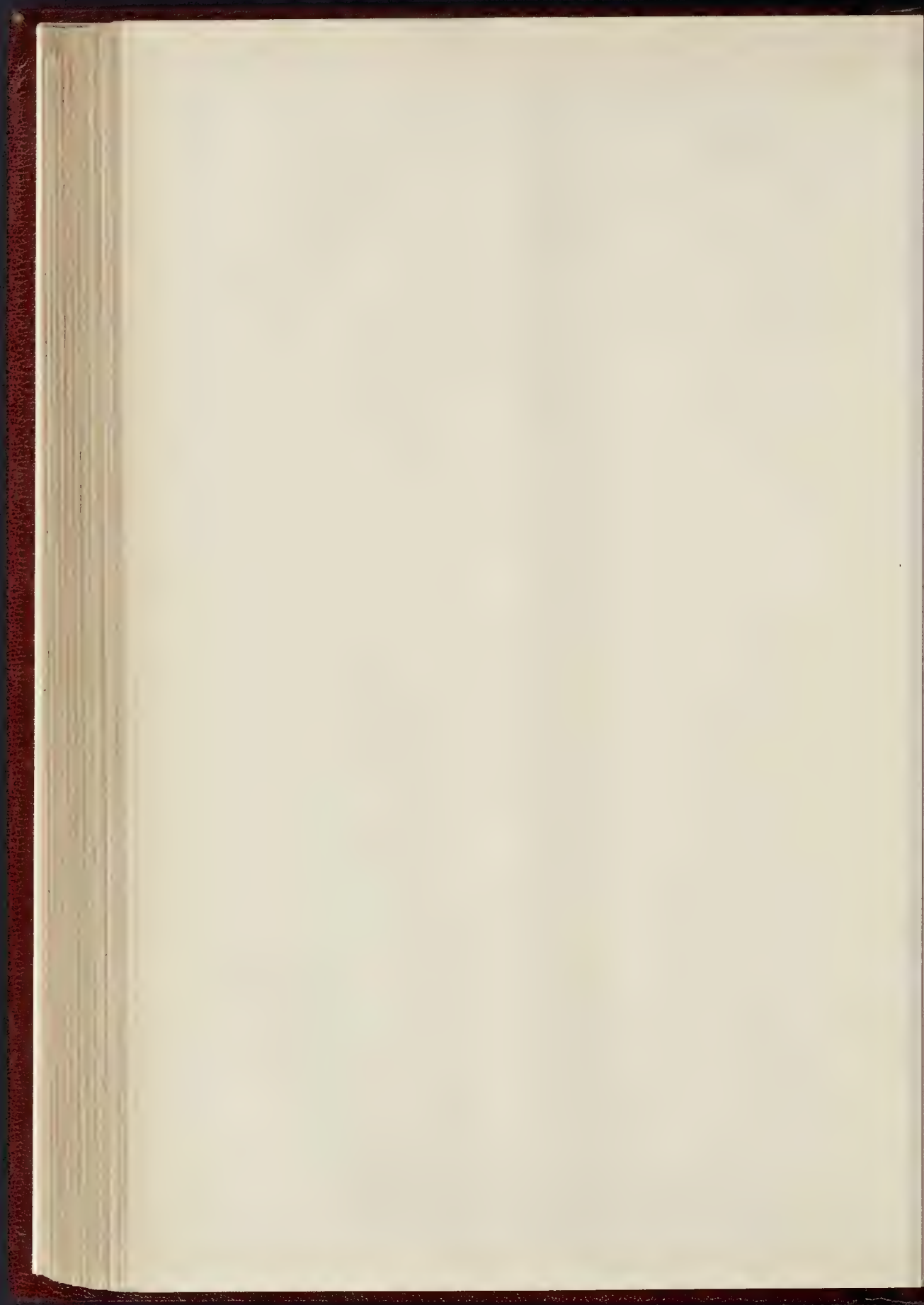




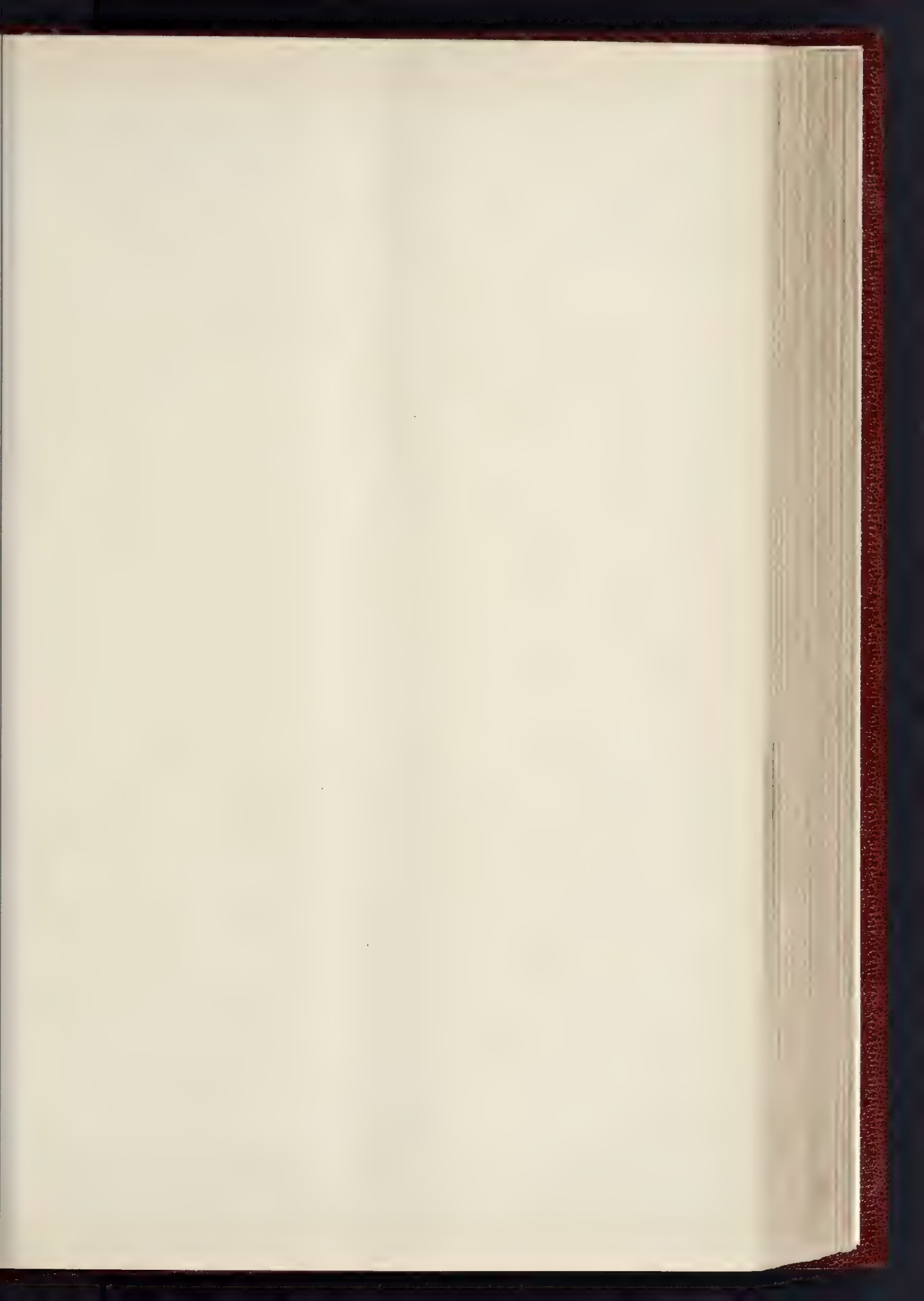
PHOTOGRAPH BY SPRINGER & CO. LONDON. PRINTED BY T. AGNEW & SONS, LONDON.

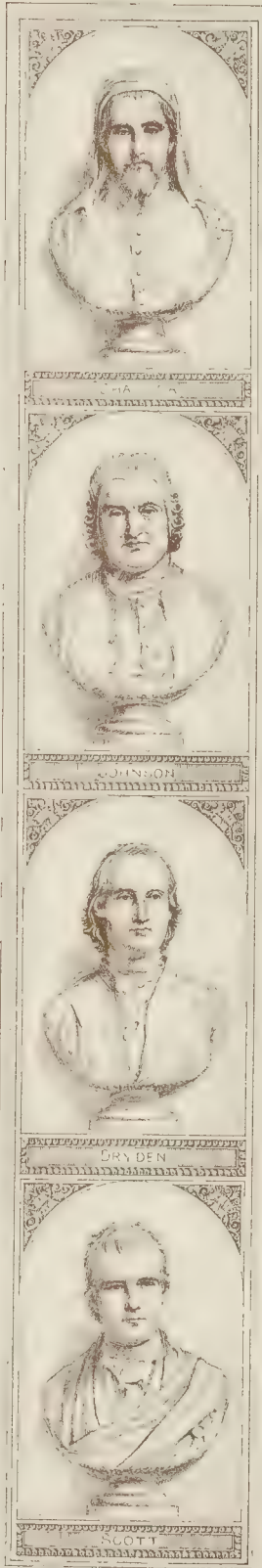
STAINED GLASS WINDOW.—NEW JERUSALEM CHURCH, KENSINGTON.

DESIGNED BY MR. JAS. F. P. CAMM. EXECUTED BY MESSRS. WINFIELDS.













SHAKESPEARE



MILTON



BYRON



WORDSWORTH





## LONDON AND MIDDLESEX ARCHEOLOGICAL SOCIETY.

COLCHESTER was the place selected for the annual excursion of this Society this year, and the excursion was made on Wednesday, August 28. It is thought that the Council are justified in penetrating beyond their former natural boundaries, as, by the rapid growth of London, Essex has now become one of the four metropolitan counties. Many of the members left London for Colchester by early trains, although the rendezvous was not announced to take place till 1.15 p.m., in the Castle library, under the presidency of Mr. E. J. Sanders, the Mayor; but owing to His Worship's unavoidable absence, Mr. J. W. Butterworth, F.S.A., was voted to the chair. About fifty ladies and gentlemen assembled, including Professor T. Hayter Lewis, Mr. E. C. Robins, F.S.A., Mr. John Leighton, F.S.A., Mr. C. H. Shoppee, Mr. T. Milbourn (hon. secretary), and others. Mr. Butterworth commenced the proceedings by calling on Mr. H. Laver, F.S.A., to explain the objects of interest. Mr. Laver said that as he was to act as "showman" that day, he would begin by pointing out the Corporation regalia of Colchester, of which they were very proud; he next referred to the "loving cup," and the silver oyster which was the standard by which formerly the size of oysters were tested. He then described the town seals; the Mayor's seal was of very early period, not later than 1500. There were also on the table several of the early charters; one of them was dated 1362. Colchester was one of the earlier boroughs of the kingdom, and it was probably the oldest town in the kingdom. It certainly was a town before London was, and one of very considerable size, as the Romans had to have 30,000 or 40,000 men to take it. It was not so early chartered as Maldon. Many of the books in the library were very rare indeed. Mr. Laver next conducted the party to the museum, and pointed out the Roman and other objects of interest which are exhibited there, and which have been found in and around Colchester. He commenced with that curious piece of sculpture, "the Sphinx," and then the Roman altar, which later has formed the subject of a very interesting paper by Mr. J. E. Price, F.S.A., and which has been published. After describing the stone coffins, coins, Roman pottery, &c., Mr. Laver proceeded to the large quadrangle of the Castle, which he said was probably the spot on which the whole of the Roman garrison in Colchester were slaughtered by order of Queen Boadicea. In the inner quadrangle, the dungeons were inspected, and the party then viewed the outside of the Castle, and the spot where Sir Charles Lucas and Sir George Lisle were shot by order of Fairfax. The execution of these two knights took place 240 years ago that day. For a more detailed and recent history of Colchester Castle we would refer our readers to the *Builder* of September 2, 1882. After visiting the Castle gardens, St. Helen's Chapel was next inspected. This building, like Rowland Hill's Chapel, London, seems to have undergone curious vicissitudes. Originally built as a place of worship, it became a school, and next a carriage-manufactory, and then a furniture factory, till it was purchased by Mr. Douglass Round, who restored it as a Church-house, and it was now used as such. It was dedicated to St. Helena, a British princess, native of Colchester, and mother to Constantine the Great. Passing through the town, the visitors noticed many quaint old houses, notably the old "Red Lion" inn, which will be found illustrated and described in the *Builder* of September 2, 1882. At St. Botolph's Priory, Mr. Laver said this was probably the earliest monastery of the Augustine friars in England. It was built in 1103. After the Dissolution it became a parish church, and during the siege of Colchester by Fairfax it was nearly destroyed by cannon shot. This priory was constructed by Norman builders with Roman materials. The visitors lingered here for some time admiring the beautiful interlacing arcade at the western front, an illustration of which will be found in Parker's "Glossary." Arriving at St. John's Abbey gateway, Mr. Laver said the abbey was founded in 1096. After the Reformation it passed into the hands of the Lucas family, who built a house upon the grounds, which was destroyed by the Parliamentarians under Fairfax. The gateway was erected between 1412 and 1416, as stated in the borough records, and at the time of the siege was used as a battery. A gun was placed on the top to fire into the wall

of the town. The last abbot held out against Henry VIII., but was captured through treachery and taken to Tyburn and executed. St. Giles's Church, close by, is the burial-place of the Lucas family. Here are interred the remains of the gallant Sir Charles Lucas and Sir George Lisle, whose melancholy fate is recorded on their common tomb. Following Mr. Laver, the entire party next proceeded to the venerable Saxon Holy Trinity Church. Mr. Laver said the tower was unquestionably Saxon, but the other parts of the church were comparatively modern. On the door of the south side of the church there was formerly attached a "sanctuary ring"; any one grasping that ring in former days was held to be within the sanctuary, and therefore safe. The Balcony-gate, with the Roman arch, and other portions of the old Roman walls of the town, were next inspected. Mr. Laver then conducted the party to the museum of Mr. George Joslin, and pointed out an effigy of a Roman centurion, perhaps the finest relic of Roman occupation found in Colchester; it bears an inscription to the effect that the centurion was Marcus Flavinius, son of Marcus of the Palian Tribe. Having inspected the other Roman relics there, the company passed a hearty vote of thanks to Mr. Joslin for his kind invitation.

## COMPETITIONS.

*Proposed Municipal Buildings, Sheffield.*—The conditions of this competition have been issued. The total cost of the building is not to exceed 80,000*l.* From the sketch designs to be first sent in, the Corporation will select, with the advice of an Assessor, those which they most approve, not exceeding six in number, and will request their authors to supply complete designs. A sum of 600*l.* will be divided equally between the architects taking part in this final competition. The Corporation have requested Mr. Waterhouse, R.A., to act as Assessor.

*Schools, Dartford.*—The first premium in this competition has been awarded to the designs bearing the motto "School Architect," estimated to cost 4,200*l.* to execute. The author was found to be Mr. E. Pincher, West Bromwich. The second premium was awarded to the design bearing the motto "Invicta," by Mr. Horace T. Bonner, of London. There were fourteen other designs sent in.

*Oundle Waterworks.*—The Oundle Commissioners, having invited several engineers to send in competitive plans, at their meeting last Monday finally selected a water scheme drawn up by Mr. W. H. Radford, C.E., Nottingham, and, after receiving personal explanations as to details, they gave that gentleman instructions to commence boring operations at once. Mr. Radford reported that the owner of the estate had offered to give the necessary land for the works on condition that Biggin Hall and Biggin Grange are supplied with water free. Mr. Radford's scheme is to sink a deep well and pump the water from the Northampton sand to a summit reservoir, whence the town would be supplied by gravitation.

*Paving New York Streets.*—New York is regarded as the worst-paved city in the world, and this although large sums are spent in keeping the pavements in order. Quite recently, the New York Legislature sanctioned the spending of 3,000,000*l.*, at the rate of 1,000,000*l.* per annum for the next three years. The new pavement will be partly asphalt laid on concrete, partly granite on concrete foundations, the latter to be in streets with heavy traffic. Permission has been granted by the Board of Estimate and Apportionment to the Commissioner of Public Works to appoint a special inspecting force, consisting of a consulting engineer, an assistant engineer, two transitmen, two levellers, four rodmen, one draughtsman, two skilled workmen, and four axemen, and the Comptroller has been further authorised to appoint an engineer to inspect the work before the contractors are paid. It remains to be seen whether a change for the better will be effected by the reforms introduced. At present the bad state of New York pavements has been due to two causes. In the first place, the work, although nominally in charge of engineers, has in effect been controlled by politicians. Next, the pavements are continually being torn up to lay and repair pipes and sewers, and we know ourselves from experience that, however thorough the work of repaving may be done, the original condition is never restored.

## SURVEYORSHIPS.

*Leicester.*—We are informed that the Special Committee of the Leicester Corporation appointed to select a successor to Mr. Gordon (who has been appointed Chief Engineer to the London County Council) for the post of Borough Surveyor have reduced the number of applicants from forty-two to seven, the following being the seven:—Mr. J. P. Barber, Surveyor to the Vestry of St. Mary, Islington; Mr. J. W. Brown, Borough Surveyor, West Hartlepool; Mr. W. Harpur, Borough Surveyor, Cardiff; Mr. Jos. Lobley, Borough Surveyor, Hanley; Mr. Chas. Mason, Deputy Borough Surveyor, Leicester; Mr. E. G. Mawbey, City Surveyor, York; and Mr. Richard Read, City Surveyor, Gloucester. We understand that a Sub-Committee will visit the several towns named to personally see the work executed by the candidates.

*Notts County Council.*—We hear that, subject to the approval of the County Council, Mr. E. P. Hooley, A.M.I.C.E., was unanimously appointed County Surveyor, by the Highways Committee, on the 24th ult. There were 143 candidates, and eight selected.

## OBITUARY.

*Mr. Joseph Jennings, F.R.I.B.A.*—One of the elder Fellows of the Institute (viz., the fourth by seniority, elected in 1847), Mr. Joseph Jennings, District Surveyor for South Saint Marylebone, died on the 6th inst., at his sister's residence at Wanstead, after a short illness. He was the second son of Mr. David Jennings, of the Hall House, Hawkhurst, in Kent, which had belonged to his family since about the year 1666. He was descended from Dr. Jennings, the author of "Jewish Antiquities," and connected with Dr. Nathaniel Lardner, author of "The Credibility of Gospel History," and with Daniel Neal, author of the "History of the Puritans." On his elder brother going abroad, he purchased the family estate, but afterwards found it more convenient for business requirements to reside at Tunbridge Wells. He was a pupil of the late Mr. Joseph Parkinson. In 1856-7 he designed and carried out the Depot for the permanent staff of the Royal London Militia (now the 4th Battalion of the Royal Fusiliers) in the City-road, Finsbury, a plan and view of which are given in the *Builder*, vol. xv. [1857]. Mr. Jennings was for many years Surveyor to the Commission of Lieutenancy of the City of London, an office which he resigned in 1882. He was also Surveyor to the Guardian Fire Office, and retained the appointment, as well as that of District Surveyor, after his retirement from practice, which occurred a few years ago. He had great practical knowledge, and was a member, and for some time Chairman, of the Board of Examiners appointed by the Institute under the provisions of the Metropolitan Building Act, 1855. He was elected a member of the Council in 1851, and until very recently took an active interest in the work of the Institute. Mr. Jennings had been for many years a director of the Architectural Union Company, and at his death had attained his eighty-third year.—*R.I.B.A. Journal of Proceedings* (Aug. 29, 1889).

*Mr. J. F. B. Firth, M.P.*, died suddenly at Chamounix on Tuesday, his death being attributed to sunstroke. He was only 47 years of age. As Deputy-Chairman of the London County Council, an office to which he was a few months ago elected at a salary of 2,000*l.* a year, he was taking a very active part in the administration of London local affairs. Some years ago he wrote a bulky volume on the Municipal Government of London. He represented Haggerston on the County Council.

*Hornsey Church.*—The new parish church will be consecrated by the Bishop of London on November 2. The organ is being built by Messrs. H. Willis & Son, and will cost 2,000*l.* It has three manuals and 47 stops, and will be, it is said, the largest of its kind in that part of London. The church has been erected from the designs of Mr. James Brooks, and was the subject of an illustration in our pages on May 12, 1888.

*Builders' Benevolent Institution.*—The annual dinner of this Institution is announced for Thursday, November 7, at Carpenters' Hall, London-wall, the President, Mr. J. W. Hobbs, the present Mayor of Croydon, in the chair.





*Residence, Marnaroneck-on-the-Sound, N.Y.—Mr. E. A. Sargent, Architect.*

#### RESIDENCE, MARNARONECK-ON-THE-SOUND, N.Y.

This house, designed by Mr. E. A. Sargent, shows that American architects are becoming quite as expert as some English ones in the art of making a new house look (on paper at all events) like an old one. Apart from this consideration, the house is pretty and picturesque in effect.

#### THE TRADES UNION CONGRESS.

THE twenty-second annual Trades Union Congress was opened on Monday last at Dundee. Shortly after 12 o'clock noon, Mr. George Shipston, the Chairman of the Parliamentary Committee, entered and took the chair amid applause. He was accompanied to the platform by the members of the committee, including Mr. Broadhurst, M.P., and Mr. Crawford, M.P. Mr. Fenwick, M.P.; Mr. John Wilson, ex-M.P.; and Mr. John Burnett, of the Board of Trade, were also present.

The Chairman, in his opening remarks, said that the Congress was more largely representative than any one that had ever preceded it. Up to that moment 210 delegates had been duly accredited to the Congress.

The officers for the Congress were then elected as follows:—President, R. D. B. Ritchie, secretary of the Dundee and District United Trades Council; Vice-President, Mr. Henry Tait, Glasgow; secretary, Mr. Robert Bruce, Dundee; tellers, Messrs. T. Corbett, Nottingham, and Mr. M. Arrandale, Manchester; treasurer, Mr. H. Slater, Manchester; auditors, Messrs. W. H. Lambton, Durham, and J. T. Morrison, London.

Mr. Ritchie, the President of the Congress, having taken the chair, Mr. Broadhurst, M.P., rose to present the Parliamentary Committee's report. The report stated that the legislative events of the year, so far as they related to labour, had not been remarkable. Perhaps the chief subject of interest was still the Employers' Liability Bill. They would remember that at the time of last Congress the Government Bill was before the House of Commons for further consideration at the autumn session. The decision of Congress upon the measure, which was further strengthened by the great deputation of the trades that waited upon the Home Secretary and other members of the Government in November, led to an adverse motion against the Bill being moved by the Parliamentary Secretary in the House of Commons. Although that motion was defeated in numbers, yet its moral effect was so strong that the Bill was with-

drawn, and had not been re-introduced. It was pardonable that some of the friends of labour should doubt the policy thus pursued; but the mind of the committee was perfectly clear as to its wisdom and ultimate value to the labouring classes. So far as the committee had been able to gather, it was the almost unanimous opinion of the great friendly societies that clause 3 of the Bill was fraught with great danger to their organisations; and at a meeting of these bodies held in London in the early part of the year, representing about two millions of members and about fourteen millions sterling in funds, the clause was severely condemned. That of itself formed a sufficient indictment against the injurious proposals. If the Government were now reconsidering the whole subject with a view to meeting the wishes of those chiefly concerned, the committee would not be disposed to be too critical as to the delay in the further consideration of the measure. The committee were pleased to be able to announce the passing of a Railway Regulation Bill, compelling all companies to adopt the block system, and to fit all passenger trains with continuous brakes. The report next dealt with the Cotton Cloth Factories Bill, in regard to which it is stated that for some years past the weavers of North-East Lancashire had complained of the pernicious system of adulterating cotton yarns, previous to being woven into cloth, which had necessitated the infusion of a considerable quantity of moisture into the atmosphere of the sheds in which the weavers work, to make the stiff, oversized yarns workable. This system had been carried on to such an extent that it had brought on the employed serious bodily ailments, sacrificing in many instances not only the permanent health but the lives of the operatives. With a view to remedying that state of things, the Congress last year instructed the committee to bring the matter before Parliament. The committee gave the question its fullest consideration, and agreed to leave the details of the measure in the hands of the representatives of the cotton operatives, with the result that a joint committee of seven M.P.'s and seven operatives was appointed to draft a Bill, which was read a first time on June 27, and the third time on August 14, a rate of progress without a precedent in the history of labour legislation. It was then sent to the Lords, who got through the Bill in quick time, and it received the Royal assent a few days ago. Although, owing to the opposition of employers, the measure was not quite all the committee should have liked, it was fairly satisfactory, as, in addition to limiting artificial moisture, there were clauses making

proper ventilation imperative. The report next alluded to the Merchandise Marks Act Amendment Bill, introduced by Mr. Broadhurst; the Quarries Regulation Bill, the prospect of getting which passed was very remote, as the Government were strongly opposed to it; Mr. Baumann's Bill to give additional powers to inspectors of factories and workshops; the Enginemens' Certificate Bill, to be introduced next session; the Mining Royalties Commission; the London International Congress; and the International Labour Convention. The concluding portion of the report contained the following words:—We congratulate the Unions on the general improvement of trade throughout the United Kingdom, and are glad to know that the workers in some branches of industry have, by the aid of combination, succeeded in taking a share of the increased prosperity. We heartily hope that this tendency will continue and increase, but without strong unions this can only take place to a limited degree. This point raises anew the question of trade combination and its value or otherwise. If trade unions have failed, as some wish it to be believed, then they should be abolished, their membership scattered, their forces disbanded, and in the wilderness of chaos the workers should commence anew the search for the best means of protection and aid. If, on the contrary, as we believe to be the case, Trade Unionism has been enormously successful, and has placed the workers of this country in a superior position to that enjoyed by the workers of any Continental country where Unionism has never existed in any practical form; if it has raised the whole status of labour by making it a power and an influence in many of the affairs of State by giving it representatives in departments of the Government, as well as in Courts of Summary Jurisdiction; if mainly by its aid labour has found its way in a representative capacity into all parts of our local government system and educational institutions, then we unhesitatingly declare that he who seeks to sow dissensions in our ranks, by spreading false reports and by appealing to passions and prejudices, is an enemy to the cause of labour.

The balance-sheet of the Parliamentary Committee for the year shows a total charge of 1,054*l.* 4*s.* 8*d.*, including a balance of 160*l.* 2*s.* 11*d.* from the Bradford Congress, 637*l.* 2*s.* 2*d.* of subscriptions, and 140*l.* from delegates' fees. The expenditure amounted to 997*l.* 11*s.* 5*d.*, leaving a balance to the good of 54*l.* 13*s.* 2*d.*

The discussion of the Parliamentary Committee's report was adjourned.

In the afternoon the delegates enjoyed an





The Denver Club, Denver, Colorado.—Messrs. Varian & Sterner, Architects.

excursion on the Tay, and in the evening they were entertained to supper in the Kinnaird Hall.

On Tuesday, Mr. Ritchie, the President of the Congress, delivered his inaugural address. He said that in his opinion the present Congress would mark an epoch of importance in the history of Trades Unionism, if, indeed, it did not lead to a very large extension of its scope and aims. All who had devoted any attention to the industrial problem were quite cognizant of the fact that a spirit of discontent was steadily permeating the wage-earning classes. Political faddists had not been slow to take advantage of this, and had endeavoured to turn it to account to discredit the influence of Trades Unionism, which they found unfavourable to the propagation of their impracticable and Utopian schemes. It was, therefore, incumbent upon the society to consider and ascertain, if possible, the cause of the discontent and dissatisfaction with the existing state of things, and to suggest a remedy, in order that the solidarity of the labour party might be maintained. The chief causes of the discontent might, in his opinion, be attributed to insufficient and uncertain employment, the unequal distribution of the fruits of labour between the labourer and the capitalist, and the ever-increasing difficulty which the intelligent wage-earner experienced in attaining a competency. The misery which sprang from the first of these evils was incalculable. With regard to the remedies, limitation of the maximum day's work to eight hours by Parliamentary enactment was the most generally approved method by which it was proposed to provide employment for the surplus labour of the country, but in future legislation must be more comprehensive than in the past, embracing, as nearly as could be, all classes of wage-earners. No one would assume that the enactment of an eight hours' day would be a permanent adjustment of the social machine, but it was a step in the right direction. He hailed with the liveliest satisfaction the advance which had been made towards free education, and to a more perfect system of technical education. They must trust in great measure in education to enable them to keep abreast of other nations. What he hoped, and thought worth striving for, was that unionism should now begin to demand a larger share in the moulding of the national life. Wherever there was corporate existence, there let unionism make its voice heard and respected. He trusted that their deliberations

at the congress might tend to bring capital and labour into closer harmony with each other, and to hasten the time when each should occupy its true place in the social economy, when their interests would be found to be identical, and when the good of all should be the aim of both.

#### THE DENVER CLUB, DENVER, COLORADO.

THIS club-house was built from the designs of Messrs. Varian & Sterner, architects, of Denver, Colorado.

It is built in grey and brown sandstone, with a tiled roof. The interior is finished in hard woods, the walls covered with stamped leather, and in parts finished with "combed work,"—a phrase which we presume refers to a method of plaster finish.

#### CONCRETE FLOORS.

SIR.—Those who have the interest of sound building at heart are much indebted to Mr. Caws for his valuable articles on "Concrete Floors," and for the letter thereby elicited from such a pioneer on the subject as Mr. Potter.

Having for the last ten years, wherever it was possible for me to do so, used concrete floors and staircases in buildings of every kind, I am satisfied that no difficulty, except that of cost, exists in building domestic houses in such a way as to be practically fireproof.

The essentials are that the floors, staircases, lintels to the windows, and the roofs shall be of materials that will resist any fire that can possibly be established within the building.

As to the cost, I have before me the tenders for the erection of a parsonage house amounting altogether to 2,162*l.*; the house is in the country, and is about three miles from a railway station. The difference in cost of concrete floors and iron joists against single-joisted combustible floors was 42*l.* 6*s.*, in this instance the small iron joists were spaced 2 ft. apart.

It appears to me that economy is to be effected in two or three ways; in the ironwork, as pointed out by Mr. Caws, in the centering, and probably in the cement itself.

Mr. Caws might have strengthened his argument as to the unnecessary use of iron by referring to concrete floors still existing in Rome. I will only refer to one quoted by Mr. Middleton ("Ancient Rome, 1885"), who states that the whole of one of the upper floors of

the Atrium Vestæ consisted simply of a great slab of concrete 14 in. thick and about 20 ft. in span, merely supported at its edges by travertine corbels, there being no intermediate support whatever.

As to centering, it appears to me that if wood centering is to remain up for five weeks, it would stop all progress in the building of an ordinary dwelling-house for that time, and would militate against the adoption of concrete floors; but is that necessary? At Cannes, for instance, brick floors are formed which set in a day. And, if we refer again to Roman construction in concrete, we find that in it one of the first considerations was to economise all temporary aids. The evidence appears to me conclusive that in walls and arches erected by the Romans, they used cement of quick setting powers, which enabled them to build a skin, or case, or centre sufficiently stable to carry the core of the wall or arch until it set and was able to do its own work. I think we still have something to learn from them.

As to the cement itself, it appears to me that some form of gypsum or sulphate of lime, which has been used for centuries for floors wherever gypsum is to be found, is better adapted for this and all internal uses than Portland cement or carbonate of lime; and in its improved form of Robinson's fire-proof cement, I have found it an excellent material. It is more thoroughly fireproof, more sound-proof, and requires considerably less water and sooner attains its ultimate strength than Portland cement.

This, however, may be tested by any one for himself.

With it I have formed all the floors in a large mill I have just erected, covering an area of half an acre, in which all the centres were struck within three days.

I think, however, that to economise in concrete floors, wood centering, which has many disadvantages, should, to a great extent, be dispensed with.

The concrete, when soft, might be carried on slabs of fibrous plaster, which, when set, would unite with them, and they would become an integral part of the construction.

The skeleton to carry wood staircases can easily be formed in concrete, and by using rolled-iron purlins 6 ft. apart or thereabouts, roofs may be similarly formed with concrete, finished in breeze, so that no laths are required, and the slates are nailed directly into the concrete.



The question of new buildings is a very important one, but of almost equal importance is the question of how to render an old house constructed with wooden floors safe from fire. I find that if sufficient of the flooring-boards are taken up, and the ceiling sound, a layer of Robinson's cement, 3 in. in thickness, may be laid over it without injury or damage to the ceiling itself; and by inserting skew-backs beforehand, this forms a basis on which any further concrete, if need be, may be carried. The beams or joists above it may be plastered with this cement, which adheres to wood, and thus the floor be rendered secure from fire.

Having in this letter had occasion to refer to Robinson's fireproof cement, I think it only right to add that I am a director of the company who manufacture it.

My object in writing this letter is not, however, to advocate the use of a special material for concrete floors, but to give my testimony to the advantages of concrete floors over those of wood.

CHARLES J. FERGUSON.

Carlisle, Aug. 28, 1889.

SIR,—I am sorry to differ from Mr. Hyatt, after his very kind reference to my contribution; but he appears to have missed the point of the passage which he quotes from my letter. The point was, not that the absence of shelliness in the fractures is a surprising fact (far from it); but that if horizontal cleavage were the cause of fracture, the presence of shelliness would prove it, and that therefore the absence of shelliness disproves it.

If Mr. Potter will fill a bottle with cement concrete, he will find that, in setting, it will break the bottle; proving that concrete expands. He will also subsequently find the concrete loose in the broken bottle, proving that contraction succeeds expansion. The experiment should be made with hot cement. But cool cement likewise expands, and contracts, though in less degree.

I should not have expected the expansion and contraction of the large slab Mr. Potter speaks of to visibly affect a brick-wall, as brickwork possesses considerable elasticity; take, for example, a factory chimney swaying in a storm like a poplar. And the inertia of a mass of flooring, 100 ft. long, would prevent expansion from so greatly extending its length as to throw end walls out of plumb.

But I can point to two cases in my own experience where the expansion of the concrete floor opened and slightly dislocated the joints of heavy stone cornices and string-bands; and in those same cases this expansion was followed by a degree of contraction.

I have for years proceeded on the plan recommended by Mr. Potter, *i.e.*, laying the floors first over the walls, and then building the walls higher upon the floors. I am at present doing a very extensive set of fireproof floors this way. It is undoubtedly the best method. But it is not always practicable. I have tried the other method of building the walls first, and putting the floors in afterwards. Where corbelled ledges could not well be formed in the walls for the floor edges to rest upon, I have built courses of brick in dry sand when the walls were carried up, and removed them piecemeal afterwards, as fast as required (and no faster), to insert the edges of the concrete flooring. I do not like this method, but it has its advantages sometimes. I have never known any mischief arise from it, but great care is needed in its exercise. The horizontal chases so formed should never be more than half-brick deep in recess, should never occur in a wall less than a brick and a half thick, and should not be continuous for lengths of more than, say, ten feet without intervention of solid piers. I repeat I dislike such horizontal chases, and I shun them, but they are sometimes unavoidable, and must then be used with great judgment and caution.

Mr. Potter's remarks on the three-layer system are a little crude. The top and bottom layers, instead of being held "with little connexion or bond" to the middle layer, are practically homogeneous with it, by virtue of the great tenacity of the cement,—always provided that good material is used, and that not too much time is lost between layers. The homogeneity of floors thus cast in layers is much greater than that of girder flanges composed of several thin plates of iron rivetted together, and which we find so excellent in practice.

In passing to and fro under centreing dripping from the concrete being cast above I have

enjoyed (1) too much experience in the shape of damage to hats and coats to accept without reserve the "perfectly colourless" theory of Mr. Potter, though it is true under certain scientific conditions which do not perfectly obtain in practice. Moreover, such dripping streams descend through the concrete with velocity, due to direct gravitation. But when the centreing is made watertight, the "gentle impingement" (as Mr. Potter very properly terms it) of concrete in course of setting is an extremely slow process, and any fluid reactions, or *pervasions*, due to such gentle impingement are correspondingly gentle and slow, and are not streams possessing appreciable velocity.

But the best answer I can give Mr. Potter's objections to waterproof centreings is to invite him to try them practically, as I have done, for he will in this way prove, as I have proved, the great superiority of the method. After my special experience of waterproof centreing, I would never willingly return to the non-waterproof method. This is a matter on which an ounce of practice is worth a ton of argument.

With regard to winter and summer work, I know one old and famous firm of cement paviors who refuse to accept orders for outside work in the winter. Their rule is, "Not after October." That firm once did a small floor for me, partially under cover, in November, and a severe frost on the night following its completion utterly spoilt their work, turned it soft, like mud, in parts, and it had to be done all over again. I am not prejudiced against winter work. The most important and extensive set of warehouse slab-floors I have yet done were many of them cast in the depths of winter. No harm came of it. But I much prefer for concrete work damp, mild weather, to either cold dry or hot dry. Humidity of atmosphere favours slow setting. No man in his sober senses would seriously propose to mix cement concrete with freezing water. As to straw and sacks for covering, they are very useful. But such frosts as sometimes turn the soil to iron, even spade deep, will not be baffled by straw and sack covers, and the wind often strips them off in spite of every care and precaution, and frost and tempest often work together. I have found the worst expansion cracks in slabs which during setting were exposed to the sun by day and the frost by night. Equality of temperature during setting is a great desideratum, not so obtainable in winter as in mild, humid weather.

FRANK CAWS.

SIR,—I was glad to see in your issue of Aug. 24 (p. 141), a letter from Mr. Frank Caws, admitting that terra-cotta is a more fireproof material than cement concrete. He is, however, mistaken about the cost of the system of construction described by me, and evidently cannot understand how it is possible to manufacture a permanent centering of terra-cotta or fire-clay, and fix it, at a price very little in advance of ordinary concrete. When I explain that this permanent centering not only saves wood centering, but also half the concrete, and that the simple process of manufacturing and fixing enables it to be done at about half the price of terra-cotta blocks, he will see the possibility of its use even for the commonest buildings. The advantages of the permanent over the removable centering is apparent to any one, for, with this system, the ceilings would be plastered, and the entire building nearly finished out in most cases while Mr. Caws was waiting for five weeks to expire before removing wood centering; as the concrete is not so great in bulk, the moisture dries out more rapidly, and the dead-weight of the floor is considerably reduced.

In ordinary dwelling houses, if concrete floors were substituted for wood, the saving in joists, lathing, and plaster (one coat) would not exceed 2s. 6d. per yard. Can Mr. Caws put in his cement concrete slabs (with or without iron) for that? I have a somewhat extended experience of Portland cement concrete in floors, and find that when gauged 4 to 1 and 6 in. thick, it costs with centering 4s. 6d. to 5s. per yard (without any iron), and then has to be done in fairly large quantities; if done as specified by Mr. Caws, it would cost considerably more.

I am glad to find Mr. Hyatt agreeing with me regarding the risk with concrete work in large slabs, and I, too, am touched in a tender spot by Mr. Potter's remarks, for my experiments and studies were originally those of an architect who had a desire to substitute for the fire-resisting systems in use a system that would be as nearly as possible fire proof.

MARK FAWCETT.

SIR,—It was with great pleasure that I read the two articles by Mr. Caws on concrete flooring, as the subject is one that is not yet fully understood. There is, however, one important statement,—

perhaps the most important statement in the whole essay,—which does not seem to me to be true; I mean this,—"the strength of slabs is inverse to their breadth or diameter, and is as the square of their thickness." At first, I considered it to be a printer's error, and was pleased to find that Mr. Caws's attention was drawn to the statement by "Architect," in your issue of August 17. To my surprise Mr. Caws declared the rule to be correct.

Professor Unwin, in his "Elements of Machine Design," gives the following rule for finding the strength of flat-iron plates:—"A square plate of  $s$  inches in length of side, thickness  $t$ , is encasté at the edge, and loaded uniformly with  $p$  lbs. per square inch. The greatest stress is

$$f = \frac{1}{2} \frac{s^2}{t^2} p."$$

I am quite aware that there is a considerable difference in the behaviour of iron and concrete, but the rule will hold good for the one material as for the other, with the exception that a different constant must be used for each material. Now apply this rule to the two examples adopted by Mr. Caws, namely:

(1) 1 ft. by 1 ft. by 1 in. carrying 400 lbs. per square foot.

(2) 10 ft. by 10 ft. by 1 in. carrying 40 lbs. per square foot.

We get the following results:—

$$(1) f = \frac{1}{2} \frac{12 \times 12}{1 \times 1} 400 = 14,400.$$

$$(2) f = \frac{1}{2} \frac{120 \times 120}{1 \times 1} 40 = 144,000.$$

That is to say, the stress in example (2) is ten times as great as that in example (1), whereas the stress ought to be the same in the two cases.

It seems, therefore, that the rule ought to read, "the strength of slabs [per square foot] is inverse to the square of their breadth, &c.," or, briefly, "the strength of any square slabs per square foot is as the square of their thickness, and inversely as their area." In other words, all square slabs, of whatever area, if of the same thickness, will carry the same distributed load. This sounds strange, but it may be true.

Will Mr. Caws, or some other reader, kindly state the rule for finding the proportion between central and distributed loads on square encasté slabs?

It may be interesting to your readers to know the relative strength of rectangular plates, as stated by Professor Unwin. Mr. Caws does not give any rule for it; but there is no doubt that in practice more oblong floors will be required than square ones. The rule is as follows:—

"A rectangular plate of thickness  $t$ , length  $l$ , and breadth  $b$ , is encasté at the edge, and loaded uniformly with  $p$  lbs. per square inch. The greatest stress is

$$f = \frac{1}{2} \frac{l^2}{b^2} \frac{1}{t^2} p."$$

GEORGE L. SUTCLIFFE.

September 3, 1889.

#### ST. MICHAEL'S CHURCH TOWER, COVENTRY.

SIR,—In connexion with the special point in the present discussion concerning the tower of the above church, I am not aware whether any mention has been made of the opinions of the architect who was originally consulted on the subject of its restoration, and with which, owing to circumstances, I happen to have become well acquainted, as follows:

It was in the year 1852 that the late Sir Gilbert (then Mr.) Scott was commissioned by the Coventry authorities to have accurate measurements taken of the whole of the above fabric, and to furnish a series of drawings, to scale, for its proposed restoration. In order practically to assist him in that matter, he selected the writer of this communication, who was then one of the staff in his office, and who, accordingly, undertook the work. While so engaged, upon one occasion when Sir Gilbert visited the church, our conversation turned upon the characteristics of the tower, and the unusual slender-ness of its angle buttresses,—their projection above the plinth being only 5 ft., while their height, including the pinnacles, is very nearly 170 ft. He considered, however, that these buttresses must have been deliberately so planned from the first, inasmuch as the gradation in their successive stages was uniform and symmetrical, as was as that of their set-offs. He never failed to state his high admiration of the whole design and composition as a specimen of its particular style, and, consequently, his desire to restore the whole in its integrity. With this object, therefore, the drawings already referred to were prepared. The beautiful interior of the tower, with its cusp-pinnated walls, and its groined ceiling rising to a height of 96 ft. from the floor, he said that he should certainly advise to be exposed again wholly to view. I cannot say what he might eventually have recommended with regard to the bells, but when he restored the adjoining church of the Holy Trinity there was a somewhat similar case, to meet which he erected a detached belfry in the churchyard.



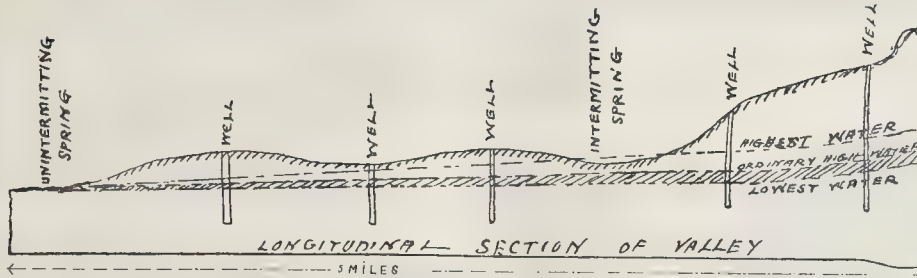


Diagram illustrating Mr. Santo Crimp's Letter on Water-Supply.

At the express wish of Sir Gilbert I made larger drawings ( $\frac{1}{4}$ -in. scale), showing completely the tower and spire by elevation, section, and plans at its various levels.—at length, fortunately, taken in hand.—Mr. J. O. Scott told me that these drawings, with my supplementary sketches, had proved an invaluable help, inasmuch as nearly the whole of the enriched surfaces, the design of which thirty-seven years ago could be satisfactorily ascertained (though often with no little difficulty), had since that time utterly perished. I wish now to record my belief that these drawings, so made, may be thoroughly relied on for their careful measurements and correct details, ample time having been devoted to the purpose, and the aid of excellent scaffolding, with other appliances, wherever and whenever required, having been freely provided. I may, perhaps, add that a very good view of this tower and spire is given as one of the plates in Wickes's "Towers and Spires," the drawing for which I had, at his request, previously revised. J. DRAYTON WYATT.

#### WATER SUPPLY: "THE STUDENT'S COLUMN."

SIR.—Having for a considerable period of time during the years 1876-8 been engaged upon a hydrogeological survey of a great part of Surrey, I should be glad to be allowed to offer a few criticisms upon that part of the chapter in your issue for Aug. 24 which refers to intermittent springs,—which are generally known in chalk districts as "bournes," more especially as my observations were particularly directed to a solution of this interesting problem.

I think it could be demonstrated that the reservoir and syphon theory is untenable, but I will merely point to the fact that chalk is an exceedingly porous rock, and as such, a syphon merely cut in it by the action of water could not possibly work.

In order to make the matter as clear as possible in a brief letter, I append a typical section of part of the area examined by me in the years named above.

A series of wells existing in a valley were first found, and the levels of their mouths were reduced to Ordnance datum. Then, the water-line, or line of saturation, was constantly observed, and its position, at intervals of about a month, was plotted upon a diagram. It was found that the position of this line varied with the seasons and with the rainfall. Approximately, its range of vertical movement is shown upon the section, the shaded portion representing the ordinary yearly range; but it happens that, at uncertain intervals, the rainfall differs exceedingly from the average, and when an excess of rain falls during those periods of the year when evaporation is not active, it is more than likely that a "bourne" flow will be observed during the summer or spring, or summer, the water-line being raised to an abnormal height, as shown upon the section, and the springs making their appearance at low portions of the valley. The actual date of the appearance of these "bournes" may be foretold some weeks in advance by carefully observing the water-level in wells in the neighbourhood, and I remember, upon one occasion, I told the owner of a well that the "bourne" would appear in sixteen days from then, which actually came to pass. Mr. Baldwin Latham, for whom I made the observations, and who has devoted an immense amount of time to the subject, can with certainty predict the appearance of these "bournes," or intermittent springs.

W. SANTO CRIMP,  
Assoc.-Mem. Inst. C.E., F.G.S.  
Wimbledon, Aug. 26, 1889.

\*\* The explanation we gave is that which has been accepted for many years, and seems to us to satisfy the facts; at the same time, the solution of the difficulty as suggested in the above interesting communication is also perfectly rational. Like many other obscure points, the phenomena accompanying "bournes" are capable of more than one explanation.

#### "RELATIVE STRENGTH OF AMERICAN WOODS."

SIR.—On page 135 of your issue for Aug. 24 is a paragraph on the "Relative Strength of American Woods." What wood is the "fir of Washington" therein referred to? Is it of the species *pinus* or *abies*, or, in other words, is it a pine or a spruce? What is its exact botanical name? Unfortunately, the nomenclature of timber is so muddled and confused that information intended to be conveyed is lost. To take an example from Baltic timber, the *Pinus sylvestris* of the botanist is vulgarly known as the "Scotch fir." It is a pine. In the balk it is known as "fir," when converted the timber merchant calls it "red deal," but the carpenter says it is "yellow deal," whilst by the entirely uninitiated it is variously named "deal," "fir," or "pine," and, sometimes, "Baltic yellow pine," to distinguish it from American yellow pine.

Personally, I have never heard the term "fir" applied to any American wood. W.

\*\* The confusion as to the nomenclature of timber probably also exists in America; but we may state that the Washington fir referred to is described as "yellow fir." No botanical name is given by our source of information.—Ed.

#### The Student's Column.

##### WATER-SUPPLY.—X.

QUALITIES OF WATER (continued).

WE will now briefly deal with the biological examination of water. It has been hinted, during the discussion of the chemical side of the argument, that zymotic diseases are produced, not by sewage and other animal contamination in water, but by the introduction into the system, and reproduction there, of exceedingly minute lowly organisms found in association with that contamination, some of which are of a deadly character. This is conceded on all sides,—it is common ground. These micro-organisms (bacteria, &c.) reproduce in water at an enormous rate, providing they can find food enough, such as sewage, &c., to support themselves; if the water be absolutely pure, it is impossible for them to flourish in it. From this it is evident that the less the number of bacteria in water, the less organic matter it contains.

To give some idea of their prolific reproduction, we may mention that Dr. Cohn, of Breslau, has stated that one single bacterium would be sufficient to convert the whole ocean into a solid mass by its progeny in less than five days, supposing only a sufficiency of food. Their tenacity of life is truly astonishing, also. Dr. Frankland, referring to some experiments made upon the subject, says "The bacteria were exceedingly lively under an atmosphere of pure oxygen; that they enjoyed themselves apparently equally well in an atmosphere of carbonic acid; and they were quite lively in nitrogen; that they did not look much depressed in sulphurous acid; that they got a little dull when put under cyanogen, but in a few days recovered even from that, and became nearly as lively as ever; but when they were brought into contact with a solution of carbolic acid of a certain strength, they immediately ceased to move and live. The same effect was also produced by spongy iron; by a short contact with that substance the bacteria became lifeless forms." The bacteria experimented upon were those developed in putrefaction, and were not capable of communicating disease to man; but inasmuch as all the known forms of bacteria behave much in the same way under such agents as spongy iron, sulphurous acid, and carbolic acid, it is probable, says the same authority, that harmful bacteria are also destroyed by the same agents.

The minute organisms are determined by the aid of the microscope, and the method largely adopted in examining water by this means is known as Koch's gelatine process. The method employed by some experimenters is shortly as follows:—The original spores of the micro-organisms being invisible, specimens of the water are examined after these have been cultivated in gelatine melted and mixed with the water, and placed in a special chamber where the air is saturated with moisture. After a few days, centres of activity, or "colonies," are developed in it, which can be counted by the aid of a magnifying glass. Mr. A. Wynter Blyth, who has paid much attention to the subject, analysed, month by month, the water of the West Middlesex and Grand Junction Water Companies, and he ascertained that the colonies per drop varied from three in November to seven in May, and as many as forty-five in July. This is much purer than the water supplied to the City of Berlin, in which 140 micro-organisms are found in the drop in October, and thirty in February. He believes that good water should not contain more than forty micro-organisms per drop, when cultivated within twenty-four hours after collection. We shall refer to the value of this conclusion presently.

It will be gathered from what has already been said, that the micro-organisms in water are broadly of two kinds, one of which is of a dangerous nature, the other harmless. But there is considerable difficulty in discriminating the difference between the two. It is claimed that certain species can be recognised which have been proved to have been instrumental in producing, if they have not been the actual cause of, certain forms of disease. The science, however, is in such an elementary state at present, that but exceedingly few of these dangerous organisms can with certainty be identified. Indeed, Dr. G. Bischof, in a communication to the Royal Society last year, concludes that "no bacteriological water-test can satisfy the demands of hygiene unless it is qualitative, distinguishing between harmless and pathogenic microphytes. No such test is at present known." This sufficiently gives the present position of affairs, though we think some reserves might have been made. There can be no doubt that whole colonies of bacteria might exist in water which would still be wholesome, unless it could be shown that they were of the particular kinds capable of producing disease. On the other hand, a single colony of the dangerous kinds, or even a few individuals, would expose the drinker to infection, and if it were always possible to detect this latter with certainty, the quality of drinking water in regard to organic contamination might be foretold almost with mathematical exactitude. Every day brings fresh discoveries on this head, and the time is not far distant when the question will be entirely resolved.

In the meantime, we may point out that the results of the experiments are often liable to be inaccurate, by reason of the peculiar circumstances surrounding the examination of the samples of water submitted. Water is not the only medium containing the micro-organisms; they exist also in large numbers in the air, their germs being so infinitesimal, and so easy of





Stables, Wentworth Hall, Jackson, N.H.—Mr. W. A. Bates, Architect.

translation from place to place, as to find their way almost everywhere. Even whilst the analyst is dealing with the sample, it may, and frequently does, become altered in nature by the addition of showers of these small germs falling into it from the air in his laboratory. Professor Tyndall found that in passing through his laboratory in Albemarle-street, which was infected with germs derived from old hay, to a shed on the roof where he was conducting some experiments on these lowly creatures, that he carried some of these germs with him, and so infected the laboratory above also. If the operator is not extremely careful, therefore, his results may not only indicate the kind of organisms found in the sample of water he is analysing, but also those of the atmosphere in his laboratory, an element entirely foreign to the nature of the enquiry.

From this it is easy to understand that zymotic diseases may be contracted by the public through drinking water which, when delivered to them, was comparatively pure, but has become contaminated by reason of the presence of these deleterious germs in the insalubrious atmosphere of their own homes. The water in their houses may also be rendered exceedingly unwholesome through domestic carelessness. Unquestionably the greatest sinners in this respect are those people, both in high and low stations of life, who, from various causes, keep their cisterns in a filthy condition, and we are of opinion that what few zymotic diseases have within the past few years been suspected to be due to water contamination in the metropolis, have in a great measure been caused by gross, inexcusable negligence on the part of consumers in not attending to the state of their cisterns and water receptacles in general, rather than to the quality of the water as delivered to them by the water companies.

We have now come to the conclusion of the argument, and it may be useful before giving our decision, to sum up both the chemical and biological evidence. We have seen that in the present condition of science it is not possible to state precisely the hygienic meaning of all the parts of a chemical water-analysis; considerable doubt exists as to the interpretation to be placed on almost every part of it connected with the detection of organic pollution, and especially in regard to previous sewage contamination. But it may fairly be conceded that unoxidised organic matter can be quantitatively recognised, and although the subdivision of the organic carbon into animal and vegetable cannot with certainty be effected, and the result is thereby prejudiced in a certain degree, yet we must remember that practically the whole is a pollution, and in many cases there are strong reasons for believing that it is due to sewage contamination. Professor Wanklyn's remark on albuminoid ammonia also must not be disregarded; whilst the chlorine often affords collateral evidence of bad quality.

The bacteriological side of the argument, in the present condition of micro-biological science,

does not point to anything very definite. It certainly proves the existence of micro-organisms in water, but it is not capable of distinguishing those which are deleterious to health, and those which are not, except (it is claimed) in a few instances. When the connexion of specific organisms shall be definitely traced to certain diseases, and the microscope can indicate these organisms with absolute certainty in water, then, we repeat, the bacteriological test will be able to gauge the quality of drinking water to a nicety; and, seeing the rapid strides made in that direction almost every day, we may confidently assert that in the immediate future chemical analysis in regard to organic contamination will most assuredly be supplanted by biological examination. A new condition of things must obtain.

Our advice to the student, then, is still to adhere to the chemical analysis in so far as it deals with mineral and present organic contamination. It is not always quite so clear in its meaning as could be desired, but, rightly understood, it is at present the best available guide to the quality of drinking-water.

#### STABLES, WENTWORTH HALL, JACKSON, N.H.

THESE stables are an example of modern American stable architecture in connexion with a large private residence. The exterior is entirely finished with shingles stained. The architect is Mr. W. A. Bates, of New York.

#### Books.

*Electric Bells, and all about them. A Practical Book for Practical Men.* By S. R. BORTONE. (London: Whittaker & Co. 1889.)

THE "Preliminary Considerations" with which this little book opens, will puzzle those who are endeavouring, for the first time, to understand the mysteries of electrical science, while they cannot fail to amuse others who have already mastered the elements of the subject from some reliable text-book, written by a man who understands what he is talking about. We learn, for instance, that "electricity appears to depend, in its manifestations, upon some motion (whether rotary, oscillatory, or undulatory, it is not known) of the atoms themselves;" after this remarkable introduction there is given an account of the inevitable experiments with a piece of ebonite and suspended pith-balls, of which the precise relationship to electric bells is not made clear. The action of a simple cell follows, the old confusion between negative elements and positive poles being maintained; in connexion with the explanations afforded there appears the following note:—"From some recent investigations, it would appear that what we usually term the negative is

really the point at which the undulation takes its rise," a statement that will at least offer the young beginner food for thought. On page 14 is shown what purposes to be the magnetic field mapped out by iron filings around a horse-shoe and a bar magnet; if any of Mr. Bortone's readers try the experiment for a bar magnet, they will be rather surprised on comparing the result so obtained with the illustration given.

The next chapter, "On the Choice of Batteries for Electric Bell Work," is marred, at the commencement, by further scientific attempts on the part of the author. What excuse can be made for such a statement as this, "Nitric acid consisting of 1 nitrogen atom, 6 oxygen atoms, and 1 hydrogen atom"? This is no printer's error, for at once follows the formula,  $\text{HNO}_3$ ; surely the writer might take the precaution of consulting some one of the many little text-books on chemistry now published, before stating wrongly the composition of one of the commonest acids of commerce. At this point, any further struggles with elementary science are fortunately abandoned, and the instructions are for the construction and management of cells, suitable for electric bell work, are thoroughly practical and well expressed.

The sections "On Electric Bells and other Signalling Appliances" are conceived and written in the author's happiest vein. He very truly states, "In order that the electric bell-fitter may have an intelligent conception of his work, he should make a small electric-bell himself." The next forty-eight pages are devoted to very clear explanations, the value of which is greatly enhanced by a sufficient number of well-drawn figures, "How to Make a Bell." The trembling, single-stroke, and continuous bell are all dealt with, and a choice of constructions given, attention being also called to less common forms, which possess certain novel features, for which special advantages are claimed. The next chapter is "On Contacts, Pushes, Switches, Keys, Alarms, and Relays." Owing to the greater number of devices dealt with, the details are necessarily given less fully than in the preceding chapter, but, with the aid of the cuts, no difficulty should arise in understanding either the action or construction of the apparatus described.

The final pages are "On Wiring, Connecting-up, and Localising Faults." In view of the fact that nearly all the failures, which bring electric bells into disrepute, are due exclusively to inferior wire, which develops faults, perhaps in a few months, in places frequently next to impossible to get at, we wish the author had written more strongly on this point than he has done, and had stated specifically what wire, in his experience, stands the test of time. The competition in the electric bell trade is so keen that even the best firms often use wire of very inferior quality, unless otherwise instructed; and if the author, in a future edition, would definitely specify the insulation to be used, or name some of the standard wires made by reliable firms, he might save many of his readers



from ultimate failure and disappointment. A number of diagrams are given, showing how connections are to be made for using electric bells in all sorts of ways, and in every case full explanations and valuable hints are given.

The closing sections, on localising faults, are eminently practical, though, of course, no methods are given beyond such as can be carried out with a few Leclanché cells and a detector. The author very justly observes:—"When the fitter is called to localise defects which may have occurred in an installation which has been put up some time, before proceeding to work let him ask questions as to what kind of defect there is, and when and where it evinces itself." If this advice is intelligently acted upon, an immense amount of useless testing will be avoided.

So far as the practical instructions and explanations contained in Mr. Botton's book are concerned, an amateur or workman engaged in electric-bell fitting cannot fail to derive great benefit from their perusal; but the scientific matter is antiquated as to its nomenclature, and if not positively wrong, is, to say the least, misleading. For these reasons a little discretion must be used by the reader when the author is engaged in other than purely practical considerations.

*A Manual of Rules, Tables, and Data for Mechanical Engineers.* By D. K. CLARK, M.Inst.C.E. Fourth edition. 1889. Blackie & Son.

This volume furnishes a very valuable compilation of practical rules and tables collected by the author, and possesses the advantage of being based upon the most recent investigations. It furnishes an epitome of the chief fundamental principles of mechanism connected with elementary constructions, and provides useful information upon the strength of materials, labour, combustion, and fuels, heat and its applications, steam and its properties, steam-boilers, steam-engines, gas-engines, hot-air engines, air-machines, hydraulic machines, the flow of air and water, mill-gearing, friction and the resistance of machinery, &c. The subject of valve-gear is, however, only incidentally mentioned in the text, and neither the object nor use of valves is specially described.

The author quotes references, and we are glad to note that he appears to have been careful of his authorities. His references suggest reliable authorities to consult for further information. The book, which consists of 984 pages, contains 353 diagrams and 320 tabular statements, all numbered consecutively independently of the page, so as to be both easily and definitely referred to. The type is clear, and the last fourteen pages provide a comprehensive index. The work is designed to be a book of general reference for competent practitioners, and is not intended as a text-book for a beginner to learn from. None are gifted with a memory sufficiently retentive to be able to write down all the formulae which an engineer has to apply in calculation, and the next best thing to being able to do so is to know where to find the information when needed, also to understand it when so found. To those who can comply with the latter condition, Mr. Clark's book will serve to refresh the memory as and when required. The mathematical tables which are added to the volume contribute to its completeness, and render it a useful manual for reference in the office of the engineer.

*The Eiffel Tower: a description of the monument, its construction, its machinery, its object and its utility.* By GASTON TISSANDIER, Editor of *La Nature*. London: Sampson Low & Co., 1889.

This preface to this small book contains the usual exaggerated flattery which M. Eiffel's countrymen (the book is a translation from the French) seem to delight to lavish on him; but the reader is not obliged to accept this, and the practical information given as to the preparation of the foundations for the tower is of interest, and well illustrated, for a popular book, as well as other portions of the mechanism of the work, and of the lifts employed. The remarks as to the uses of the tower, at the end of the book, are mostly absurd, and have been invented after the completion of it, to give some colour of justification to what is only an enormous piece of "brag." M. Tissandier thinks "the eagerness of the crowd to visit the great monument is a sufficient reply to all the criticism that has been levelled against it." That a great many fools go up it is quite true; there is always

plenty of that kind of appreciation to be had for any new kind of folly.

We observe that Frenchmen, in writing up the Eiffel Tower, now think it necessary also to depreciate the Forth Bridge and its engineers, even to the extent of circulating positive falsehood. M. Tissandier circulates the following quotation from the *Génie Civil*:—

"It is in the setting up," says M. de Nansouty, "that the real difference of method is seen. For the Forth Bridge, the works are furnished with the plans of the fitting and with the parts referred to on the tracings; and some margin for discretion is left in their adjustment and completion. An opportunity is thus given for a certain amount of initiative, and there is need for the employment of a varied and complicated stock of tools requiring mechanical power. In the works on the Eiffel Tower there are, on the contrary, no such complications. There is not a boring or a shaping machine on the spot. The pieces reach the Tower complete in every way. Each piece is numbered, and fits on to the preceding piece with mathematical precision."

That is precisely what is done at the Forth Bridge. Every piece is completely fitted and rivetted in the shops, and the pieces numbered and marked, and then taken down and sent on to be set up on the work. We do not believe the French engineer who has circulated this mendacious statement has ever been at the Forth Bridge works at all. It is little creditable to the common-sense and judgment of French engineers to have lost their heads in this way about the Eiffel Tower; and it says little for French scientific journalism that the editor of a paper of the pretensions of *La Nature* should publish such nonsense. We can hardly imagine our corresponding English periodical, *Nature*, lending itself to this kind of thing.

*Old Houses in Wolverhampton and the neighbourhood: consisting of twenty original etchings on stone, with short description of each.* By J. R. VEALL, Architect. Published for the Authority: J. Steen & Co., Wolverhampton.

We cannot much commend the drawings in this book, which are pen-drawings lithographed, of a rather coarse style of execution; and the author makes a mistake (though not an uncommon one) on his title-page, in describing them as "etchings on stone." Etching is a system of drawing on copper, with a needle, and the term is quite wrongly applied to pen-drawing. The illustrations are, however, sufficient to record the features of the buildings, many of which are of considerable interest, more especially if it be the case, as the author tells us, that amid the changes that are being made in Wolverhampton many of these buildings are likely to be removed before long; and Mr. Veall deserves the thanks of those who are interested in old town structures for preserving a record of these. He says he has plenty of material for another similar volume, and we hope he may receive encouragement to produce it; but if so, he should aim at a more refined style of drawing.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

12,540, Skylights, Ventilators, &c. J. Mason.

According to this invention, half the hinged weathering plates are cast with the solid portion of the frame, and the other half with a suitable projection, or bead, cast with the swinging portion. In addition to these, weathering-plates with projections are used. These are plain, or have a bead in which tongues of V section are fitted. For hinged side-lights for vessels the invention is peculiarly applicable.

12,541, Apparatus for W.C. J. B. Cook.

In the apparatus which is the subject of this patent the ordinary governing valve is used, but on the top of the valve casing is fitted another corresponding casing wherein an ordinary recessed or bucket valve is fixed. A passage governed by a regulating tap passes up the walls of this casing, and one end of the passage communicates with the water-supply pipe, the other opening into the casing above the bucket valve. When the valve is closed it is in its normal position, but when the lever of the supply-valve is released the water gradually fills the bucket, and is forced to flush the closet. The valve and the actuating mechanism are both claimed as new.

14,665, Flushing W.C.'s. W. W. Cottam.

This invention consists in the utilisation of the ordinary earthenware pipes as a means of reserving water or other water for the flushing of closets without the aid of tanks or cisterns. The invention

further provides a watertight flap or valve, the upper portion left open for an overflow. By raising the top it cuts off the water completely, and forms a dam or reservoir, and by raising the body of the valve, which is done by a handle or chain, or some such mechanism, an effective flush for the closet is provided.

5,054, Apparatus for Testing Drains. T. Kemp.

According to this invention, an iron tube turned up at end so as to pass under the seal of the trap, contains within it a small glass tube, in which is a chemical having a strong odour. This glass tube is broken, and the contents flushed or forced into the drain. The small can only escape from defective parts, and thus faults are found and localised.

8,482, Flushing Tanks. J. and A. Duckett.

It is claimed that by a peculiar arrangement of syphon-tubes as part of a trap, solids are arrested, and the drain and tank periodically and automatically flushed.

9,628, Lavatory Apparatus, &c. J. W. Holland.

According to this invention a tube or rim has holes at intervals for flushing the basin around which it is fixed. Water is conducted to this rim, and finding an outlet through the said holes, striking with sufficient force against the inside of the basin to cleanse it.

##### NEW APPLICATIONS FOR PATENTS.

Aug. 19.—13,036, A. Taylor, Building up the Inside of Kilns for Burning Enamelled Bricks and Tiles.—13,046, W. Bramwell, Chimney-tops.—13,050, T. Hyatt, Pavements and Paving Machines.—13,051, J. Pierce and F. Luther, Enamelled Metallic Tesselated Plates for Floors, &c.

Aug. 20.—13,098, W. Edwards, Fastening or Fixing Ironwork to Stonework or Woodwork.—13,105, De Pennefather and M. Walker, Chimney, Ventilating, and other Cows, Heads, or Wind-guards.—13,118, A. Clark, Moulding Planes.

Aug. 21.—13,153, F. Barnett, Ventilating and Purifying Sewers, Drains, and the Interior of Buildings Automatically.—13,150, W. Crawley, Preventing Down Draught to Chimneys and Ventilating Shafts.—13,203, J. MacMahon, Composition for Preventing Decay in Wood.

Aug. 22.—13,228, J. Oates, Painters' Brushes, &c.—13,267, J. Hamilton, Circular-Saw Machines.

—13,280, J. Arnold, Disinfecting and Deodorising Sewer Gases, &c., in Soil-pipes, Drains, &c.

Aug. 23.—13,239, A. Tringrove, Window-sashes and Frames.—13,329, C. White, Water-proof and Fire-proof Material for Roofing, &c.

Aug. 24.—13,380, G. Zachmann, Door-lock.—13,383, H. Perry, Cornices for Rooms.

##### PROVISIONAL SPECIFICATIONS ACCEPTED.

8,188, L. Follansbee, Traps for Baths, Water-closets, &c.—10,212, W. Read, Painters' and Plumbers' Blow-lamp.—10,655, E. Adams, Securing Windows and Ventilation.—10,754, J. Dean, Flushing Closets with Water Waste from Sinks.—10,914, H. de Lespaul and W. Shafts, Manufacture of Concrete.—11,144, H. Johnson and T. Wilson, Air Supply Ventilators.—11,145, H. Johnson and T. Wilson, Air Inlet Ventilator for Sash Windows.—11,146, H. Johnson and T. Wilson, Exhaust Ventilators for Chimney Flues.—11,252, H. Trimby, Self Countersinking Screw for Wood.—11,355, R. Gibbs, Bricks and Blocks.—11,387, J. Pullen, Opening and Closing Casements and Fan-lights.—11,403, N. Procter and Others, Brick-making Machines.—11,943, J. Lovell, Hanging Window-sashes.—12,257, A. Illidge, Sash-fasteners.—12,459, J. Mulligan and C. Swindell, Chimney or Ventilating-caps.—12,575, S. Cosles, Door-locks and Latches.

##### COMPLETE SPECIFICATIONS ACCEPTED.

###### Open to Opposition for Two Months.

14,286, J. Ransome, Artificial Stone and Concrete Blocks.—14,327, A. Hutchinson, Construction of Bathos.—14,663, J. Rogers, Syphon Clusters for Waste-water Preventers.—14,553, G. Pankhurst, Brick, Tile, or Slab for Building.—14,990, J. Colton and J. Lambert, Glass Mosaic-work.—15,152, J. Denham, Brick-machines.—15,168, A. Bradley, Fret Saws.—15,176, L. Teale, Fire-places.—15,178, A. Robinson, Apparatus in Combination with Water-closet Preventers.—15,202, J. Shone, Sewer or Flushing Tanks.—15,203, J. Shone, Ventilation of Drains and Sewers.—15,236, J. Dewrance and B. Church, Cementing Asbestos.—16,214, J. Phelps, Eaves, Gutters of Roofs.—7,599, H. Price, Sanitary Dust-bins.—8,188, L. Follansbee, Traps for Baths, Water-closets, &c.—8,747, J. Boreford, Water-waste Preventers.—9,290, A. Elmendorf and Others, Water-closets.—10,978, W. Bartholomew, Baths.—11,444, M. Adams, Roofing Tiles, &c.—11,570, A. Boulit, Closing Devices for Keyholes and Locks.

**Margate Main Drainage.**—We are informed that the tender of Messrs. B. Cooke & Co., of Battersea, has been accepted for the execution of these works, of which Mr. Baldwin Latham, C.E., is the engineer. The contract amount is about 60,000l.



## RECENT SALES OF PROPERTY:

## ESTATE EXCHANGE REPORT.

AUG. 13.—By W. B. HALLETT (At Chelmsford).  
Chelmsford—Lower Anchor-st., "Brickfield-cottage," 17, Lower Anchor-st., f., r. 272 1/2 p.a. ... 2330  
10 to 17, Lower Anchor-st., f., r. 272 1/2 p.a. ... 920  
7, 8, 9, 5A, 5B, and 5C, Lower Anchor-st., f., r. 282 1/2 p.a. ... 960

AUG. 27.—By J. J. DEVERRELL & Co.  
Haverstock-hill—113, Mansfield-rd., u.t. 63 yrs., g.r. 26 1/2 p.a., ex. 246 ... 330

By Messrs. COBB.  
Port Victoria, Kent—Three cottages and 1/2 ac. Op. f., r. 200 p.a. ... 560  
Finsbury—"Goldington House," and 2a. 1r. 10p., f., r. 200 p.a. ... 3,300

AUG. 28.—By JONES & SON.  
West Ham—63, Upton-row, f., r. 218, 2a. p.a. ... 155  
Limehouse—35, Roper-maker's-fields, f., r. 222, 2a. p.a. ... 170

By VANDERBILT & CO.  
Regent's-park—25, Oval-rd., u.t. 55 yrs., g.r. 230, r. 245 ... 200  
Hampstead-rd.—13, Edward-st., u.t. 33 yrs., g.r. 211, r. 270 ... 600

AUG. 29.—By MOSS & JAMESON.  
Clerkenwell—21 and 22, St. John's-sq., f., r. 2170 p.a. ... 3,400

By E. STIMSON.  
Peckham—115, Asylum-rd., u.t. 57 yrs., g.r. 23, 5a. 9d., ex. 232 ... 175  
1, Shields-st., u.t. 54 yrs., g.r. 26, r. 245 p.a. ... 325  
Brixton-rd.—No. 372, u.t. 49 yrs., g.r. 213, 10s., ex. 2100 p.a., Henalok-rd., u.t. 78 yrs., g.r. 240 p.a. ... 790  
Chelsea—5, Lamont-rd., u.t. 55 yrs., g.r. 27, ex. 240 p.a. ... 300

By F. W. GLAZIER.  
Tottenham Court-rd.—The lease of 114, Whitfield-st., u.t. 20 yrs., r. 231, 2a. p.a. ... 125

By WELLS & READ.  
Upper Clapton—38, Beechholme-rd., u.t. 89 yrs., g.r. 26 1/2 p.a. ... 220

AUG. 30.—By PROTHROB & MORRIS.  
Victoria Park—107, Bishop's-rd., u.t. 54 yrs., g.r. 25 ... 330  
Stratford—51 to 55, Henalok-rd., u.t. 78 yrs., g.r. 24, 2a. 6d. ... 1,400

[Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; ex. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## Miscellaneous.

**The Purification of the Mersey: Action of the Stockport Corporation.**—The *Manchester Guardian* says that the Corporation of Stockport, at a special meeting on the 29th ult., authorised the purchase of ninety-five acres of land in the township of Cheddale as a site for works of sewage purification; and Mr. A. M. Fowler, C.E., of Manchester, received instructions to schedule the land and prepare the necessary plans with a view to an early application to the Local Government Board for a provisional order. The land is described as highly suitable for the purpose, and conveniently situated on the banks of the Mersey, a short distance from Stockport. In the event of the scheme for an extension of the borough being carried out it will be comprised within the future municipal boundary. This action of the Stockport Corporation is important, and must influence that of other municipal authorities on the Mersey watershed. It is a practical response to the appeal of the Ship Canal directors. Stockport has from the first shown a great interest in the Canal, and its Corporation seems determined to do what is practicable within its own limits to purify the streams which will become feeders to the great waterway. The Council passed a further resolution directing that notice should be sent to all the municipal and local authorities above Stockport informing them of what is being done, and requiring them likewise to take steps for dealing with their sewage before it is passed into the streams. This notification will affect Ashton, Stalybridge, and other towns and populous villages on the banks of the rivers Mersey and Tame.

**Guernsey.**—Messrs. Pepper & Boyes, of London, have just placed in St. Matthew's Church, Guernsey, a memorial window to the late Lieutenant Governor, Lieut.-General Elkington. It is a one-light window, with a figure of St. Michael.

## The Technical Education of Plumbers.

Mr. W. R. E. Coles, the Clerk of the Worshipful Company of Plumbers, sends us a copy of a circular communication (the terms of which have been approved by the Right Hon. C. T. Ritchie, the President of the Local Government Board), which is being forwarded, in accordance with Mr. Ritchie's suggestion, to the Clerks of the Boards of Guardians and Sanitary Authorities of the kingdom. The circular communicates a report of the proceedings of the highly influential and representative deputation which recently waited upon him to ask his official aid in promoting the great public movement which has been in active progress during the past five years, for advancing technical education among plumbers, and securing the National Registration of the qualified plumbers of the United Kingdom. The circular (which is signed by Mr. W. H. Bishop, the Master of the Plumbers' Company) says:—"It is unnecessary to occupy your time by referring in detail to the serious evils hitherto and now suffered by the public through defective and unsanitary plumbers' work, or in remarking upon the anomalous circumstance that while it has long been the practice to require that medical practitioners, druggists, and others dealing with matters affecting the health of the community should possess sufficient training and prove their qualification before undertaking their duties, there is not at present any corresponding safeguard to the public in respect of plumbers, upon whose efficiency the health of the public is even more largely dependent. It will suffice for the practical object of this communication to direct your attention to the fact that the whole subject has been very fully considered; and, with the approval and assistance of a large body of Municipal and Sanitary Authorities, Medical Officers of Health, architects, educationists, and publicly-elected representatives of each section of the plumbers' trade, a system has been carefully organised by which the educational status of plumbers may be elevated, and the registration of qualified men provided for throughout the United Kingdom." The circular then goes on to invite the co-operation of the public bodies to whom it is addressed. We are informed that from the response already received, the effort now put forth is likely to materially promote the object in view.

## New Town-hall at Helsingborg, Sweden.

The jury appointed to consider the designs for a new Town-hall at Helsingborg, Sweden, for which there was a large number of competitors, has awarded three premiums and purchased two other meritorious designs. The first prize has been awarded to Herr Alfred Hellerström, whose design shows a richly-ornamented Gothic palace of sandstone and brick, with large round towers at the four corners, and a lofty square central clock-tower over the main entrance. Most of the other architects had chosen the Renaissance style. The exhibition of all the drawings in Stockholm has attracted great attention, critics maintaining that it furnished a fine and highly-creditable proof of the ability and power of the rising generation of Swedish architects.

**The North Sea-Baltic Canal.**—The work upon the North Sea-Baltic Canal is being actively proceeded with, the men at work upon it numbering some 3,500, nearly all of whom live in barracks. There are twelve of the latter buildings along a distance of 100 kilometres, and three hospital barracks. Work is now carried on along the whole length of the canal, nearly 70,000,000 cubic feet of earth having been excavated, at a cost of 2,800,000. The great dock-works at each end of the canal—viz., at Brunsbüttelhafen and Holtenau—have been entrusted to contractors. The entire canal is to be fully completed by the end of 1894, but a considerable section long before. A large number of the workmen are Italians and Austrians.

**The English Iron Trade.**—The English iron market continues very steady and very strong. In some departments of trade business is as brisk as ever, whilst in others it is rather of a halting nature, but it is fully expected that the demand will soon be very heavy again in all branches. While stocks of pig-iron are being slowly but steadily reduced the demand keeps fairly active. There has been another large rise in Scotch makers' iron, as much as 3s. a ton more being quoted for the Coltness brand, and from 6d. to 1s. 9d. per ton for other descriptions. Finished iron and steel are largely dealt in, chiefly for shipbuilding purposes; the shipbuilding trade continuing very prosperous. Engineers are briskly employed.—*Iron.*

## PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	7	0	0	7	15	0
Teak, E.I.	load	12	0	0	12	0	0
Sequoia, U.S.	foot cube	0	2	0	0	3	0
Ash, Canada	load	3	10	0	3	10	0
Birch	load	3	10	0	3	10	0
River, U.S.	load	2	15	0	2	15	0
Fir, Danish, &c.	load	2	10	0	2	10	0
Oak	load	2	10	0	2	10	0
Canada	load	5	10	0	5	10	0
Pine, Canada	load	3	10	0	3	10	0
" yellow	load	3	10	0	3	10	0
Lath, Danish	fathom	4	10	0	4	10	0
St. Petersburg	load	5	0	0	5	0	0
Wainoot, Bigg, &c.	log	2	15	0	2	15	0
Deals, Finland, 2nd and 1st	std. 100	9	0	0	11	0	0
" 4th and 3rd	std. 100	7	0	0	8	15	0
" 2nd	std. 100	11	0	0	15	0	0
" white	std. 100	10	0	0	11	0	0
Sweden	std. 100	9	0	0	10	0	0
White Sea	std. 100	9	0	0	10	0	0
Canada, Pine, 1st	std. 100	18	0	0	20	0	0
" 2nd	std. 100	11	0	0	12	0	0
" 3rd	std. 100	8	0	0	10	0	0
" Spruce, 1st	std. 100	9	0	0	11	0	0
" 3rd and 2nd	std. 100	7	0	0	8	0	0
New Brunswick, &c.	std. 100	6	0	0	7	0	0
Baltic, all kinds	std. 100	6	0	0	7	0	0
Flooring Boards, sq., 1 in. prepared, First	std. 100	0	11	0	0	14	0
" Second	std. 100	0	6	0	7	0	0
Other qualities	std. 100	0	5	0	6	0	0
Cedar, Cuba	foot	0	0	44	0	0	5
Honduras, &c.	foot	0	0	44	0	0	44
Mexican	foot	0	0	44	0	0	44
St. Domingo, cargo average	foot	0	0	44	0	0	44
" Mexican	foot	0	0	44	0	0	44
Tobacco	foot	0	0	44	0	0	44
Ronduras	foot	0	0	44	0	0	44
Box, Turkey	ton	4	0	0	13	0	0
Rose, Rio	ton	15	0	0	20	0	0
Bahia	ton	14	0	0	19	0	0
St. St. Domingo	ton	0	0	0	1	0	0
Porto Rico	ton	0	0	0	1	0	0
Walnut, Italian	ton	0	0	44	0	0	44

METALS.		£.	s.	d.	£.	s.	d.
Iron—							
Pig, in Scotland	ton	4	15	0	0	0	0
Bar, Welsh, in London	ton	4	15	0	6	10	0
" " at works in Wales	ton	4	15	0	5	0	0
" " Staffordshire, in London	ton	5	10	0	8	10	0
Copper—							
British, cake and ingot	ton	47	10	0	0	0	0
Best selected	ton	48	10	0	0	0	0
Sheet, strong	ton	58	0	0	0	0	0
Chili, cast	ton	0	15	0	0	0	0
Yellow Metal	lb.	0	0	5	0	0	58
Lead—							
Pig, Spanish	ton	12	12	0	12	13	0
Bar, Spanish, com. brands	ton	12	17	0	0	0	0
Tin—							
Straits	ton	81	15	0	0	0	0
Australian	ton	81	0	0	0	0	0
English ingot	ton	95	0	0	0	0	0
Zinc—English sheet	ton	21	0	0	22	0	0

OILS.		£.	s.	d.	£.	s.	d.
Linseed	ton	21	15	0	22	0	0
Cocconut, Coochin	ton	27	10	0	28	0	0
Ceylon	ton	24	0	0	24	0	0
Palm, Lagos	ton	28	0	0	0	0	0
Rapeseed, English pale	ton	32	0	0	0	0	0
" brown	ton	30	0	0	0	0	0
Cottonseed, refined	ton	27	0	0	28	0	0
Tallow and Oleine	ton	21	0	0	40	0	0
Lubricating, U.S.	ton	5	0	0	8	0	0
" refined	ton	7	<sup>1</sup> / <sub>2</sub>	0	13	0	0
Tar—Stockholm	ton	1	4	3	1	4	3
Archangel	ton	0	15	0	0	16	0

## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 Noon on Thursdays.]

**BANSTEAD (Surrey).**—For a new billiard-room to "Caeleton," Banstead, Surrey, for Mr. John Jacques. Mr. W. H. Woodroffe, architect, 214, Great Dover-street, London, S.E.—  
W. Downe ..... £330 0 0  
G. Parker ..... 630 0 0  
W. Taylor ..... 634 10 0  
Young & Lonsdale ..... 602 0 0  
E. W. Sanders ..... 537 0 0

**BEDFORD.**—For 2,000 tons broken granite delivered at Bedford Station, for the Authorities:—  
J. Scott & Co., Ingelton ..... £0 15 0 per ton  
J. E. Page, Mountford ..... 0 9 9  
Ellis & Eversard, Barton Hill ..... 0 9 6  
Charnwood Granite Co. .... 0 9 6  
H. J. Skelton & Co. .... 0 9 0  
Enderby and Stonor Stanton Co. 0 8 10  
Ferguson & Starkey, Enderby ..... 0 8 10  
\* Accepted.

**BELTON.**—For a small farm-house, Belton, Suffolk, for Sir Savile B. Crossley, Bart., M.P. Messrs. Bottle & Olley, architects, Great Yarmouth:—  
Jas. Leggett, Yarmouth ..... £282 0 0  
Cork & Beech, Yarmouth ..... 408 0 0  
Arthur Bedwell, Lowestoft ..... 475 0 0

**BROMLEY (Kent).**—For building a new billiard-room, and making sundry alterations to the main building at the "Beech Tree," Bromley, Kent, for Mr. Chas. Wall. Mr. Horace F. Bonner, architect, King-street, Chesham. Quantities supplied by Mr. H. Dow White, 15, New Broad-street:—  
Holloway, Deptford ..... £1,331 0 0  
Sheepbrooks, Bromley ..... 1,117 12 0  
Payne, Bromley ..... 1,070 0 0  
Jerrard, Lewisham (accepted) ..... 1,043 0 0  
Robson, Lewisham ..... 827 0 0  
Pewterer's Work.  
Brown, Cumberwell (accepted) ..... £113 0 0



## COMPETITION, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Municipal Buildings.....	Sheffield Corporation...	600l.	Dec. 2nd	ii.

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Granite Kerb.....	Kest Ham Local Board	W. H. Savage	Sept. 10th	xiv.
Broken Granite.....	do.	do.	do.	xiv.
Paving Footpaths.....	do.	do.	do.	xiv.
Leveling and Making-up Streets.....	do.	do.	do.	xiv.
Granite.....	Staines Local Board	Official	Sept. 11th	xv.
Roadmaking and Paving Works.....	Hammerridg Vetry	H. Mait	Sept. 11th	xv.
General Sewer Works.....	Lambeth Vestry	Hugh McIntosh	Sept. 12th	ii.
Sewer Extension.....	Bromley Local Board	Official	Sept. 17th	xiv.
Roadmaking and Paving Works.....	Leyton Local Board	W. Dawson	do.	xiv.
Cast-iron Water Mains.....	Tottenham Local Board	J. E. Worke	Sept. 25th	xiv.
Roadmaking and Paving Works.....	Greenwich Bd. of Wks.	Official	Sept. 18th	xiv.
Erection of Schools.....	Beckenham School Bd.	Jno. Ladds	Sept. 19th	xiv.
New Vestry Hall and Offices.....	St. Martin-in-the-Fields	do.	do.	xiv.
Construction of New Road, Croydon.....	Yestry	R. Walker	do.	xiv.
Erection of Board School.....	Croydon Land, &c., Co.	Blake, Haddock, & Co.	Sept. 21st	ii.
New Works, Bristol Lunatic Asylum.....	Tisbury School Board	F. W. Albany	do.	ii.
Street Works.....	Bristol, City of	H. Crisp & Catley	Sept. 24th	xiv.
Alterations, County Police Station, Chelmsford.....	Sheffield Highway Com.	C. F. Worke	Sept. 25th	xv.
New Coastguard Station, Deal.....	Essex C. C., &c.	Official	Sept. 27th	ii.
Brick and Stoneware Pipe Sewers.....	Admiralty	Official	do.	ii.
Superstructure of Lunatic Asylum.....	Aylesbury Local Board	G. Cannon	Sept. 28th	xiv.
Enlargement of Lunatic Asylum, Coudon.....	London County Council	C. T. Hine	do.	xiv.
New Post-office, Barrow-in-Furness.....	Com. of H.M. Works	C. H. Howell	Sept. 30th	xiv.
Sewerage and Sewage Disposal Works.....	Bingley Local Board	A. E. Presna	do.	ii.
Storage Reservoir, &c.....	Yeadon Water Co.	do.	do.	xiv.
Construction of Portion of Aqueduct.....	Manchester Corporation	G. H. Hill	Oct. 3rd	ii.
Municipal Buildings.....	Gloucester Corporation	Official	Not stated	xiv.
Block of Stables, Wagon Shed, &c., Chatham.....	War Department	do.	do.	ii.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of Works.....	Cheabunt Local Board	2l.	Sept. 11th	xviii.
Sewerage Inspector.....	Blackburn Corporation	104l.	Sept. 14th	xviii.
District Surveyors (3).....	Leicestershire C. C.	200l. each	Sept. 17th	xviii.

**BROMLEY (Kent).**—For 1,300 feet lineal of 9-inch stoneware pipe sewer in Bird-in-hand-lane, &c., for the Bromley Local Board. Mr. Hugh S. Cregeen, Surveyor:—  
 A. T. Catley.....£300 0 0  
 T. Adams.....285 0 0  
 G. Bell.....281 0 0  
 Woods & Co.....276 0 0  
 H. Drury.....270 13 8  
 T. Lansbury.....214 0 0  
 A. Palmer.....305 0 0  
 E. Peill & Sons (accepted).....190 0 0

**BROMLEY (Kent).**—For making up the several roads hereafter named, for the Bromley Local Board. Mr. Hugh S. Cregeen, Surveyor:—

Blyth-road.	
Woods & Co.....	£1,360 12 2
John Mowlem & Co.....	1,108 0 0
A. T. Catley.....	1,099 3 11
G. Bell.....	1,098 0 0
A. T. Catley.....	988 0 0
E. Peill & Sons.....	940 0 0
T. Lansbury.....	937 7 10
A. Palmer (accepted).....	601 0 2
Highland-road (portion of).	
Woods & Co.....	£520 0 0
G. Bell.....	448 0 0
A. T. Catley.....	427 10 6
J. Mowlem & Co.....	419 0 0
A. T. Catley.....	380 0 0
T. Lansbury.....	372 17 10
A. Palmer.....	365 12 4
E. Peill & Sons (accepted).....	363 0 0

Watson-road.	
H. Drury.....	£453 14 0
Woods & Co.....	429 5 2
A. T. Catley.....	425 0 0
G. Bell.....	425 0 0
T. Adams.....	397 0 8
J. Mowlem & Co.....	382 0 0
T. Lansbury.....	330 10 8
E. Peill & Sons.....	330 0 0
A. Palmer (accepted).....	324 19 9

Watson-grove.	
Woods & Co.....	£217 2 10
H. Drury.....	307 13 10
G. Bell.....	321 0 0
T. Adams.....	290 9 10
J. Mowlem & Co.....	285 0 0
A. T. Catley.....	276 0 0
R. Peill & Sons.....	250 0 0
T. Lansbury.....	247 12 2
A. Palmer (accepted).....	232 3 4

Mooreland-road.	
Woods & Co.....	447 15 6
A. T. Catley.....	444 0 0
T. Adams.....	431 17 4
H. Drury.....	421 1 11
G. Bell.....	415 0 0
J. Mowlem & Co.....	412 0 0
T. Lansbury.....	345 14 0
E. Peill & Sons.....	342 0 0
A. Palmer (accepted).....	324 16 10

**BROMLEY (Kent).**—For the construction of a new road, 330 ft. in length, in the College Field, for the Bromley Local Board. Mr. Hugh S. Cregeen, Surveyor:—  
 G. Bell.....£391 0 0  
 Woods & Co.....363 19 10  
 A. T. Catley.....360 0 0  
 T. Adams.....336 5 8  
 J. Mowlem & Co.....330 0 0  
 E. Bell & Sons.....285 0 0  
 A. Palmer.....277 10 7  
 T. Lansbury (accepted).....275 17 2

**CATFORD, S.E.**—For alterations and additions to the St. Lawrence's Mission-room, Brookdale-road, Catford:—

Jerrard, Lewisham.....	£180 0 0
Laird, Catford.....	161 0 0
Robson, Lewisham.....	147 10 0
CHARLTON (Kent).	
For a pair of houses at Dean's common, Charlton, for Mr. George Chapman. Mr. Thomas Dinwiddy, F.S.L., architect:—	
Kenard Bros.....	£300 0 0
Martin.....	849 0 0
T. D. Leng (accepted).....	845 0 0

**CROYDON.**—For the erection of small house, Drummond-road, Croydon. Mr. Henry Gough, architect, Station-road, West Croydon:—  
 Smith & Bulled.....£385 0 0  
 Page.....373 0 0  
 Bennett.....346 10 0  
 Saunders\*.....330 0 0

\* Accepted as amended, £300.

**FARNBOROUGH.**—For alterations and additions to schools at Farnborough, Kent, for the Farnborough School Board. Mr. St. Pierre Harris, architect and surveyor, 1, Basinghall-street, E.C., and Orpington, Kent:—  
 R. Lowe.....£1,549 0 0  
 J. Orville.....1,376 0 0  
 W. Payne.....1,312 0 0  
 Arnaud & Son.....1,300 0 0  
 T. Crossley.....1,289 0 0  
 Owen.....1,278 14 0  
 Somerford & Son.....1,243 0 0  
 T. Knight.....1,169 0 0  
 W. Holt (accepted conditionally).....1,100 0 0

**HERNE BAY (Kent).**—For the erection of the R.C. Church of Our Lady of the Sacred Heart, at "The Retreat," Herne Bay, Kent. Mr. Albert Vicars, architect, 151, Strand, London:—

Thos. Heath, London.....	£5,358 0 0
Grover & Son, London.....	5,898 0 0
Patman & Fotheringham, London.....	5,750 0 0
Chas. Frank & Sons, Doukling, Somerset.....	5,637 0 0
T. H. Adamson & Sons, Ealing, Middlesex.....	5,596 0 0
T. L. Greene, London.....	5,470 0 0
Wm. Oldrey & Co., London.....	5,459 0 0
E. M. T. J. Adams, Herne Bay*.....	4,655 19 3

\* Accepted.

**KETTERING.**—For constructing reservoir embankment, filters, service reservoir, and laying three miles of mains, for the Kettering Waterworks Company. Mr. Thomas Hennell, engineer, 8, Delahay-street, Westminster:—  
 W. Cunliffe, Dorking (accepted).....£12,379 0 0

**LECHLADE (Gloucestershire).**—For the construction of Works in connexion with the water-supply for the Farrington Union Rural Sanitary Authority. Mr. F. H. Barfield, F.S.L., engineer, 55, Lancaster-road, Stroud-green, London, N. Quantities by the engineer:—  
 Chas. East, Burford, Oxon.....£1,463 11 11  
 Jos. Bowley, Lechlade, Gloucester-shire.....1,445 11 5  
 Draw Bros., Chalford, Gloucester-shire.....1,437 19 0  
 J. Pickett, Leicester (accepted).....1,361 4 0  
 [Engineer's estimate, £1,363, 7s. 4d.]

**LONDON.**—For sundry works required to be done in alterations and additions, and for the erection of a new billiard-room at the "Pegasus Tavern," Green-lanes, Stoke Newington, N., for Mr. W. H. Ward. Mr. Horace T. Bonner, architect, King-street, Chancery. Quantities supplied:—

Alterations and Additions.	
Evans, Upper Holloway.....	£1,853 0 0
Jerrard, Lewisham.....	1,150 0 0
Jackson & Todd, Hackney.....	1,120 0 0
Spencer & Co., Lambeth.....	1,075 0 0
Mollett, Stoke Newington.....	1,019 0 0
Veale, Stoke Newington.....	957 0 0
New Billiard-room.	
Mollett.....	£271 0 0
Jerrard.....	880 0 0
Evans.....	850 0 0
Jackson & Todd.....	840 0 0
Spencer & Co.....	670 0 0
Veale.....	653 0 0

**LONDON.**—For the construction of dock and foot-bridge at the west end of the Putney Embankment, Putney, for the Wandsworth District Board of Works. Mr. J. C. Radford, C.E., surveyor. Quantities by Mr. W. E. Storer:—

Alfred Thorne.....	£4,295 0 0
John Mowlem & Co.....	3,768 0 0
Chas. Killingback.....	2,820 0 0
B. Cooke & Co.....	2,572 0 0
John Aird & Sons.....	2,500 0 0
Geo. Neal & Co. (accepted).....	2,389 0 0
[Surveyor's estimate, £2,300.]	

**LONDON.**—For repairs, &c., at the Homerton Work-house, for the Guardians of the Poor of the City of London. Messrs. Davis & Emanuel, architects:—

Lewis & Son.....	£1,633 18 9
Louch.....	1,571 13 0
Whitehead.....	1,468 0 0
Barker.....	1,443 0 0
Hooke.....	1,432 0 0
Rat.....	1,314 0 0
Jackson & Jennings.....	1,239 2 0
Rider & Son.....	1,295 0 0
Barrett & Power.....	1,231 4 7
Little & Son.....	1,200 0 0
Young & Co.....	1,168 0 0
Holland.....	1,179 0 0
W. Shurmer.....	1,143 0 0
Read.....	1,134 15 8
Robey.....	687 0 0

**LONDON.**—For erecting new Congregational Church, Queen's Park, Harrow-road, London. Mr. Rowland Platts, architect, 13, Fitzroy-square, London, W.:—  
 Treasure & Son, Noel-park, N. (accepted).....£2,050 0 0  
 [There were fourteen competitors.]

**LONDON.**—For various additions to the Royal Agricultural College, Camden Town. Mr. Arthur Vernon, architect, 23, Great George-street, Westminster:—  
 Holland & Haussen.....£1,499 0 0  
 Bywaters.....1,355 0 0  
 Sturt (accepted).....1,253 0 0

**LONDON.**—For repairs to buildings and furniture, Mansford-street School, E., for the School Board for London:—

Davis Bros.....	£137 13 0
T. Crayth.....	101 13 0
C. Willmott.....	85 8 6
A. Cook.....	67 15 0
Barrett & Power.....	63 7 0
J. W. Nottingham.....	60 10 0
B. E. Bead.....	59 1 0
Thos. Hooks.....	53 18 0
F. Carter.....	52 9 0
W. Pratt.....	51 8 0

**LONDON.**—For kerbing and channelling works in Norroy-road and Chelverton-road, Putney, for the Wandsworth District Board of Works. Mr. J. C. Radford, C.E., surveyor:—

John Ball.....	£761 2 5
Turner & Son.....	748 0 0
Wm. Griffiths.....	724 0 0
Alfred Palmer.....	693 0 0
Thos. Adams.....	634 0 0
A. T. Catley.....	610 0 0
Geo. Bell (accepted).....	574 0 0
[Surveyor's estimate, £531.]	

**LONDON.**—For decorative and sanitary work at No. 33, Randolph-crescent, Maida Vale. Mr. Delius Joseph, architect, 17 and 19, Basinghall-street, E.C.:—  
 A. W. Hammond.....£480 10 0  
 Turtle & Appleton.....448 0 0  
 J. W. Falkner.....385 0 0  
 J. Martin (accepted).....349 0 0

**LONDON.**—For additional story and decorative work at No. 23, Pembroke-gardens, Bayswater. Mr. Delius Joseph, architect, 17 and 19, Basinghall-street, E.C.:—  
 E. J. Young (accepted).....£385 9 0



**OUTLON.**—For two pairs of cottages, Outlon, near Lowestoft, for Sir Savile B. Crossley, Bart., M.P. Messrs. Beale & Oley, architects, Great Yarmouth.—  
 Jas. Jaggott, Yarmouth.....£656 0 0  
 Cork & Beech, Yarmouth.....823 0 0  
 Samuel Norman, Blundell.....786 0 0  
 Arthur Bedwell, Lowestoft.....765 0 0

**ROTHERFIELD (Sussex).**—For new residence at High Sleep Farm, for Mr. Robert H. Hafford, Mr. C. Stuart Robertson, architect, Finsbury-pavement, E.C. 1.—

H. & E. Lea, London.....£1,639 0 0  
 Strange, Tunbridge Wells.....1,798 0 0  
 Goldsmith, Crowborough.....1,793 0 0  
 Mansfield & Son, Tunbridge Wells.....1,790 0 0  
 Moon, A., Rotherfield.....1,738 0 0  
 Adams, H., Tunbridge Wells.....1,688 0 0

\*Accepted.

**SALISBURY.**—For the erection of new schools, Fisherton Anger, Salisbury, for 490 children. Mr. Fred Bath, architect, Crown-chambers, Salisbury. Quantities supplied.—

H. J. Kite, Fisherton, Salisbury \*...£3,029 10 0  
 \*Accepted.

**SOUTHBOROUGH (near Tunbridge Wells).**—For building a mixed school at Southborough for the Rev. H. Deardon. Messrs. Brett A. Elphicks and Albert Howell, architects, 46, Queen Anne's-gate, Westminster.—

Mansfield, Tunbridge Wells.....£1,530 0 0  
 J. Jarvis, Tunbridge Wells.....1,466 0 0  
 Pannett & Co., Tunbridge.....1,444 10 0  
 Gallard & Son, Southborough.....1,395 0 0

\*Accepted subject to alterations.

**STAINES.**—For erecting new Wesleyan Chapel at Staines. Mr. H. Isitt, architect, Bradford.—

Ingram, Woking.....£3,950 0 0  
 Mathews & Mann.....3,937 0 0  
 Gray, Egham.....3,745 0 0  
 Faulkner, Walton.....3,590 0 0  
 Woods, Otlands Park.....3,395 0 0  
 Knight & Son, Chertsey (accepted).....3,380 0 0  
 P. Peters, Weybridge.....3,340 0 0  
 G. Beavall, Staines.....3,260 0 0  
 Pillar, Reddington.....2,987 0 0

**SWANSEA.**—For new offices, Fisher-street, for Messrs. B. Evans & Co. Mr. H. C. Portsmouth, architect, Swansea. Quantities by the architect:—

Thomas, Neash.....£,530 0 0  
 Hilton, Swansea.....3,200 0 0  
 Rees, Aberavon.....2,984 4 7  
 Billings, Swansea.....2,850 0 0  
 Faulkner, Walton.....2,738 0 0  
 Morgan, Swansea.....2,788 13 9  
 Bennett Bros., Swansea.....2,650 0 0  
 Thomas Watkins & Jenkins, Swansea.....2,642 0 0  
 David, Swansea.....2,642 0 0  
 Jenkins Bros., Swansea (accepted).....2,325 0 0

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 R. H. Stevens, Sydenham.....462 13 6  
 Waddington & Co., Limited, Sydenham (accepted).....437 0 0

*Alterations, &c., at the Travellers' Club, Pall Mall.*—In reference to the list of tenders for this job, published by us last week, Mr. W. J. Mitchell, of Dulwich, writes to say that his tender for the work, amounting to 1,826*l.*, was omitted. The omission was made by the sender of the list, and not by us.

*Additions to House, Maida Vale.*—Messrs. A. White & Co. write with reference to the tenders for this job, published in our last, that their tender amounted to 259*l.* The work was, however, cut down by the architect, and the sum agreed upon after that operation was 207*l.* It was not stated by the sender of the list that the last-named amount was an amended tender.

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# The Builder.

VOL. LVII. No. 2472.

SATURDAY, SEPTEMBER 14, 1889.

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Chapel and Schools, Beckenham.—Messrs. H. D. Appleton and E. W. Mountford, Architects .....	Double-Page Photo-Litho.
Liberal Club-house at Kettering.—Messrs. Gotch & Saunders, Architects .....	Single-Page Photo-Litho.
Houses at Snaresbrook.—Messrs. Potts, Sulman, & Hennings, Architects .....	Single-Page Photo-Litho.

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### Swedish Granites.



O country in Europe is richer in granite and crystalline rocks of a kindred nature than Sweden, and the influence of the granite industry of that kingdom is felt in all countries bordering the Baltic and North Sea. Thus Scandinavian granite has found its way into the British market, and is now a common feature, both in Aberdeen and London; and competition has become so keen that kerbing and pitching no longer pay the Scotch and Cornish granite-merchants as they used to do. Small blocks which once were used up for these purposes, have now too often to be thrown aside on the rubbish-heap. Not only is one of the once most profitable branches of the trade brought to the dead level of keen foreign competition, but the cartage of the stone from the face of the quarries to the rubble-heaps has enormously increased the working expenses, whilst the accumulation of the waste material is a positive hindrance, in many instances, to the future development of the quarries. From this it will be readily understood that where the waste, when worked and dressed, can be sold at a good profit, the quarry-owner is able to turn out ordinary blocks for polishing and engineering at much lower rates than otherwise,—in fact the cost of the stone can be reduced all round. Certain contractors working their own quarries are, by their large capital and influence, or by the favourable situation of their workings, enabled to secure much of the trade, and even kerbing and pitching are said to be profitable in their hands. To the average granite merchant, however, the small margin of profit on the latter, if any, is barely worth troubling about; a local trade is done, but that is all. The introduction of wood-paving and asphalt has also lessened the demand for pitching.

In spite of all this, however, there is still an enormous trade in granite, and it is impossible to shut our eyes to the fact that there is now a greater tendency to extensively employ the material for building and engineering purposes than there has ever been before. Whereas a few years ago it was a rarity to see the stone used in London edifices, it is

now a common building material in the metropolis, and so far the granite used is mostly British. Here and there, however, the foreign stone may be found, and from information recently at hand we think it likely that it will shortly force itself still more into public notice. Our insular prejudices make us believe that there is no granite so durable and capable of being polished as British, and it is fondly hoped in certain quarters, that this element will enable our material to hold its own against all comers. This is entirely a delusion. There are bad foreign granites as there are also inferior British kinds, and both find a ready sale from their cheapness; but there are granites in the Scandinavian peninsula, in Finland, and in Brittany, which are quite as handsome and durable as any that have ever been sent out from Aberdeen, Peterhead, or Penryn, and many of the former kinds are landed and sold in Great Britain at a fair profit.

Hitherto, although her sister country, Norway, has had a large share in the competition, Sweden has only made herself felt, principally in North Britain; but now she is coming south. Not content with supplying the major part of the paving material of Berlin and Copenhagen, she is ambitious to furnish the English metropolis also with granite, both rough and polished. Many Swedish merchants have some idea of the nature, situation, and extent of British granite quarries, and the methods adopted in quarrying and polishing the stone here. Even if all this were not already known to them, they now have ample opportunity of obtaining information on the subject, as we shall see. The Swedish Government, through its Geological Survey, has instituted minute inquiries in this country respecting our granite industry. This, we believe, is at present only known to about half-a-dozen people in England. Well aware of the assistance science is able to afford industry in a matter of this kind, that Government last year sent a practical geologist here to thrash out the subject. The series of articles on British granites that appeared in our "Student's Column," under the heading of "Stone Quarries," in the latter end of 1886; and a long leading article on "Granite Quarrying" which afterwards appeared (all of which have subsequently been issued in book-form), had previously attracted that gentleman's attention in Stockholm, and were made the basis of his work whilst in this country. The results of his labours have

only just been officially published,\* and the information obtained from the articles alluded to is duly acknowledged. In this book, amongst other things, the author shows that Swedish quarry-owners and proprietors of polishing works have much to learn of the British, especially in regard to polishing; and he is of opinion that, whilst we polish granite more cheaply and much quicker than the Swedes, the latter, through taking more time over it, do the work better. The publication of this book, coming from such an authoritative quarter, cannot fail to influence the industry in Sweden, in showing granite merchants how improvements may be effected in various ways; and we know of a case in which one of their largest granite-owners has already taken advantage of the superior methods adopted in this country.

As Swedish granite-merchants have much to learn from us, so have we a great deal to learn from them, not the least important desideratum being as to why they are enabled to put granite into our markets so cheaply. But if we wait until our Government sends out some competent person to Sweden to go exhaustively into the matter, we shall wait in vain; though it would be no more difficult to institute such an inquiry in Sweden than it was for the Swedes to come here,—in fact it would be much easier. There are certain preliminary points in connexion with Swedish granites and the industry generally, however, that we might now profitably discuss in the absence of a more complete inquiry.

Extensive tracts of Sweden are formed of Laurentian rocks, which embrace many kinds of red and grey gneiss. The former colour predominates in the western parts of the kingdom, in the north of Scania, in Halland, Westergötland, and a part of Värmland; the latter in the eastern, in Blekinge, Södermanland, Uppland, Helsingland, and Medelpad. The granites also are numerous and of varying structure and composition. The chief masses belong to a time anterior to the Cambrian period. They generally occur as great masses, which follow the major axis of the country from north to south. As a rule granite is found in the interior, whilst gneiss predominates along the coast; to this, however, there are marked exceptions, the principal being furnished by the tracts whereon the greater number of the granite quarries

\* "Om Granitindustrien i utlandet, särskildt Storbritannien." (Sveriges Geologiska undersökning.) Af Hjalmar Lundbohm, Stockholm, 1889. (Swedish text only.)



are situated. The two crystalline rocks mentioned have, as usual, but one name in the market,—viz., granite. They are quarried chiefly along the coasts and fjords, and in islands in—1. Bohuslän; 2. Halland; 3. Blekinge; 4. Småland; 5. Östergötland; and 6. Stockholm, which districts include also the principal business centres of the country.

1. *Bohuslän*.—The granite in this district varies from fine to medium-grain, the prevailing colours being light-grey and pink. The chief quarrying districts are situated west of Iddefjorden, near Hunnebostrand, and Lysekil. The quarries at the first-mentioned place are in the hands of Norwegian merchants, being near the frontier. Malmö, an island near Lysekil, is the place where granite was first worked to any extent in Sweden,—in the year 1844. There, also, is the only polishing establishment in Bohuslän, the oldest works of the kind in the country. The granite from Malmö is principally of three kinds. The first is of a brownish-yellow colour, speckled black, is very fine-grained, being largely used for paving, building, harbours, docks, and, to some extent, also for monumental purposes. The second is of a light salmon-colour, slightly coarser in grain, and is in much request by architects for outside walling. It is only within the last few years that granite has been used for this purpose in Sweden. The third variety is of very fine grain, light grey in colour, and suitable (so far as such a heavy rock as granite can be suitable) for carvings. It occurs as a vein running through part of the island. In the vicinity of Malmö, there is a quarry for paving-stone in a similar rock.

A coarse-grained granite, of dark greyish yellow tint, which contains much smoky quartz and takes a fine polish, comes from Gåsö, near Lysekil. The small island of Buholmen, also near Lysekil, furnishes decidedly the most handsome granite in this part of the country. It is coarse-grained (Swedish merchants call it "medium"), having ragged patches of pink and green felspar with smoky quartz, polishes beautifully, and is largely exported in monumental form to Germany, Denmark, and Aberdeen. Part of the stone in the island is fine-grained, and is very extensively raised for paving and building. Its very even grain and colour, and the easy and cheap method by which it is quarried and worked, render this stone a formidable competitor in the market. The joints in the quarries are regular, running nearly horizontal and vertical. In this there is considerable analogy with our Cornish granites, the weathering along the joints at the surface in both cases having influenced the shape of the hills; the result is that the material is worked on a rising bed. The inclination of the "bedding" joints, however, is not quite so great as in the majority of Cornish quarries, whilst the beds themselves are not so thick as in the latter. There is very little or no overburden. The structure of the stone is, nevertheless, entirely dissimilar to any found in Cornwall. A coarse red granitic gneiss, not unlike the so-called antique Egyptian syenite (really a hornblende granite), occurs a little south of Lysekil. Some small quarries for paving-stone have been opened near Gothenburg, the best known of which, perhaps, is called Fisköback. The majority of the quarries in Bohuslän are close to the sea; there are also excellent harbours and good accommodation for shipping the material.

2. *Halland*.—The predominating rock in this district, and indeed in south-western Sweden, is called an "iron-gneiss." It is principally worked near Halmstad and at Falkenberg. The stone varies much in regard to colour, structure, and relative quantity of constituent minerals. The two most common kinds are (1) from Gutbranstorp, near Halmstad, having flesh-coloured felspar, white quartz, and black biotite mica; and (2) from Falkenberg, a dark-grey rock with lines of pink and white felspar. They nearly always contain small crystals of magnetic iron. The stone is very hard, but easy to split, and makes good paving-sets, although the jointing is not regular. These quarries also are

generally situated near the sea, but the harbours are not so good as in Bohuslän. The greater part of the material is sent to Copenhagen and various North German cities. The dark-green gneiss (pyroxene-gneiss) from Varberg is, perhaps, one of the best-known rocks of Sweden. It is of a very rich colour, though rather too dark, takes a good polish, and is believed to be one of the most beautiful monumental stones sent out of the country. Large quantities are exported to Germany, Denmark, and Great Britain. This rock may frequently be seen in certain monumental-granite merchants' yards in Aberdeen, and, on the occasion of a visit to that city, we were informed that it had a ready sale. It is evidently more suitable for interior ornament than exterior work.

3. *Blekinge*.—The largest quarries in Sweden for paving and engineering blocks are found in the small island of Jjurkö, near Karlskrona, where the stone is a gneissose-granite, having red felspar, grey and black quartz, and very little mica. It is very hard, but easy to work. Other large workings are at Stornö, near Carlshamn, and Kläfnen, a small island near Ronneby. The granite at the former place is coarse-grained, and very closely resembles that from Tillyfourie, near Aberdeen, the principal difference being that the felspar in the Stornö rock occurs as larger crystals. The granite from Kläfnen is finer-grained, being light-pink in colour; it is largely used for paving, for which purpose it certainly appears to be very suitable. At Almö, near Karlskrona, and at Sandvik, near Carlshamn, even, fine-grained granites are raised, the tint being red at the former place and grey at the latter. The stone is principally exported to Germany, being especially used for paving in Berlin.

4. *Småland*.—In the great mass of granite forming the eastern half of the district of Gothland many varieties of the rock occur, mostly suitable for building and ornamental purposes. In this part of the country the joints are generally very regular, which much facilitate their working, causing but very little waste. The red granite from Vänevik, near Paskallavik, largely exported to Germany, is coarse-grained, the quartz is light yellow and amethystine, the large orthoclase felspars occur as deep-red crystals, whilst the mica is present only in very small quantities. The handsome appearance of the stone is chiefly due to the delicate tints of the quartz. Virbo, north of Oscarshamn, produces a coarse-grained, deep-red granite of historic interest. It is mostly worked for pedestals and other monumental purposes. We may mention that the much-talked-of "Siegesdenkmal," or memorial monument of the Franco-German War of 1871, in the "Thiergarten" of Berlin, is principally built of this stone. The small island of Jungfrun, in Kalmarund, is made of rock of very similar appearance to that from Virbo, with which, at first sight, it might very easily be confounded.

Polishing-machines have been erected near Vestervik to work the fine-grained pink granite from Elvik, and the almost black granitic rock and gneiss of the neighbourhood.

5. *Östergötland*.—The well-known granites and polishing works of Grafversfors are situated in this district. The four principal varieties of the stone are all coarse-grained, two being red speckled grey and black, the third is pink, and the last bluish-black. Not one of them is a true granite. The red kinds are exceedingly handsome stones, the coarser-grained having the constituent minerals much crushed, the divisions being surrounded by red peroxide of iron, whilst the other rock has light blue, almost opalescent quartz. A celebrated vase in Lund, 15 ft. in diameter, is made of the last-mentioned material. The fine-grained pink and grey granites from Jonsberg, east of Norrköping, are extensively raised for paving and building, whilst the dark grey stone from near the last-mentioned town, and the coarse, brownish-yellow granite from Dankeberg,

near Linköping, are chiefly used for monumental and architectural purposes. Grafversfors is the principal granite centre in this district.

6. *Stockholm*.—All the granite occurring in the immediate neighbourhood of the capital is of a light grey colour, very fine in texture, compact and hard. The quarries are very numerous, the chief being at Hufvudsta, the stone being principally used for paving and building in Stockholm. Several new quarries have recently been opened between that city and Upsala. At the latter place the stone is dark grey, and contains a fair proportion of hornblende. This fine rock, distinguished by its bluish-grey quartz, is in very great demand, being the only kind of stone serviceable for building purposes that is at the command of the town. The new foundation of Upsala Cathedral consists of this material.

The northern and central portions of Sweden, although possessing a great quantity of granite, do not furnish much to the market. A fine-grained, slightly porphyritic, red granite, found and polished near Elfdal, in Dalarna, is a pretty stone, and in its time has provided the material for many Royal presents. The large polished sarcophagus of King Charles XIV., a celebrated vase at the Royal Castle of Rosen-dal, near Stockholm, and one of the finest urns possessed by her Majesty the Queen, are all made of it.

A brick-red granite comes from Rödön, near Sundsvall, and is remarkable in that nearly the whole rock is made of orthoclase felspar, the other minerals being quite secondary in importance.

The specific gravity of the different varieties of Swedish granite mentioned is from 2.56 to 2.67. A cubic foot weighs from 157 to 164 Swedish pounds (147.1—153.72 lbs. English), and, when put into water about ninety hours, absorbs from 3 to 7 Ort (12.73—29.75 grammes) of that liquid.

During the last few years Swedish black diorites and hyperites, both highly crystalline rocks, have been in great demand, large quantities being sent away to Germany and Denmark. Black diorite is quarried, amongst other places, at Vestervik, in Småland.

The old porphyry works at Elfdal, which are well known in England and all over Europe, are now closed, but the splendid blocks of porphyry found in the district are still worked at a more convenient place by J. A. Melkersons, of Mora. There are a great number of different-coloured varieties; the old works had about thirty kinds. It is mostly used for rich interior ornament, vases, urns, &c.; also for tombstones and monuments. Large blocks, however, cannot be obtained.

Amongst the principal firms of granite-merchants in Sweden we may mention C. A. Kullgrens Enka, of Uddevalla, the Halmstads Stenbuggeriaktiebolag, F. H. Wolff, of Karlskrona, Kessel & Röhl, of Vänevik, Nilsson & Co., of Vestervik, the Almö Stenbuggeri, and the Grafversfors Stensiperi. By-the-bye, the Swedes have a standing joke against English engineers and contractors. The first-mentioned firm, perhaps the largest of all, is almost invariably addressed by them as "Herr C. A. Kullgrens Enka." Letters are commenced "Dear Sir." It may be well to remember that "enka" means widow, and that although the name of the proprietress is Kullgren, the style of the firm, following Swedish custom, is "Kullgrens Enka."

It will be observed that we have not often, in the foregoing remarks, drawn attention to any similarity between Swedish and British granites in regard to composition and structure. The fact is that they are, with but few exceptions, totally unlike each other. Some certainly approach (in structure only) the fine grey Aberdeen stones, but there is not even the faintest indication of anything like a Cornish granite in any Swedish stone we know of. Some of the red granites, although somewhat like that from Mountsorrel, in Leicestershire, are easily distinguishable. Indeed, it may be said generally, that a man who really knows his business ought to detect any of the commoner kinds of Swedish granite in the



market at the first glance. This is satisfactory so far as it goes.

There are many reasons why Swedish granite can be put into the British market so cheaply. In the first place, nearly all the quarries are quite close to the sea, in some cases actually on the sea-shore (or near some leading water-way inland), whilst the natural harbours and shipping accommodation are very good. The majority of British granite-quarries, as we have on a former occasion pointed out, are a little distance inland, and carriage to the nearest port of shipment adds considerably to the cost of the material. Again, the joints in the Swedish quarries are often so regularly disposed, and are at such convenient intervals from each other, that at many of the workings in Bohuslän, for example, the men cut the paving-setts from the rock *in situ* by simply making a series of parallel cuts through the stone, and the material is so free that this is done with the greatest facility. By this means very little labour is expended in masoning, and there is not much waste to cart away. In England, in those places where the beds are tolerably regular, as a rule the beds run too thick to enable paving-setts or kerbing to be cut in this way. The paving masons in Sweden often quarry on their own account, and sell the paving-setts to the quarry proprietor, which system obtains in this country also to some extent, especially in Cornwall. We are informed that Swedish masons, in this way, can often make 5s. per day. Piece-work, however, is the common practice for other branches of the trade, except in regard to such labour as cannot be conveniently dealt with in that way. Many men get 3s. 6d. for their day's work, but some take less, depending on the district. Wages generally are lower than in British granite-quarries and works. This can be accounted for in many ways,—not the least significant being the circumstance that the cost of living in Sweden is comparatively little. No coal is found in that country; what coal is used is mostly English; but some of the granite-polishers (as at Gräfsversfors) use water-power, which is cheaper. The "feathers" of the "plug and feather" wedges for cutting granite are shaped differently in Sweden. The "feathers" there are square, whilst those used in this country have rounded backs to suit the sides of the holes; there is no doubt that ours is the better shape. Gunpowder is the ordinary explosive in quarrying, and as foremen in Sweden seem to understand its capabilities better than the majority of our men do, they are much more economic in its use. Dynamite is seldom, if ever, employed. The rent (including royalties, &c.) of quarries is higher here than in that country.

When all these things are taken into careful consideration there is little wonder that Swedish granite competes so successfully in the market.

Before concluding, we may as well point out that the work of the Swedish Geological Survey is eminently practical in its character. It not only maps and describes geological phenomena from a purely philosophical point of view, but issues separate publications, written by men who thoroughly understand the subject, on certain tracts of country of economic interest, indicating, amongst other things, the presence of good and bad stone. As an example of this kind of work, we may cite the practical geological treatise on the district of Kalmars, in south-eastern Sweden. It minutely describes the granites in the area, pointing out where stone of good quality exists that could be easily worked and shipped, &c. It is accompanied by a large map, on which not only is the area occupied by granite clearly shown (together with that of other stones and minerals), but the particular kinds of granite are separately mapped. Thus it shows the areas respectively occupied by foliated, red, grey, coarse-grained, medium-grained, fine-grained, and porphyroid granite. The possession of such a work is invaluable to a granite-merchant in seeking

sites for new quarries; and it is often instrumental in indicating the presence of suitable stone near towns requiring the material, saving cartage, &c. Maps on this plan, dealing with the building-stone areas of our own country, would be very useful to British quarry-owners, and they could be executed for very little money. The stone industry, from its magnitude and the thousands of men employed in it, is one of the most important in the country; but, like as in regard to other industries, we fear that the time is still in the dim and distant future when the British Government will take enough interest in it as to place sufficient funds in the hands of our Geological Surveys to enable them to publish a series of this kind of practical geological maps. We are far behind some Continental countries in this, as in many other scientific things of a kindred nature.

#### NOTES.

**T**HE conditions of competition for the new Municipal Buildings at Sheffield deserve notice, amid the frequently ill-regulated competition schemes of the day, for the sensible and fair spirit in which they are framed. The first competition is to be a sketch one, open to all comers, and appears to fulfil the proper conditions of a sketch competition: the scale of the drawings is to be  $\frac{1}{4}$  in. to a foot; the drawings are limited to plans, two sections, and an elevation, on strainers  $2' 0'' \times 1' 6''$  in size; alternative designs (often sent in by young competitors, with a notion of having "a double chance") are to be ruled out. A schedule of accommodation is added, with the sizes of the rooms required, but it is to be noted that these are "suggestive sizes" only, and not absolutely binding; a relaxation which removes a great stumbling-block often felt in competition plans, when a demand for precise adherence to specified sizes breaks a plan down at some one point, just when the principal difficulties are got over. The Corporation of Sheffield will select six sets from these, under the advice of their assessor, and 600l. will be distributed equally among these selected men for providing such further drawings as may be considered necessary for a final selection. The assessor will be Mr. Waterhouse, in both competitions; but the Corporation reserve to themselves the right of ultimately deciding which design they will accept. From the terms and spirit of their conditions, however, we may fairly conclude that they intend to give all proper weight to the opinion of the assessor. This ought to be a model competition, and we hope the result will be a fine building for Sheffield.

**H**AWKSMOOR'S well-known Church of St. Mary, Woolnoth, at the corner of Lombard-street and King William-street, has been closed till further notice, pending an investigation into its sanitary condition. From a paragraph which appeared in the *City Press*, it might be inferred that the evil smells which are complained of are attributable to interments in the vaults below; but personal inspection and inquiry do not enable us to take this view of the case. In company with Mr. H. D. Phillips, the Vestry Clerk, we have this week visited the church. On descending into the vaults we were unable to detect any unpleasant odour; and from the fact that, under the direction of Mr. Penrose, all the coffins and graves in the vaults were some years ago covered with layers of charcoal and cement concrete, to an aggregate depth of 5 ft. or 6 ft., the top of the concrete being hermetically closed by a rendering of fine cement, we did not anticipate any other result of our investigation on this head. Mr. Phillips himself made no secret of his opinion that the scare which has led to the temporary closing of the church is unduly alarmist in character, but at the same time he admitted that he had at times perceived a bad odour apparently proceeding from behind the wall-panelling. (This might be due to the decaying remains of a dead mouse or rat.) One of the pew-

openers, too, told us that when the church was first opened in the morning the bad smells were very apparent, and that she has herself suffered much from sore throat. The church is, no doubt, in an insanitary condition; but, so far as we were able to form a judgment, its insanitary condition is due,—firstly, to want of adequate ventilation; secondly, to a defective water-closet, very badly placed; and, perhaps, thirdly, to sewer-air emitted from a sewer-gully or grid in King William-street, close to the side door of the church. As to the first point, the air of the church seems to be perpetually stagnant, and no wonder, for apparently the only provision ever made for ventilation is by four "hoppers," one in the centre of each of the four large lunettes which form the clerestory windows. Of these four hoppers, one cannot be opened at all, owing to failure of the gear, and another is not opened because it is broken and in a dangerous condition; only two of these small openings, therefore, are available for the ventilation of the church. The only other windows in the church are the four at a lower level on the south side, next King William-street, and these do not open at all, although the heads could easily be made to do so. As to the second point, the water-closet is an old one of the dangerous and unhealthy kind known as the "pan closet"; its water supply is so defective that at times it is without any at all; and it is placed in a most cramped and confined situation, in a narrow low recess leading out of a narrow passage leading from the vestry. There is no ventilation from the closet except by an opening above the top of the door into this passage, the other end of which leads to the open air. The current of air, we should say, is generally inwards along this narrow passage towards the vestry, and thence, no doubt, through the vestry into the church. We have said enough, we think, to show that there is quite sufficient in these facts to account for the bad air in the church, without attributing it to the interments, or even to the whiff of sewer-air which assailed our nostrils as we passed along the pavement of King William-street. We are glad to hear that the sanitary arrangements of the church are to be thoroughly overhauled.

**A**MONG the exhibits at the Berlin Accident Prevention Exhibition,—which has proved a great success,—a model theatre attracts much notice, furnished with all safety appliances. For the prevention and arrest of fire, all the materials used in its construction are impregnated with a chemical solution, said to be fireproof; whilst the ordinary drop-curtain,—there being also an iron one behind,—is made of cow-hair, a material which, it is said, is excellent for the arrest of flames. There are a great number of exits for a rapid emptying of the building, worked on various systems, the opening of some being effected direct from the machine-room behind the stage by means of electricity, whilst others show different lock-and-key systems. In the roof are huge shutters, which may be opened from below to admit of the escape of smoke. Another novelty is a lever upon the back of every seat in the theatre, which, by a single twist of the hand, turns the chair up horizontally aside against the next one, whereby lengthways passages are formed when desired. There is no other illumination in the house but the electric light, worked by a dynamo; but, in case this supply has to be turned off, there is a large number of glow-lamps fed directly from accumulators. This last feature is an excellent one. For the rest, it is probable that such complications of contrivance as are here described will only prove a source of confusion in the event of danger, and that such model theatres are of more interest as popular exhibits than they will ever be in practice.

**T**HE thanks of architects and archaeologists are due to the *Standard* for helping to spread a protest against the careless treatment of monumental brasses. The "restorer" is not always the Vandal he is painted; but

\* "Praktiskt geologiska undersökningar inom norra delen af Kalmarslän," &c. Stockholm, 1884.



restorations are sometimes undertaken by ignorant or frankly "Philistine" persons, who sorely need to be reminded both of the reverence due to the monuments of the dead and of their real value as contemporary evidence of historic facts, and such persons are more easily moved by an article in a daily paper than by all the protests that have ever been made by architects and others who have a special knowledge of and interest in the matter. It may, however, be pointed out that one of the special acts complained of,—namely, the taking up of brasses from the pavement and placing them against a wall,—is frequently the only way to preserve them from being effaced by the feet of worshippers.

THE autumn issue of the "Mittheilungen" of the Athenian German Institute is, perhaps not unnaturally, a thin and somewhat meagre number. The Prussian military service had irrevocably claimed Dr. Dörpfeld (we hope for the last time) for the space of three summer months, and the result is that we have no architectural and topographical report from his hand. Dr. Wolters, however, gives an interesting provisional account of the discoveries in the dome-shaped tomb (Kuppelgrab) at Palli, which are to be published in further detail by the discoverer, M. Tsountas, in the "Ephemeris." Pending this publication, we may note that among the discoveries are several swords of the well-known Mycenaean type, forty archaic engraved stones, and, above all, two magnificent golden cups, elaborately wrought, on one of them a design of palm-trees and a cattle hunt, which promises to be of great archaeological importance. Perhaps the paper of most general interest, however, is one by Herr Blummer; he publishes a vase found at Lokris, and now in the Archaeological Museum at Athens, on which is represented the inside of a potter's workshop. The walls are hung round with shelves, on which stand vases of various shapes. The master of the shop is seated in the middle, and holds a cylix in the left hand; with the right he aims a blow at a retreating slave. One is tempted to hope the blow will not reach its mark, as the slave holds in his hand a number of drinking-cups piled one above the other. These he is carrying with as much dexterity as that with which a modern waiter balances a pile of plates. Worse, however, is going on at the right-hand side of the picture—an unfortunate slave is hung up by the feet and wrists to the ceiling, and in this position is being severely beaten.

SIGNOR GAMURRINI chose for the subject of his festal address on the anniversary of "Rome's Birthday" a very curious Etruscan monument from the Chiusi Museum. The address is published in the last issue of the Roman section of the *Mittheilungen* (1889, iv, fasc. 2), and the Etruscan *cippus* discussed is reproduced in phototype on Plate iv. The quadrangular monument is decorated on three of its sides with low reliefs representing scenes from the early Italian matrimonial rites. The principal representation consists of three figures, two men and a woman, over whose heads two attendants hold a large piece of fringed drapery. This is a very graphic presentment of the ceremony of *co-nubium*; the drapery is the *nubes*. The generation,—now rapidly passing,—that used to learn "Henry's Latin Grammar," were always taught—

*Nubere* is of the female said,  
The English of it is to wed.

It appears from this monument that the verse only tells half the truth. The man, as well as the woman, when married, was most distinctly *nuptus*, i.e., "under a cloud," and it appears the bride's father also. Into his somewhat fanciful speculation as to the origin of the church ceremony, and as connecting with Neptunus (Neptunus), we will not follow Sig. Gamurrini. One end of the *cippus* is decorated with a scene from the other form of the marriage ceremony, the *comptio*, and on the other side is a mixed scene of sport and tillage, which has not any very apparent meaning. Altogether, the

*cippus* is well worth the attention of classical scholars and students of ancient custom.

WE have recently received the official report of the Third Annual Convention of the National Association of Builders of the United States of America, held at Philadelphia in the early part of this year. It contains some very able papers on various subjects connected with building, and the discussions include a great deal of interesting reading. The Association is to be commended for the enlightened interest which it appears to take in the education of building artisans. Their legislative Committee have presented a report on the best system of education for a man who is to be recognised as a "regular journeyman in the building trades," in which they recommend first, the serving of a regular course of instruction in a mechanical trade school; second, a term of practice with an employer on actual work; finally, "completion of the education of the mechanic to be acknowledged after a proper examination has been passed before a Board of Examiners appointed for the purpose by the Association of Builders to which the employer may belong," and the issue of a certificate by the said Association. The report concludes with a recommendation that this method be "persistently agitated," and that a Special Committee be appointed to have the matter in charge. The report was adopted by the meeting, and it is to be hoped they will be able to bring it to a practical issue.

SOME extensive repairs are about to be carried out at Abbots Langley manor-house, Hertfordshire, under the direction of Mr. C. P. Ayres, of Watford, architect, for the governing bodies of Trinity College, Oxford, and Sidney Sussex College, Cambridge. The village, otherwise known as Chiltern Langley, in Cashio hundred, lies near to St. Albans, on the eastern bank of the Bulbourne. According to Domesday survey, the demesne was given to the monks of that Abbey, whence its name, by Egelwyn, surnamed the Black, and Wynfield, his wife. King John confirmed this grant wherewith to equip the monks with clothing. Having passed to the Crown at the Dissolution, the manor was conveyed by James I. to one Francis Combe, of Hemel Hempstead. Combe, having no children, provided by his will, dated in 1641, for the endowment of a school here, and devised this property to the two colleges for the education of his own and his wife's kindred in perpetuity. His wife Jane's effigy is in the parish church of St. Lawrence, which is supposed to occupy the site of an ancient English church, or chauntry, for the Survey speaks of a priest as in residence here. A nave and two aisles were added to the old chancel circa 1200; the chancel was rebuilt by Abbot John de la Mook in 1396-1401. Here is also a monument to Robert Raymond, Baron Langley, Lord Chief Justice of England, with a recumbent figure clad in judicial robes (1732). The church was restored and reseated twenty-two years since. Nicholas de Breakspear, who, in December, 1154, was elected Pope by style of Adrian IV., is commonly stated to have been a native of Abbots Langley; the place whence he took his agnomen lay within the adjoining parish of St. Michael.

AN illustrated essay on Haddon Hall, which originally appeared as an article in our columns, has been brought out by the author, Mr. J. A. Gotch, as a pamphlet.\* The illustrations, most of which also appeared as accompaniments to the original article, are reproduced from pen drawings by Mr. T. Garratt. Under the circumstances, for us to specially recommend it would perhaps, in the words of Portia, "come too near to praising of ourselves"; but we believe those who are interested in Haddon, either because they have seen it or because they are going to see it, will find the sketches pleasant and correct memoranda of picturesque corners of the

building, and Mr. Gotch's remarks interesting in style and archaeological matter.

IN the last number of *L'Architecture M. Boussard* discusses, under the head of "L'Hygiène des Habitations," the question "Doit-on laisser subsister la respiration murale?" in other words, should we encourage porous walls as an assistance to ventilation? M. Boussard argues against it, on the ground that walls may contain much that may contaminate the air passing through them. He gives a noteworthy instance of this, in a case about which he was himself consulted, where the tenant of a costly apartment in a house in flats declared that he would have to leave in consequence of disagreeable smells which were perceptible from the adjoining property. The smell was perceptible in his apartment, and came from the wall; but it was not perceptible on the other side of the party-wall. The wall itself was examined and traces found in it of ancient contamination, which undoubtedly had caused the nuisance. It was only perceptible at night, owing to the suction of the air through the wall when the house was warm and the windows and doors closed. Taking out the piece of wall and rebuilding it with clean and impermeable materials, nothing more was perceived of the nuisance. The account is given as an argument against the opinion of M. Trélat in favour of permeable walls, on sanitary grounds. It certainly suggests another side to the subject which seems to have been rather overlooked.

THE *Daily Telegraph* is, or affects to be, incredulous with respect to a report that "ancient" water-pipes, made of the hollow trunks of trees, have been discovered in the Strand at some distance below the surface. The report has not reached us, but surely there is nothing in the least surprising in it, for, from the earliest until quite recent times, water-supply pipes, when there were any, were more often the trunks of elm or other trees, with the middle bored out, than anything else, and such a discovery as that reported would arouse but a languid interest among archaeologists, even if the pipes were proved to be, what the *Daily Telegraph* rather hastily assumes them to be, relics of the Roman occupation of the country. It seems to us much more likely that they are some of the pipes laid down by Sir Hugh Myddelton for the distribution of the water of his "New River" in the early days of the seventeenth century, and which we are told were "of elm and lead, but for the most part of elm." Some of these pipes were discovered, as recorded in the *Builder* in 1871, in Gracechurch-street. They were from 8 ft. to 10 ft. long, and from 18 in. to 24 in. across at the thick end, the other end being trimmed off to fit into the next length. The bore varied from 6 in. to 9 in. in different places.

A CARD headed "Sanitary Hints for Household-ers" has been brought out by Mr. G. M. Lawford, Associate Inst.C.E., which deserves the attention of those who wish to keep the sanitary apparatus of their houses in order. It is intended apparently to be hung up as a memorandum, and contains general directions to servants, and a list of certain precautions in regard to cleaning and inspecting traps, drains, &c., weekly, quarterly, half-yearly, and yearly. Some diagrams are appended to render the directions clearer. We strongly recommend this briefly-worded and useful memorandum to householders, as a reminder of things that are often overlooked and forgotten.

WE have received a third edition of Mr. Butterfield's pamphlet,† with a sectional illustration, on his form of kneeling-boards for church seating. In all he says as to the advantage of a fixed kneeling-board over hassocks which are always getting astray, and quickly wearing out, we are agreed; but we should still wish for some kind of durable

\* London: Gotch & Gomme. 1889.

† London: G. Gill & Sons.  
Published by Rivingtons.



padding on the upper surface of the "kneeling-board." Nor are we by any means disposed to accept Mr. Butterfield's seats with absolutely vertical backs. A seat-back sloped backwards is more comfortable for every one while sitting, and for many persons—women not in strong health for instance—it is an absolute necessity; and we must decline to recommend the vertical back. From some parts of the pamphlet it would seem that it was a kind of virtue that people should be more or less uncomfortable in church. We certainly cannot see either the physical or spiritual advantage of this.

#### A THOROUGH CHANGE.

BY OUR IDLE ARCHITECT.

It is written that to carry one's ordinary occupations into one's vacation is folly; that our annual "change" should be such in every sense, and not alone of air and scene. The wisdom of this dictum is apparent upon reflection. But Wisdom cries out in the streets and few regard her. We architects are, it is feared, great sinners in this respect, and not as other men. The lawyer, for instance, leaves behind him his drafts and indictments, and, seizing rod or gun, hurries off to enjoy himself as a gentleman should do. The doctor does not, we fear, reckon his own rede, but acts as a "Locum," exchanging practice with his country brother. But that is the way with doctors, who are proverbially careless of the lessons they enjoin. We should, however, follow the better example, and not the worse, nor go for ever fussing about with our note-books and rules, poking our noses into every old building, when we ought to be better employed. For ourselves we will, regretting the follies of our youth, try for once another tack, and give the new doctrine of change a fair trial. But, first, can we find in this our dear native land a suitable district for our experiment,—one so architecturally uninteresting that our new-made resolution may not be put to a too severe test? We take a map and get at the sought-for spot by elimination. Yorkshire and its abbays, Lancashire and its old halls, Northampton with its churches, are one after another banned; at last we get at a promising locale where the gilded architect may take his scanty fortnight's leisure without health-destroying incitements to professional study. Yes, we put our finger down with confidence and say, here, at least, we shall be free from allurements, and escape for a time from our besetting propensity. To make assurance doubly sure, we consult our Murray. It's all right. "There is absolutely nothing at Blankbury which will interest the archaeologist." "The church is an unpretending structure, restored, or rather rebuilt, in 1837." Good! quite the right period for us. "Blank Hall was destroyed by fire in 1817, and the present house offers nothing which need delay the tourist." Excellent again. "A fragment of a former gateway at the entrance of the Park, said to have been designed by Inigo Jones, or one of his pupils (!), should, however, be seen." Should it! Thank you—not in our line. We are resolved. We will incontinentally visit this delightful spot. Nor book nor pencil will we take, nor pocket-rule nor compass, and we will resolutely clear our mind of shop and all its associations. To drive to Euston, fling ourselves into one of the cosy smoking-carriages of the Wild Welshman, and alight at a certain station, was—as the late Mr. G. P. R. James would have said—the work of a moment. A drive of a dozen miles along sharply undulating roads, and here we are. Truly, it looks as though the architect had never found his way hither. Not a glimpse of church or hall, snug homestead, or cosy cottage. "Barren, barren all, Sir John!" The houses which dot the mountain-sides and cluster in the valleys are mere rectangular blocks, with slate roofs and whitened all over. Even the village smithy has no picturesqueness. What could be nicer? Oh, most voracious Murray! Fate sets us down at the door of a painter who has chosen to make his home among the mountains. It is a humble dwelling, rectangular like the rest, and like them whitened all over. A monthly rose blooms over the doorway, not a Tudor rose, or we could not have rested here without jeopardising our resolution. It appears that our friend's house is the centre of a little community of artists, who inhabit the small farm houses and labourers' cottages cast about the hill-sides—

a simple folk, to fortune and to fame unknown, who devote their placid lives to art. You meet them in the twilight coming homewards, like the bees, laden with spoil from heath and wood—stairway figures bearing jauntily their freight of canvases, easels—what not? after their long day of happy work. An ingenuous race! content if they can catch some passable likeness of the beauty which everywhere surrounds them, and ready with sweet alacrity to show you all their work. The only red roof in the valley—near the poplars—covers a club they have built for themselves, where, during the long winter evenings, they study, from the not too-lively life, rustic models of all conditions. Here, too, they hold high jinks now and again, when —, who has a marvellous tenor voice, or —, who sings a capital comic song, comes to visit them. And here, four times a year, they give a dance, which form of amusement has been artfully thrown in to disarm the criticisms of the wives, who, left alone with their children and stitching, have doubts about the expediency of clubs in general, and suspicious as to the kind of study which goes on at this particular one. Our host is president, and we are introduced to the members,—the bashful genius; the funny man, who plays the banjo, and knows all Moore and Burgess's jokes; the wealthy amateur, who is considered but half an artist, because he is not "hard up." There was "nothing going on" just then, and we would rather die than attempt to describe what we have not seen. But the company drop in casually, one by one, at our host's, whose hospitable doors stand ever open to all comers. We are a silent member at those frequent jolly gatherings, but it is possible to take notes without a note-book. Our anti-sketching virtue undergoes a little trial in this the only sitting-room of the house, half kitchen, half hall, wholly snug and comfortable,—the sort of room, indeed, which our semi-Bohemian tastes have always declared for. It is long and low, with a vast cavernous fireplace at one end, across the head of which run two shelves displaying brass candlesticks of supernatural lustre disposed amongst a litter of really old china. Ceiling there is none. The joists are honestly shown, and hooks upon their sides carry whips and sticks, and all sorts of picturesque odds and ends. An internal wooden porch projects far enough to make a bay for the great oak settle placed under a long range of casement lights high up and screened by the transparent green of a trailing vine. A fixed buffet, a grandfather's clock, a high-backed chair, are opposite, and everywhere pictures, pictures, pictures. At the end opposite the fire is a noble piece of furniture for which we have no name. It is partly sideboard and partly cupboard, and full of queer shelvings and recesses. It is of oak, blackened by age, and bears the letters R.L. and the date 1686. On its shelves and odd, nameless nooks of vantage, gleaming plate and glowing china are ranged, and the whole is a painter's study. The balusters,—good, substantial things, not like their attenuated modern imitations,—have just a sufficient family resemblance without being too exactly alike, and the great, bulbous corner legs are simply grand. Our fingers follow affectionately their contours, and moulded neckings, and find a joy in them which no mere painter can understand. If we had only a pencil stump and the back of an envelope! But stay, this is dangerous ground. We feel something of the old feeling creep over us, and desist. "Virtue endangered makes a stern resolve." The fire burns the brighter for the deepening twilight, and the lights flicker upon the nubby parts of the old oak and play round its bright burdens. On one side of the receding fireplace sits our host, "the general," as he is called,—his white head and beard standing out Rembrandtesquely from the dark background. On the other sits the painter's daughter,—young and pretty (gentle reader, we are old and discreet),—ruddy of head, a mountain child,—the sharp clicks of whose knitting-needles form an accompaniment to the old painter's stories of rough times in the mountains,—how the sudden swirls of wind have torn his canvases from his easel and planted it on his back, or the waters have washed him at midnight clean out of his humble tent! A lamp shining from the joists overhead gives just enough light to read or sew by at certain spots, and does not search with vulgar scrutiny every cranny in the room, like our unbearable London gas. Only by one the guests drop in, and all their talk is of art. How —'s picture is sold, and —s on the

line at Liverpool, and what — and — are doing for next year's shows. We find that, as a rule, they think meanly of the recognised heads of their profession, and are fairly well satisfied with themselves. One of them, who is clad in a velvet knickerbocker suit, with crimson stockings, and flowing amber tie, is an impressionist, it appears, and has good-naturedly brought in some sketches. "Blots, sir," he says, "merely blotted in for effect. This one, 'Firework Display on Jubilee Night,'—done, as you perceive, while the rockets were exploding. This, 'The approach of the military band and flags on the recreation-ground,' was knocked off in three minutes, as you will see noted upon it. Merely blotted in. *Some day I shall paint this.*" It seems that he never does paint anything, but has in contemplation whole galleries of important works. "I shall paint this grand old valley, Sir, some day, with one broad, nervous sweep of a full brush." The younger hands argue with him, and meet with desperate falls, for he has read twice as much and can talk infinitely more and better than they. The older ones listen, and look archly across to each other in the pauses of the white clouds which escape from their silent lips. He is a dear good creature,—quite harmless, generous to a fault, and by far the handsomest ornament the club can boast. He tells us we really must see a church only three miles off, built, he is informed, by Harold I and most interesting. We explain that anything that is interesting has no interest for us, and thank him for the warning. To the Club children in arms are not admitted,—which is strange,—for children only just out of arms appear as full-blown painters here. There is young Slick, only seven! You see him in the morning, brushing with hasty steps the dew away, and struggling under the usual professional load,—easel, white umbrella, canvas, &c. A dwarf you think, until he gets nearer, when you perceive that he is little better than a baby, his blackberry-stained mouth in strange contrast to the professional character of his burden. Oh! a boy carrying his father's "things!" Not a bit of it. He, too, is an artist. Only been painting a year and a half, and knocks off the local scenery like winking. Gets 15s. for his large pictures, including the frame. "Safe to be at the top of the tree before long," &c. Talking of trees, did ever any one see such foliage as this valley spreads out before us in this divine September weather? We have watched the picture grow. First the wild cherry burst out like flame in its setting of dark pine. Then the ruddy tips of the oak and the golden blaze of the ash followed, and everywhere the stately beech glows with exuberant crimson and brown; and all the woodlands shout for joy. The deadly nightshade in the banks, and the wild bramble in the hedges, should be framed and glazed, and the scarlet hips be strung as jewels for my lady's neck. The mountain torrents leap and tumble down a hundred glens. "sdyding in palpitating light," and lingering in darksome pools about the weather-worn boulders, on which the lonely robin sits and pipes its solitary note. "Is not this our life more free from care,"—and colder,—than if spent as of yore in measuring musty old churches with their melancholy old monuments? Out upon them! Rest you, brother architects, we will not measure more,—that is, in holiday time. Our experiment has been entirely successful.

We bid adieu to our genial artist friends and return to our desk re-created indeed, a new man, wiser but not sadder.

"O for one hour of youthful joy!  
Give back my twentieth spring!"

No! we cannot, alas! recall our mis-spent youth, but we can resolve that in future our holidays shall be holidays, *per et simple*, and we urge upon our younger brethren to work while they work but play while they play, and not to take either *mixed*, if they would get the full benefit of both. B.

"Turbines."—In the article on this subject in our last, in the third column of page 166, line ten from bottom, for "section-tube" read "suction-tube."

"The People's Hall," 272, Whitechapel-road, is being converted into a Food and Shelter Depot for General Booth. The work has been let to Mr. A. Martin, builder, Battersea, Mr. J. Williams Dunford being the architect.





House, Lenox, Massachusetts.—Messrs. Peabody & Stearns, Architects.

#### RESIDENCE, LENOX, MASSACHUSETTS.

THIS house is designed by Messrs. Peabody & Stearns, architects, of Boston. The basement and piers are of white marble from local quarries; the upper walls and roofs covered with stained shingles. In the interior the dining-room is finished in oak; the library in cherry-wood; the remainder of the rooms in pine, painted.

The marble was used as the cheapest local stone, and not for effect.

#### NOTES FROM ITALY.

COUNT SACCONI, the architect who has planned the monument now being erected on the Capitol to King Victor Emanuel II., is superintending some very important repairs in the Church of St. Cyriac of Ancona (an edifice of the eleventh century, in the Byzantine style), and in the famous shrine of Nostra Signora di Loreto. The basilica, or holy house of Loreto, is built in the Gothic style of the fifteenth century, with battlements on the outside, in order to be turned, if required, as it often was, into a fortress. In the sixteenth century it was transformed by Sangallo in the Roman style. Count Sacconi undertook the difficult task of returning it to its primitive state, namely in the Gothic style.\* It was a bold undertaking, but he contrived to surmount all obstacles. The arches, which

ruined the stateliness and elegance of the ancient architecture, have mostly been demolished, and the slender and harmonious lines of the Gothic style can again be seen. The cupola, which was very nearly coming down, has been repaired by Count Sacconi by means of an invisible chain net-work; while the paintings have been confided to Prof. Maccari, well known both in Rome and abroad, for his beautiful frescoes of the Senate-hall in the Piazza Madama. The repairs executed in the chapel of St. Joseph, on the right-hand side of the church, deserve particular attention. This chapel, which was the best preserved of the ancient church, has suggested the type of all the others, and the repairs, although not yet brought to an end, are really magnificent. Four large fresco pictures are being painted on the walls, illustrative of the life of St. Joseph, and underneath are four allegorical figures surmounted by canopies, and representing Work, Faith, Obedience, and Justice. We owe the paintings to Prof. Faustini, and the decorative part to Prof. Stella, both citizens of Venice.

We must also bestow a glance of admiration at the stately altar, planned by Count Sacconi and executed by the sculptor Signor Maccagnani, and by the Roman intaglio artists, Prosperi and Benni.

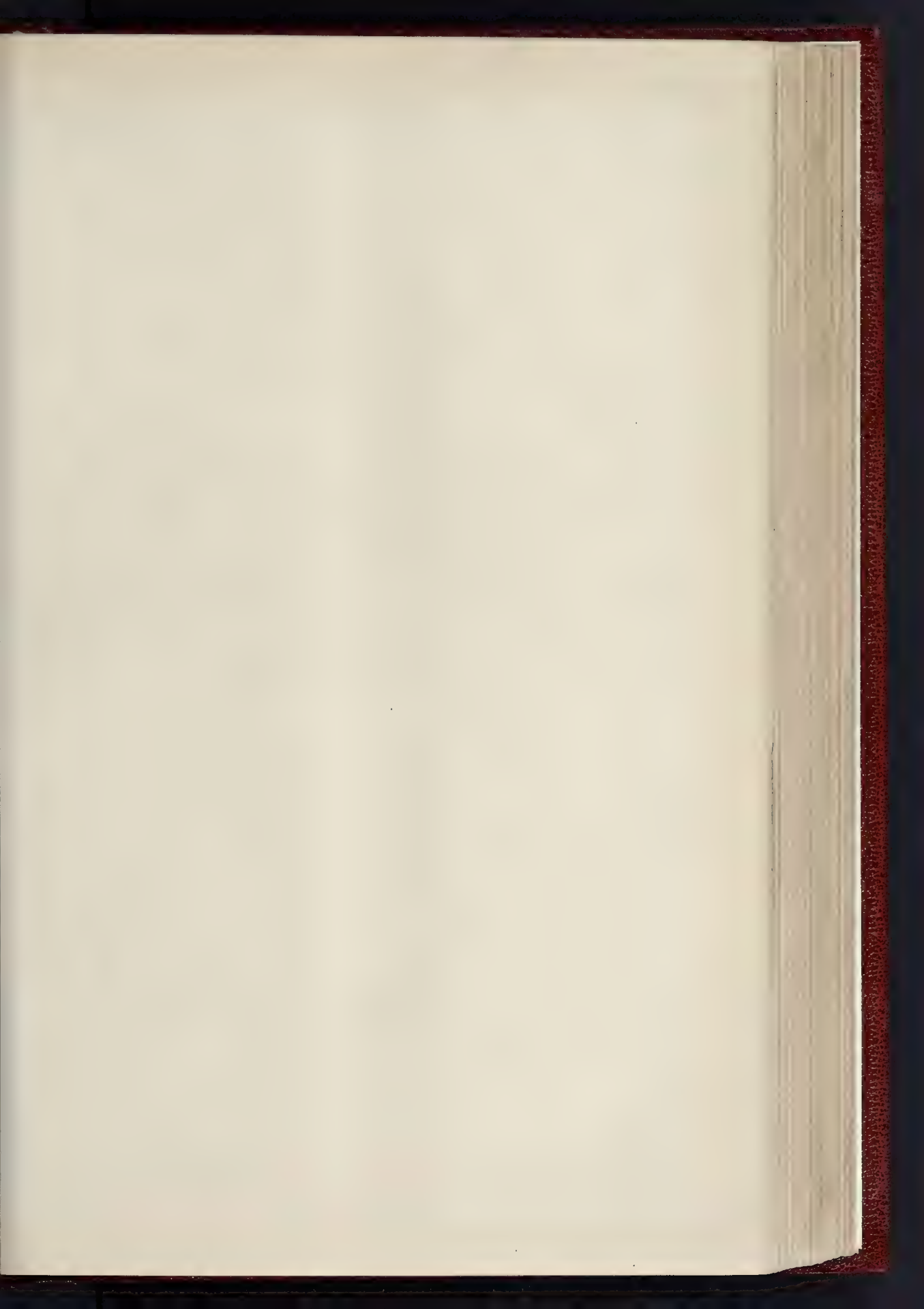
The stained glass windows made by Francesco Moretti, of Perugia, are also very beautiful. The artistic iron grates are praiseworthy works of Mattacotta, of Fermo, who has made the large gratings of the chapel in the same style. Many other important repairs are being completed, such as a large window, by Signor Scottica, of Arezzo, with the help of Signor Basili. The repairs and covering of the cupola were confided to the Venetian Arturo Biondetti, who had

before gained some renown by his repairs of the Ducal Palace and of the Church of the Salute in Venice.

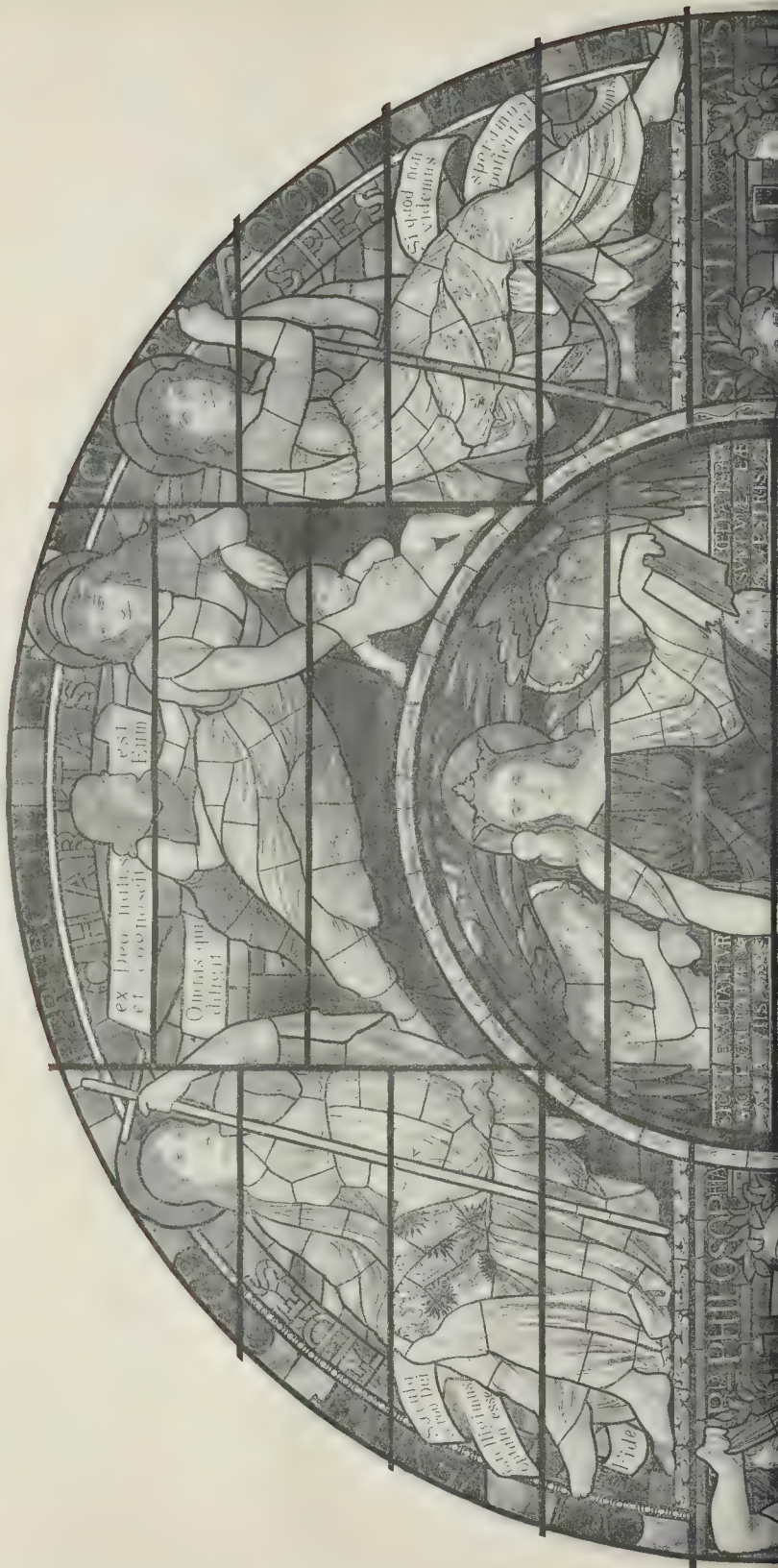
A very interesting book has been lately published by Signor Ongania, the well-known editor of the splendid work on the Basilica of St. Mark, in Venice. The book was written by Prof. Raffaele Cattaneo, and is entitled "Italian Architecture from the VI. to the XI. Century: Historical and Critical Researches." It is enriched with many engravings, representing the principal monuments mentioned by the author in the course of the work. The subject of the first chapter is the Latin-Barbaric Architecture, which flourished from the sixth to about the eighth century. Some famous marble sarcophagi in the church of St. Apollinare, in Ravenna, and especially the one of the Archbishop St. Felix, are studied in the chapter, together with the pulpit of the Church of St. John and Paul. The only remains of Byzantine art now to be seen in Rome are in the Church of St. Stefano Rotondo, and in some parapets and other details in the Churches of St. Clement and St. Lawrence. The author subsequently examines and compares the sculptures in the Cathedral of Santa Maria in Grado. Prof. Cattaneo's opinion is that all these works of art were executed during the sway of the Lombards. In the second chapter the author draws the attention of the reader to the Barbaric-Byzantine monuments, such as the parapets, or rather the *pluteus*, of St. Marc, the Baptistery of Clivdale, in the province of Friuli, famous for its altar by Ratchis. The Church of Santa Maria in Valle in Clivdale, also possesses some remarkable pieces of sculpture of this period of art, to which we may also safely attribute the monuments in the

\* We give the statement of our Italian correspondent as a piece of news, "without prejudice," as the lawyers put it. Probably most English readers will think Count Sacconi might as well have let it alone. The exterior as it recently existed was at all events "real Sangallo," which is something; what it is after the operations here described it would be rather difficult to say.—Ed.





THE BUILDER, SEPTEMBER 14, 1889







WINDOW FOR LIBRARY, DREW THEOLOGICAL INSTITUTE, MADISON, NEW JERSEY.

DESIGNED BY MR. HENRY HOLIDAY EXECUTED BY MESSRS. POWELL AND SONS.







Residence, Worcester, Massachusetts.—Mr. W. R. Emerson, Architect.

Church of S. Salvatore, in Brescia, as also those in Theodora's tomb in the City of Pavia. These works were mostly executed under the superintendence of Greek artists, and the author proves this theory by comparing these sculptures to those of the Athen's Cathedral, of the Church of Belshah, in Syria, and of the Castle of Safa, likewise in Syria. This period of art was followed by one in which we can clearly see the Italo-Byzantine style, viz. imitations of Greek artists by Italian ones. It flourished in Rome principally under the Pontiffs Hadrian I. and Leo III. To this period we owe the Churches of S. Maria, in Cosmedin, S. Saba, S. Prassede, as also some sarcophagi in the Church of St. Apollinare, in Ravenna, and some sculptures in the Churches of St. Michel, in Capua, St. Ambrogio, in Milan, and St. Vincent, in Prato (Tuscany). The book finishes with a chapter on architecture in the Lagoon and the Province of Venice from the year 976, by order of the Doge Peter Orleolo I. (a. 976).

This book does honour to its author, and will, doubtless, meet with a hearty reception both in Italy and abroad by the lovers of ancient art, history, and especially Italian art. L. B.

**Plumbers' Work.**—At the Municipal Buildings, West Hartlepool, a few days since, the Mayor (Mr. Alderman G. Pyman) held a meeting to present certificates of registration to plumbers in the district. He expressed his strong sense of the importance of the action taken by the Plumbers' Company to improve the workmanship of plumbers, and referred to the necessity for apprenticeship. Dr. Courley, Medical Officer of Health, said that his professional duties convinced him of the necessity for plumbers' work being carried out by thoroughly qualified men. Mr. Barrett, head-master of the Athenaeum Science Class, advocated the establishment of a special class for instructing plumbers in the theoretical as well as the practical branches of their craft, and he referred to the action being taken in the matter by Mr. L. Robson. Councillor Armour, Secretary of the North of England Registration Council, attended, and explained the steps which are being taken by the Plumbers' Company to give effect to their desire to impart technical and scientific education to plumbers, in addition to a thoroughly practical knowledge of their trade.

#### RESIDENCE, WORCESTER, MASSACHUSETTS.

THIS is an illustration of a house erected from the designs of Mr. E. W. Emerson. The lower story is built of "field stone," the walls and roof being shingled and stained. In the interior the first story is finished in oak, ash, and cherry, and the second story in stained pine.

#### LIVERPOOL AUTUMN EXHIBITION.

OWING to the disagreement of the Town Council last Spring respecting the purchase of Sir Frederick Leighton's "Captive Andromache," it was at one time doubtful whether there would be any exhibition at all this autumn. However, the Liverpool Corporation inaugurated their nineteenth annual gathering last week, with a collection of pictures of more than average excellence. It includes not only some of the best pictures from the London 1889 Exhibitions, but also very agreeable and interesting works from the studios of France and the Low Countries. The local artists show well to the front.

Figure subjects and portraits comprise the most notable exhibits. Mr. Orchardson's "Young Duke" occupies the place of honour. Mr. Kennedy's "Neptune," Mr. J. M. Swan's "Prodigal Son," Mr. Halswelle's "Blasted Heath," and Mr. Goodall's "English Landscape" (a new departure) may be singled out for their worth. Much cleverness is displayed in the portraits in this collection. Amongst them may be found those of two architects, Mr. E. R. Robson, by Mr. C. E. Halle, and Mr. Edmund Kirby, by Mr. Percy Bigland.

This year sculpture has been encouraged by an improvement in the manner of its display. Formerly, in passing through the picture galleries, one used to stumble against a plaster or marble group, and be thankful to have escaped injuring and injury. Now the sculpture exhibits are all arranged together in the same room. The Committee's favours have, however, been turned from Architecture, whose contributions may be seen hanging on the entrance staircase walls,—a situation where, we are sorry to say, a careful study is impossible. Perhaps the quality of the works submitted has had something to do with the

selection of so inferior a place for their exhibition.


There are one or two drawings by London draughtsmen which have already been noticed in our Royal Academy criticisms. The rest, with one or two exceptions, are of a poor description: the defective perspective in one is so glaring as to cause astonishment at its acceptance. If the Arts Committee were less tolerant, and fearlessly rejected all incompetent work, their exhibition probably would include not only London and other provincial works, but also representations of the best local architecture.

**Glasgow Architects and the Royal Scottish Academy Charter.**—Last week a meeting of architects was held in the Religious Institution Rooms, Glasgow, Mr. J. Gordon, President of the Glasgow Institute of Architects, in the chair. In opening the proceedings the chairman explained that the meeting had been called for the purpose of considering what action, if any, should be taken in view of the application of the Royal Scottish Academy for an amended charter. That body, as they were probably aware, was founded in 1838, ostensibly for the advancement of painting, sculpture, architecture, and engraving. How far it had served its purpose in regard to painting was a question for painters to determine. In respect, however, of architecture, he thought they were pretty well agreed that its action in the way of advancing architecture had been nil. After fully fifty years' existence the Royal Scottish Academy was now applying for an amended charter, with additional privileges. It was thought, therefore, that the time was suitable for endeavouring to secure a fuller recognition of the claims of architecture by that body, and a better representation of architects in its membership. How these were to be secured was a question they had not met to determine. The architects of Edinburgh were moving in that direction, and he believed they had appointed a committee. The present meeting had been called to consider whether a committee of the Glasgow architects should be appointed to associate with their friends in Edinburgh. The discussion took place in private, but it was ultimately agreed to adopt the suggestion of the chairman, and a committee was appointed to co-operate with Edinburgh architects.—*Scotsman*.



## Illustrations.

THE CENTRAL FOUNTAIN ON THE  
CHAMP DE MARS.

 HIS ambitious and somewhat tumultuous work, which occupies the axis of the Champ de Mars half-way between the Central Dome and the Eiffel Tower, like some other things in its vicinity is not perhaps in the best taste, but atones to some extent for this defect by its remarkable life and vigour; and considering that it was all designed and executed in the space of eighteen months, it is really a *tour de force* of sculptural ability. When the idea of a central fountain for this position was first mooted, M. Formigé, the architect, was asked to furnish a sketch of an idea for it, which he did; but it was not every sculptor who would have undertaken, like M. Coutan, to complete it in the short time allowed for so large a work.

The idea is that of the figure of Progress carried along on the ship emblematic of Paris; the figure was originally to have represented "Paris" itself, but the idea of "Progress" was afterwards substituted, as wider and more suggestive in its associations. The meaning of the trumpet-blowing figures on the prow is obvious enough; the other figures round the central one represent Art, Agriculture, Commerce, and Industry; at the helm sits the Republic in a Phrygian cap; and at the prow may be observed the Gallic cock in very full crow. The figure tumbling backwards off the ship, in the foreground, is "Ignorance"; a female figure on the other side (not seen in the illustration), thrown overboard in similar fashion, symbolises "Routine," concerning whom a French contemporary, describing the fountain, exclaims parenthetically "Bon Dieu! que Routine a des charmes!" which is perhaps true in more senses than one. These tumbling figures form a far too *pronounced* incident for sculpture, and have a rather absurd appearance; and of the commonplace character of the fat women on dolphins round the edge of the basin we have before spoken; whether M. Coutan is also responsible for these we do not know; probably not; they belong to the ornamental gardening style of sculpture.

The whole group is no doubt wanting in repose and harmony of line for a piece of monumental sculpture; but it is redeemed by its great vigour and spirit of action and expression; and as a work produced on short notice and against time it shows a power of improvisation that is truly remarkable.

WINDOW, DREW THEOLOGICAL  
INSTITUTE, NEW JERSEY.

THIS window, designed by Mr. Henry Holiday for the Library of the Drew Theological Institute at Madison, New Jersey, was described in a "Note" in a previous number (page 151, ante). The idea, as then described, is to represent "Theologia" as enthroned in the centre of the composition, with moral virtues and intellectual powers grouped around in the outer part of the circle, while Humility occupies the central position below, as leading the young up to the knowledge of God. Taking the word "Theologia" in its widest and deepest meaning, the conception is a fine and a true one. Of the composition the reader can judge for himself; we wish we could enable him to judge of the colour, which is very fine and harmonious. The centre portion of the window is the richest in colour, the draperies of the side figures being kept in rather lower tones even in the warmest portions, so as to give climax to the centre.

The drawing is reproduced from Mr. Holiday's full-size cartoon, from which the window has been very well executed by Messrs. Powell & Sons.

## CHAPEL AND SCHOOL, BECKENHAM.

THE Chapel, which was built some four or five years ago, was won in a limited competition, the design including the school-building.

A different building committee being now in existence, the design for the latter has been considerably revised. The plan now consists of central hall, with class-rooms on three sides, the hall being lighted by windows above the level of their roof. A church parlour, with separate entrance, vestries, &c., are also provided.

The materials used for the walling are stock bricks, with red bricks for the arches, quoins,

and buttresses. The stone is Doulting, supplied by Trask & Co., of Ilminster, Somerset. The roofs are covered with Broseley tiles. The works are being carried out by Mr. Kick, of Bromley-road, Beckenham (whose estimate amounts to 1,650*l.*), from the designs of Mr. Edward W. Mountford and Mr. Herbert D. Appleton, who are joint architects of both church and school.

## LIBERAL CLUB AT KETTERING.

THIS building, which was opened on April 27 by the Right Hon. Jas. Stansfeld, M.P., occupies a commanding position in one of the chief thoroughfares of Kettering. The irregularity of the site, and the wish of the directors to have a balcony, gave rise to all the principal features of the structure. The front was set back, leaving the two large bay windows, while the sloping line of the side gave room for the circular bay, and the octagonal side turret. The accommodation is shown on the key plans, and includes refreshment-room, reading-room, lecture-room, billiard-room, and lavatories. In addition to this there is a second billiard-room on the top-floor, as well as store-rooms and another lavatory. At the back of the club is the caretaker's house, one room of which serves as a cloak-room or green-room, in connexion with the lecture-room, where entertainments will occasionally be given.

The materials used are red sand-brick and Weldon stone, all the moulded work being in the latter material. The first-floor and the upper floor are both double, *i.e.*, the ceiling has separate joists of its own. These floors are also pugged with 3 in. of coke-breeze concrete between the floor-joists. These precautions are found effectual, and prevent the noise of dancing in the lecture-room being heard in the refreshment-room. The heating is by open fires, supplemented by a delivery of warmed fresh air into the hall, staircase, ground-floor rooms, and lavatory. The ventilation is mainly by upcast shafts, forming part of the chimney-stacks. The shafts are merely covered over on top, and have wire netting over their openings, which are in the side. There has always been a good up-draught whenever tried. Kite's inlet ventilators are used in all the rooms, and the upper billiard-room has two of Kite's extractors. The stone windows have iron casements and fixed lights, except in the case of the large sheets in the front bay windows, which have solid wood frames. No alcoholic drinks will be sold, nor is the club likely to be used much for substantial meals, except on market days; all the necessary cooking, therefore, will be done in the caretaker's house.

The contractor is Mr. E. Barlow, of Rothwell, whose tender amounted to a little over 2,000*l.*; the sub-contractor for the plumbing work being Mr. E. Nicholls, of Northampton. The architects are Mr. J. Alfred Gotch, F.R.I.B.A., and Mr. Chas. Saunders, Kettering.

## HOUSES AT SNARESBROOK.

THESE houses are now being erected on the Grove Estate, near Snarebrook station, Essex. Each plot has an average frontage of 50 ft., with sufficient depth for tennis-lawn and garden in rear of house, whilst the roads are wide, and are to be planted with trees at the edge of the footpath.

The accommodation consists of four bedrooms on the first-floor, with bath-room and w.c., &c., over which is an attic bedroom, and a large room in roof, about 38 ft. by 18 ft. and 10 ft. high, suitable for a billiard-room, and with lights arranged to suit the table; or, in a family, where such a room is necessary, it would make a play-room for children.

The materials used are, for the roofs, brown Broseley tiles, the gables being hung with bright red tiles; the exterior of the first floor is rough-cast and half-timbered, with the ornament shown modelled in cement; the facing bricks of the lower part are red Suffolks.

The houses are being carried out from the plans and under the superintendence of Messrs. Potts, Sulman, & Hennings, architects, who are also laying out the estate.

**School, Southborough (Kent).**—It is proposed to build a mixed school at High Brooms Southborough, near Tunbridge Wells, for the accommodation of 250 children, the building to be of local bricks, with terra-cotta dressings. Messrs. Brett A. Elphicke and Albert Howell are the architects.

## THE TRADES' UNION CONGRESS.

As a pendant to the account which we gave last week\* of the opening proceedings of the Trades' Union Congress at Dundee, we call from the voluminous reports which have appeared in the Scotch papers a few items which will be of interest to many of our readers.

## The Eight Hours' Question.

Mr. James Maudsley, Manchester, presented the report of the Parliamentary Committee on the vote of the trades on the eight hours' question. There were only, he said, some thirty-three societies which had made returns on the subject. That was not altogether satisfactory, especially as these societies represented only 169,540 members, a comparatively small proportion of the Trade Unionists in the kingdom. In favour of an eight hours' working day there voted 39,629 members, and against it 62,883. Of those in favour of an eight hours' working day, 28,489 had voted for obtaining it by Act of Parliament, and 12,274 for securing it by the trade organisations. Taking the total vote as 102,512 out of the 169,540 recorded, he found that the majority against an eight hours' working day was 23,254.

Mr. Birtwhistle, Accrington, said that the minority in favour of an eight hours' working day had to be reduced by 3,000, because the Ayrshire Miners' Union, which was returned to Congress as having 1,000 members, had recorded 10,000 votes in favour of an eight hours' working day.

Mr. Keir Hardie said that they had 10,000 miners in Ayrshire, and they simply had taken their votes upon the question.

## Employers' Liability.

Mr. E. Harford, secretary to the English Railway Servants' Society, moved the following resolution:—"That this Congress is of opinion that the Employers' Liability Act should be so framed as to prevent contracting out of its provisions, place no limit to the amount of compensation recoverable, or require notice of injury to be given by the *employee*. It, therefore, instructs the Parliamentary Committee to prepare a Bill embodying the foregoing provisions." They would, he said, be satisfied with nothing less than an Act out of which employers could not contract themselves. They were averse to that specious legislation which pretended to give with one hand while it took away with the other. Some of the provisions of the Government Bill of last session were of the most objectionable character. A great deal was said about freedom of contract; but where was it to be found when a man must either work or starve, and when an employer had the power of saying that he could give employment, but that it was of a risky and dangerous character, and the workmen must insure against any accident? They were not in favour of litigation for the purpose of securing compensation. What they wished was due provision for the prevention of accidents, and he was pleased to say that those railway companies which had not contracted themselves out of the Act had made greater provision for the safety of their workmen, while those who had availed themselves of insurance schemes had not been so careful of life and limb.

Mr. J. H. Wilson, Sunderland, seconded the motion.

Mr. Johnstone, Durham, moved as an addition to the resolution:—"That this Congress approves the action of the labour members in opposing the Bill of last Session." They should, he said, repudiate Mr. Bradlaugh and men of that stamp, who represented themselves as the champions of the working classes.

Mr. Fordie, Edinburgh, supported the extension of the Bill to seamen, who had, he said, been shamefully neglected in the past.

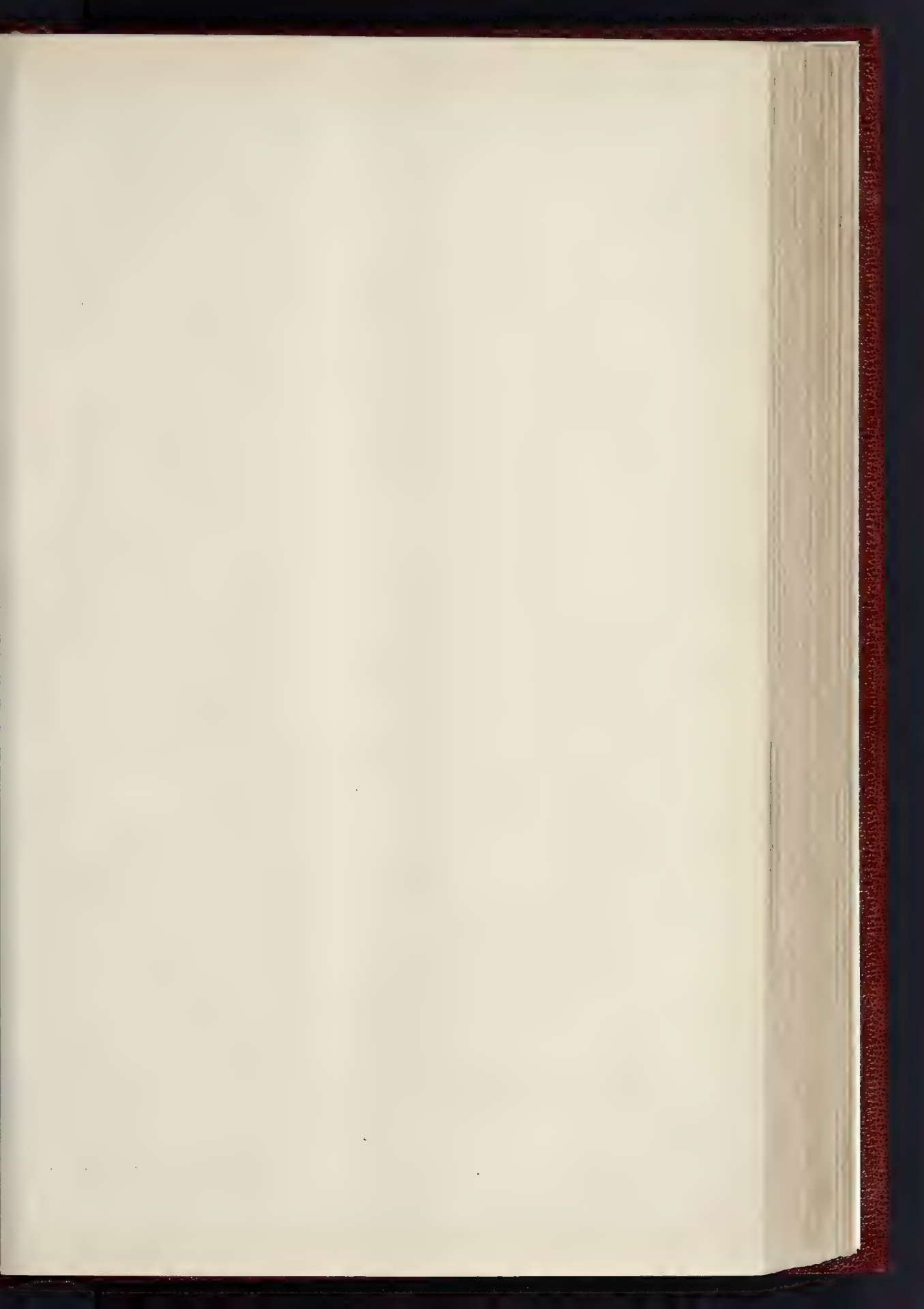
Mr. Harford accepted the addition to the resolution, and it was unanimously agreed to.

## Labour Representation in Parliament.

Mr. T. R. Threlfall, Southport, moved the following resolution:—"With the view of furthering the representation of labour in Parliament, this Congress instruct the Parliamentary Committee to render every assistance in securing the passing of a measure. First,—For the payment of Members of Parliament by the State. Second,—For the payment of the returning officers' expenses at elections from the local rates. Third,—We further recommend that, wherever practicable, labour organisa-

\* See p. 176 ante.







Fontaine du

THE CENTRAL FOUNTAIN GROUP ON

M. JULI





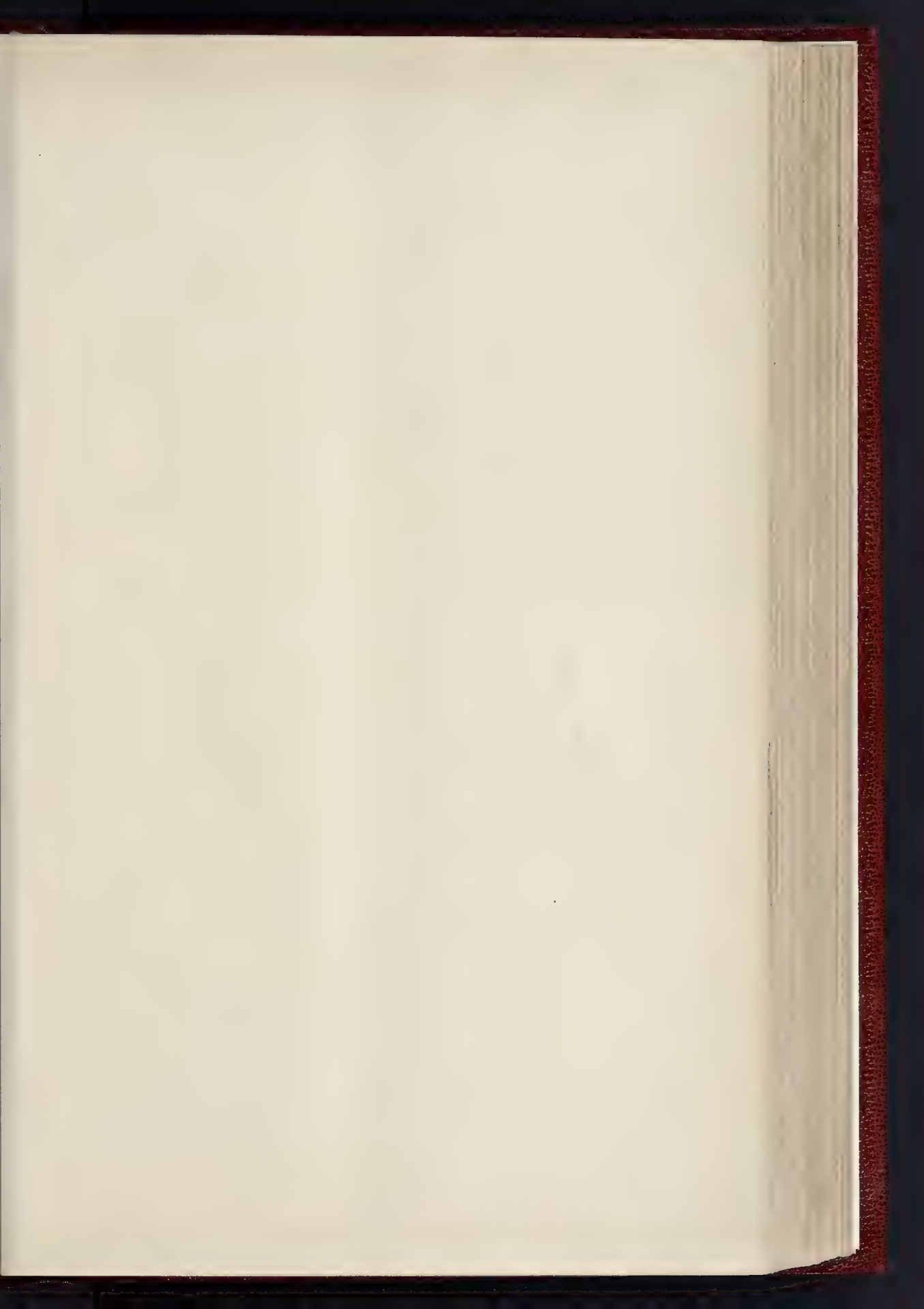
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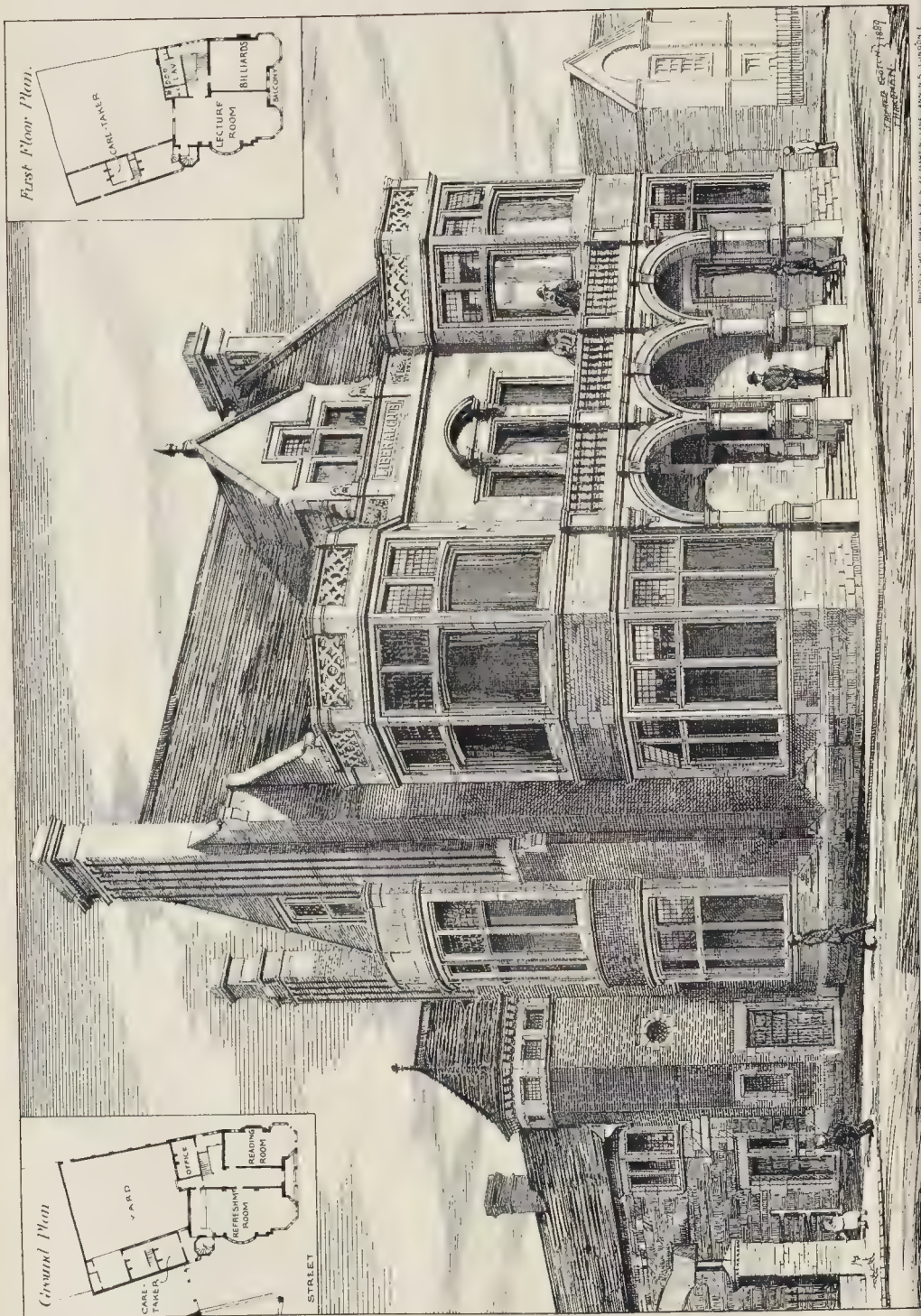
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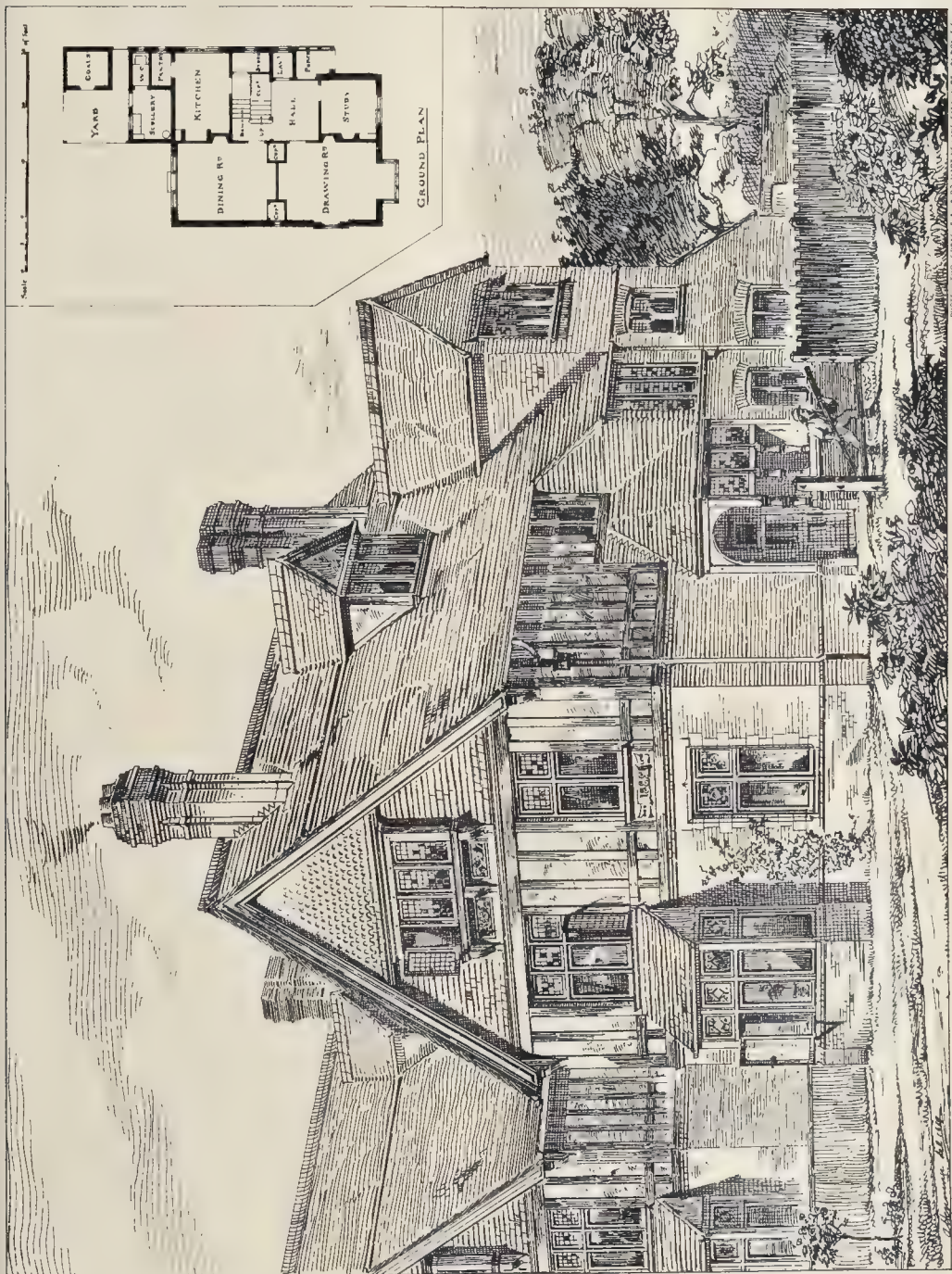




THE BUILDER, SEPTEMBER 14, 1889.



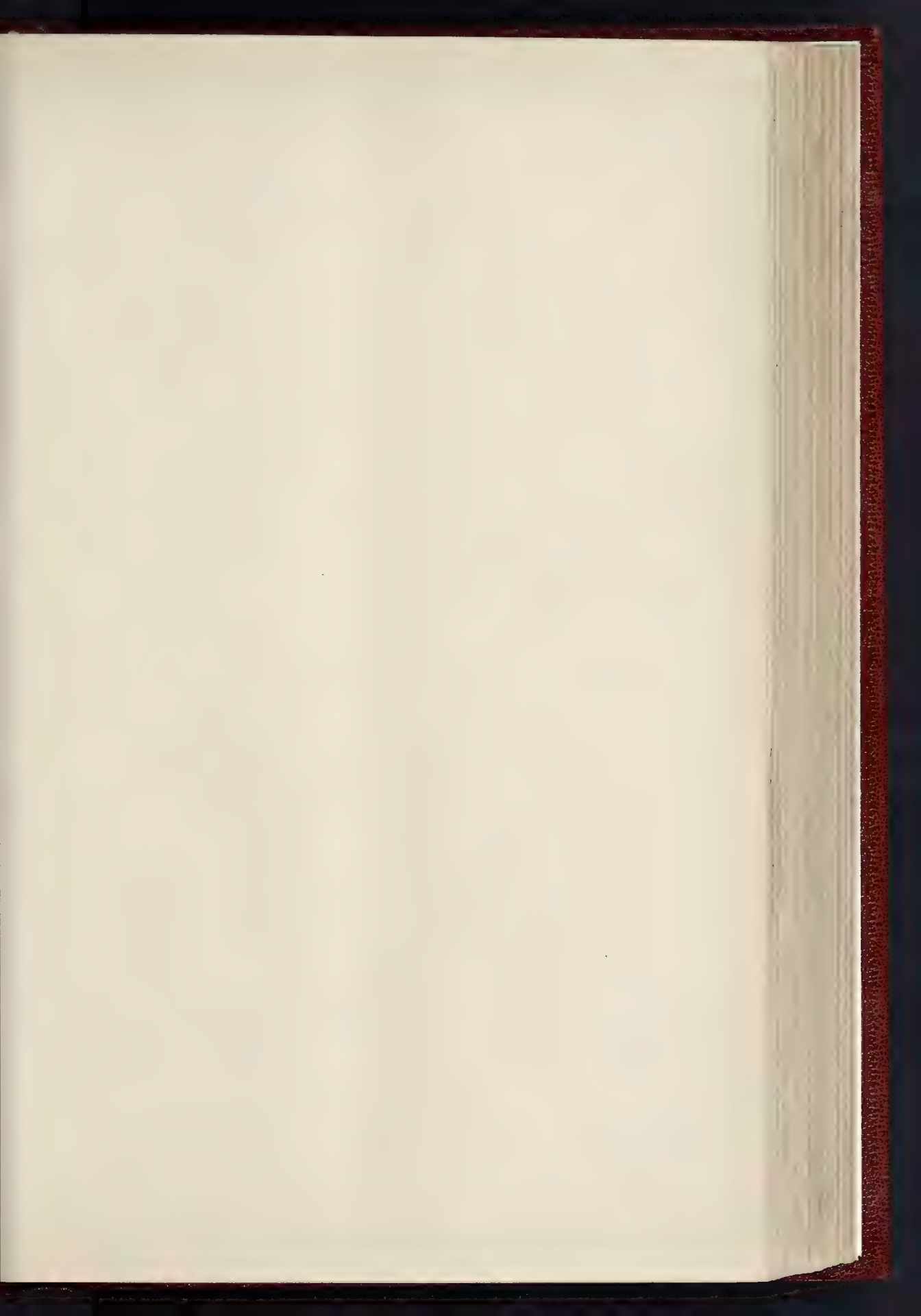


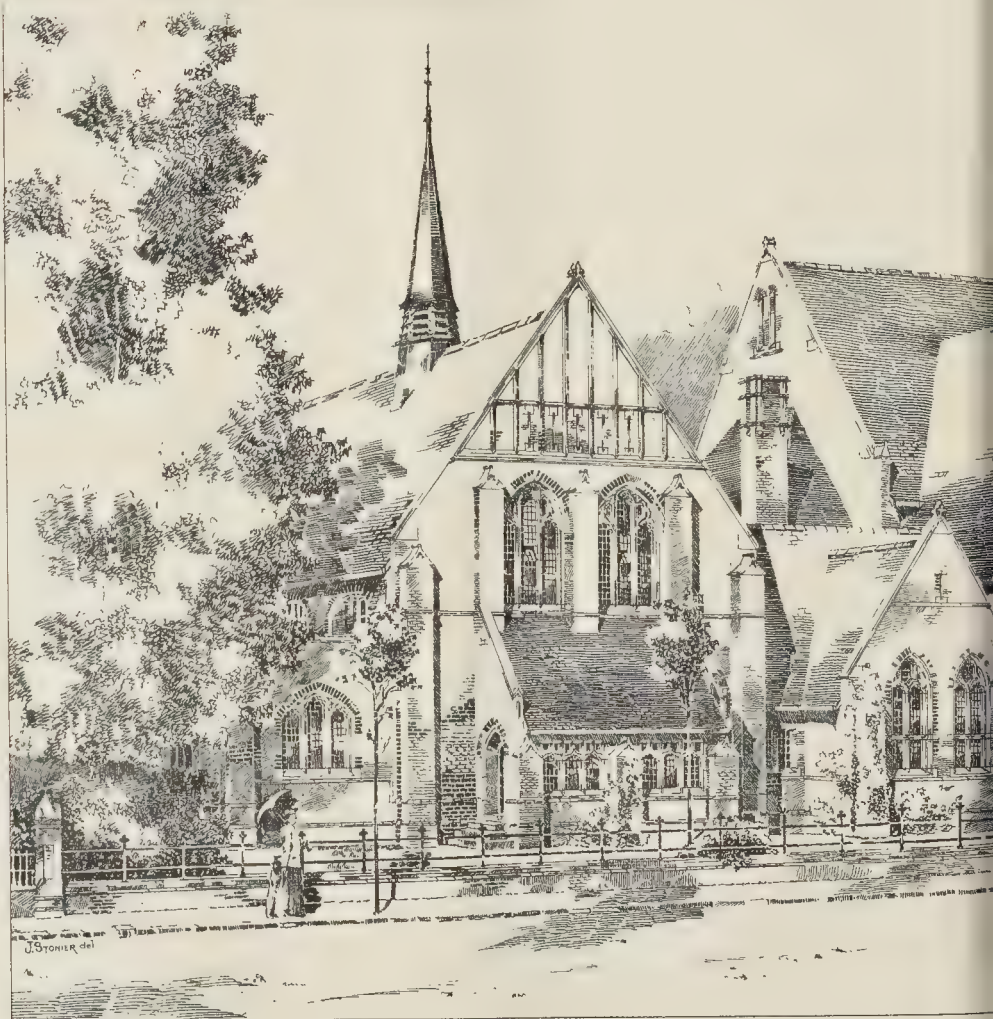
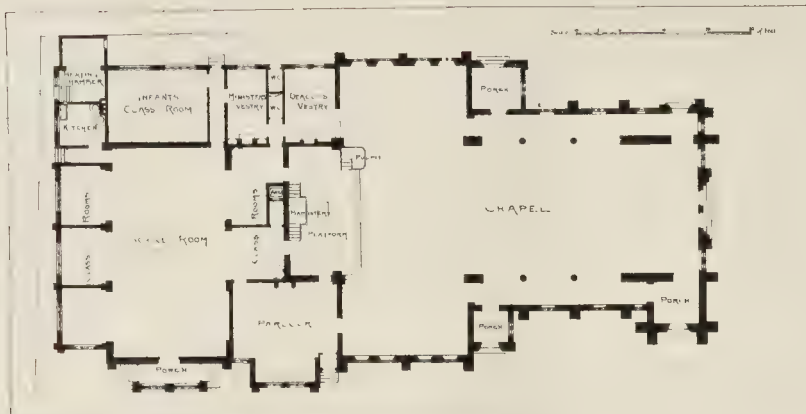


HOUSES AT SNARES BROOK.—MESSRS. POTTS, SULMAN & HENNING, ARCHITECTS.



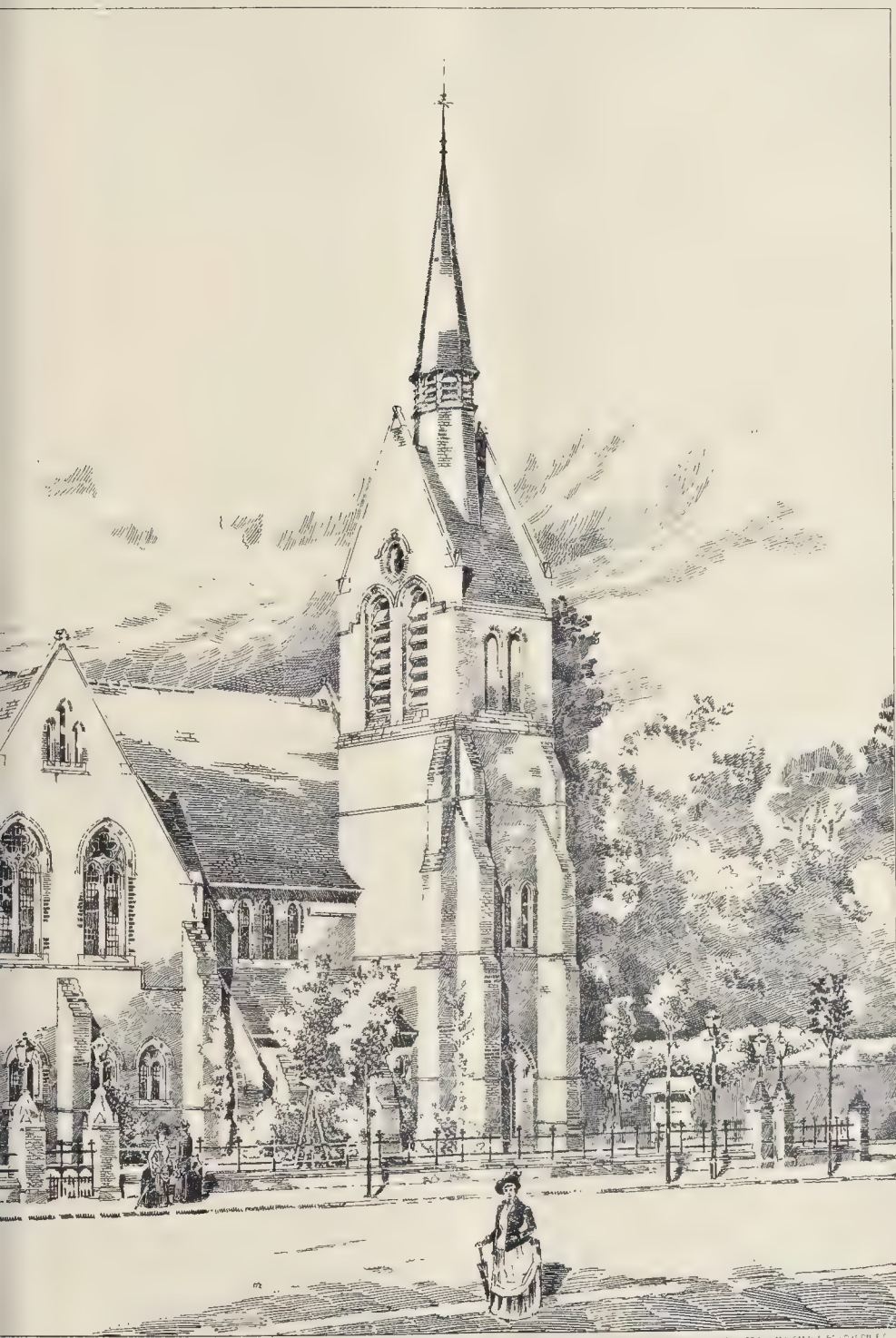






NEW SCHOOLS AND CHAPEL, BECKENHAM.—MESSRS. J. STONIER & SONS, ARCHT.









tions should take advantage of every opportunity of aiding in securing direct labour representation in Parliament, also in Town Councils and other local bodies." In speaking to the resolution, he said they might complain about their grievances till Doomsday, but until they sent men of their own class to the House of Commons it was useless to expect any thorough reform. Great and important progress was being made, but the labour movement must be kept in the hands of the trade unions, and not be left to those who might use it for their own purposes. State payment of members did not form an important item on the programme of either political party, but if the trade unions were true to their convictions it would soon go upon the political programme. It was not, in the ordinary sense, a party question. Both sides were afraid of it because it struck against the interests of the classes and favoured the masses.

Mr. Wilson, Sunderland, in seconding the resolution, urged that not only in Parliament, but in Town Councils, they should have more representation, and they should also have a larger number of labour men as magistrates on the bench.

Mr. Henry Tait, Glasgow, said the Durham miners had shown them how labour representation in Parliament could be maintained, and if they followed that example they would act more beneficially than in passing a resolution calling for State aid. What he proposed was that a fund should be formed at that Congress for the purposes of labour representation in Parliament, to be at the disposal of the Parliamentary Committee, who, along with the Congress and that Committee, would decide where candidates should be run. He indicated that he had little sympathy with some parts of the platform of the labour party, of which Mr. Keir Hardie was a member; and maintained that if they returned members of Parliament instructed on the views of the Congress, they would go far to lessen the influence of outsiders who aspired to be leaders of the working men.

After a long discussion, the motion was adopted.

#### Certificates for Engine Attendants.

Mr. J. Swift (Manchester) submitted the following resolution:—"That this Congress is of opinion that no person should be placed in charge of steam engines or boilers (sea or land) who has not undergone an examination to prove his practical fitness for such employment, and instructs the Parliamentary Committee to render all the help they can to secure legislation in this direction during the coming year." He said that a competent engine or boiler attendant would be able to discover and point out defects which to the mind of a man without knowledge and experience would present no danger and receive no notice. Were all engine and boiler attendants duly qualified, the number of accidents and explosions would decrease.

Mr. T. Ball (Leeds) seconded the resolution on behalf of the enginemen of the United Kingdom. It was supported by several speakers, and adopted.

#### Factory and Workshop Inspectors.

Mr. W. Inskip, Leicester, moved:—"That in view of the evidence adduced before the Lords' Commission on 'Sweating,' together with the facts that in factories, mines, and upon railways inefficient inspection takes place, it be an instruction to the next Parliamentary Committee to take the necessary steps to bring the following before the Government of the day:—That this Congress is of opinion that the present evils of the 'sweating system' have been brought about mainly by the inadequate way the Factory and Workshops Act has been administered, and that a further number of practical working men be appointed as inspectors of factories, workshops, mines, and railways." He said that the disclosures made at the Sweating Commission proved the necessity for an increase in the number of inspectors. People were amazed at the increase of 'sweating' and the want of proper inspection. It was for the Congress to insist that a larger number of inspectors should be appointed, and he was convinced that that would go far to secure the amelioration of the working classes specially affected.

Mr. Fenwick, M.P., said he would second the resolution, provided there was added after the word "administered" the clause—"also, seeing that the Shop Hours Regulation Act of 1886

has failed to accomplish the object for which it was passed, owing to the fact that no authority is responsible for the enforcement of its provisions."

Mr. Inskip said he would accept the addition, as it went in the direction of demanding that more working men should be appointed as inspectors.

Miss Whyte (London) was understood to move an amendment to the effect that women inspectors should be appointed where women were employed.

Eventually the resolution, thus amended, was adopted.

#### Labour Legislation: The Eight Hours Day.

Mr. Keir Hardie then moved:—"That this Congress instructs the Parliamentary Committee to take action on the following resolutions:—

(1) The passing of labour legislation being a necessity in all countries to meet the industrial development of recent years, and to prevent further physical and moral degradation of the workers, the Congress proposes the following as a basis of such legislation:—(a) The maximum working day for all trades to be eight hours. (b) Prohibition of the industrial work of children under fourteen years of age, and restriction of the work of young persons under eighteen years of age to six hours per day. (c) Prohibition of night work, with the exception of those industries in which continued work is an absolute necessity. (d) Prohibition of the employment of women in such industries as are known to be specially hurtful to the female organism. (e) Absolute prohibition of night work for women and young persons under eighteen. (f) A rest of at least thirty-six uninterrupted hours each week. (g) Prohibition of such industries and such modes of production as are specially injurious to the worker. (h) Proper inspection of all working places where industrial work is performed, domestic industries included, by a sufficient number of inspectors paid by the State, of whom at least the half must be nominated by the workers themselves. (2) The Congress further declares that these reforms can only be finally established by legal enactment, though much may be done to advance them by the ordinary trade union methods. It therefore calls on the workers to organise politically and industrially, so as to realise these reforms soon. (3) That the Congress declares it to be the duty of all workers to support the Swiss Government in its desire towards an International Congress of the Governments of the world, in order to formulate international treaties for the better protection of labour. (4) The Congress approves of the proposal to make May 1, 1890, a universal holiday on which to hold mass meetings in furtherance of the eight-hour working day." In speaking to the resolution, he said he had attended the Paris Congresses. Those who attended these Congresses came from all parts of the world. Some of the delegates were trade unionists, some were members of political labour parties; nearly all were socialists,—though there were some who were not. He wanted to read to the Congress what Socialism became in the hands of international Congresses practically composed of Socialists. The resolution he submitted was just the programme of the Congresses to which he had referred. He suggested that the whole of that resolution, with the exception of subsection A, be either deleted or left over until they had decided what action that Congress was prepared to take upon the question of an eight hours' day obtained by legislation. That would simplify matters very much, and they would have a full and fair discussion on the eight hours question. Then he was prepared to agree that the other parts of the resolution should be voted upon *seriatim*. Proceeding to deal with the merits of the question, he said the argument with which they were met in advocating an Eight Hours Bill was that it would so affect their trade and so increase the cost of production that it would be impossible for this country to compete with Continental nations. He was quite aware that competition with their continental neighbours grew keener every year, and that so long as peace continued it must grow keener; but he would have them remember that on the Continent the principles of his resolution were making rapid progress. Judging by the signs of the time,—especially by recent declarations in Germany,—he feared that Great Britain was not to have the honour of setting an example to the other nations in the matter of shortening by legislation the

hours of labour of the workmen. The problem of the age was how to dispose of the surplus labour at present in the market. A great army of men whom no man could number were ready to take their places in their workshops if a dispute about wages should arise. Emigration would not remedy the evils complained of in this connexion, neither would the nationalisation of land. The reform he advocated—an Eight Hours Bill—could be obtained from Parliament in a fraction of the time it would take to bring about the nationalisation of land. Why did their men work long hours? It was because they were compelled to do so. If all men joined the trade unions they would not require to go to Parliament for that reform. But all men would not join the unions, and as the trade unions suffered, they, in self-defence, were bound to seek legislative authority to help them.

Mr. Cronin, Glasgow, in seconding the resolution, said the question was one which they had to face, and he believed the proposal to establish an eight-hour working day would be carried into effect. It had been said that this was a Socialist question, but it was nothing of the kind. It was every day taking deeper root among the working classes, and the sooner it was taken up by the trade unions the better. If it was allowed to drift into the hands of Socialists, they would have themselves to blame.

Mr. Harvey, Derbyshire, complained that the result of the ballot on this question had not been printed for the information of members, and said there was an idea that the question was being burked.

An explanation of the delay in getting the printing done having been given on behalf of the committee, it was agreed to adjourn the discussion till to afternoon, with the view of endeavouring to get the details of the voting officially supplied to delegates.

After luncheon Mr. John Wilson said he had seen Mr. Hardie, and had arranged with him that the whole of the resolution, with the exception of section A, should be taken up now; and that section A should be discussed after the slips had been circulated. This was agreed to; and then it was resolved, on the motion of Mr. Wilson, "That section A, dealing as it did with the eight hours question, should be the first order of the day to-morrow morning."

Mr. Hardie then submitted his resolution, deleting section A in the meantime, and explained the proposals he advocated.

Mr. Newstead, London, seconded the motion.

Mr. Corbett, Nottingham, moved the previous question as regarded all the remaining questions embraced in Mr. Keir Hardie's resolution. This was seconded by Mr. Galbraith, Durham, and, on a division, carried by 75 votes to 49.

#### Trade Federation.

Mr. Juggins, Darlaston, proposed:—"That in the opinion of this Congress the time has arrived when the various trades should be drawn into closer unity, and requests the Parliamentary Committee to draw up some system of federation for the consideration of the next Congress."

Mr. Keir, Aberdeen, a blind delegate, in seconding the resolution, said that the Aberdeen Trades Council had been endeavouring, particularly last year, not only to federate the trades already organised, but to secure the union of trades that were still without organisation. In this they had succeeded to a very large extent; and he suggested that some of the Trade Unions in the south might take a leaf out of their book, though they were so far north.

The resolution was unanimously adopted.

**Sewer Disinfection.**—We have received an account of an experiment made by Mr. John Shaw, of Willington-on-Tyne, in deodorising and disinfecting the emanations from sewer gullies-holes. It is the old idea of a basket of disinfecting material; but in place of charcoal, the basket is filled with pieces of coke saturated with paraffin. In the report of a trial made with it recently at North Shields, it is stated that the method operated satisfactorily in preventing smell where it was previously very perceptible. The cost of filling one basket is about 9d., and it is stated that it retains its efficiency for a year. We should presume that the smell of paraffin is to some extent substituted for that of sewer air, and that may be almost as disagreeable to some persons; but it will probably not be so bad for them.





Residence, Glen Ridge, N.J.—Mr. W. C. Hazlett, Architect.

#### RESIDENCE, GLEN RIDGE, N.J.

THIS is what is called in the States a "frame-house" of timber, with stone foundations. The interior is finished on the ground-floor with hard-wood, and the remainder with white pine. The cost was 6,500 dollars. The architect was Mr. W. C. Hazlett, of New York.

#### ARTIFICIAL VERSUS NATURAL STONE.

SIR,—It may seem a paradox to ask which is best—natural stone or artificial stone? I, however, having examined carefully into the question, find no difficulty in answering in the most positive manner that for many purposes well-made artificial stone, composed of granite, sand, and hydraulic lime, Portland cement or blue lias cement, mixed in due proportion and formed into flagstone, ashlar, steps, copings, window-sills, and, indeed, all forms for which stone is used, moulded or plain, artificial stone is beyond all compare the cheapest and best. Look at the dictionary for the word flagstone, and you will find that it means "a stone that separates in flakes or layers,—a flat stone used for paving." Then look for homogeneity, which means a substance all of one kind throughout, which artificial stone is.

I have recently been to Croft, near Leicester, and have seen the natural granite kerbs and paving sets, and paid special attention to the artificial stone and flags, and consider that there are no better in the trade. I have also again walked over the York flagged foot pavements in the West-end of London, and can only say that in wear they are true to the name flagstone,—a stone which wears in flakes. There is not a single square yard of foot pavement of Yorkshire flags which has been six months in wear which is not showing flakes. The artificial Croft flags, on the contrary, will wear to the last, and be sound. As a trial and test for wear betwixt natural Portland stone and artificial Portland cement stone, at a bank in London, there are two doors. At one there was a natural stone, at the other an artificial stone, and this wore out three of the real stone.

September, 1889. ROBERT RAWLINSON.

#### CONCRETE FLOORS.

SIR,—I am disposed to believe that Mr. Ferguson may be right in his idea that "some form of gypsum, or sulphate of lime, is better adapted than Portland cement, or carbonate of lime," for concrete floors, were it not for the question of expense. I believe the cement used for Dennett's fireproof flooring is lighter, equally strong, more fireproof, and, above all, much less prone to expand and contract than Portland cement; but the prices obtained for Dennett's flooring are too high to enable it to compete with wood flooring for ordinary dwellings.

I suppose Mr. Ferguson, in advocating the employment of slabs of fibrous plaster as a permanent centering and ceiling, does not overlook the fact that these slabs would still need temporary supports; so that the cost of the fibrous plastering would be substituted for cost

of use of planking only. I think the result could not fail to be more expensive than by the method of waterproof centering, which I am now using, and have recently described.

When replying to Mr. Fawcett's first letter, I was unaware that he had in the market a method of his own. But I subsequently saw his advertisement in the *Builder*, and at once felt it would ill become me, as a mere architect, to publicly discuss with Mr. Fawcett, or any other manufacturer, the merits of his own material and methods.

It appears to me (but I may be mistaken) that Mr. Fawcett's flooring must be more costly than simple slabs of concrete; because of the quantity of both iron and terra-cotta employed. At the same time, Mr. Fawcett's method may possess special advantages for special cases, where cheapness is less essential than for ordinary dwellings.

In mentioning half-a-crown a yard as the amount saved by omitting joists and one-coat ceiling, Mr. Fawcett leaves out the cost of the remaining two coats of ceiling and of the flooring boards themselves. My contention amounts to this: that the floors of the upper rooms of cottages and small houses, if of good concrete slabs, say 4 in. thick, would possess enormous excess of strength, and would cost not more than wooden floors and plaster ceilings *per ordinaire*. It is for this class of work, offering safety from fire to the common people, that I think any construction of confined iron girders, terra-cotta, and concrete inapplicable, because too expensive. The prices at which considerable contracts for concrete flooring, done under my direction, have at various times been taken (and which I am, of course, precluded from publishing in detail), justify my contention that fireproof dwellings need cost no more than non-fireproof ones.

I may perhaps be permitted to add that if we, in a discussion of this sort, do not welcome the expression of opinion from personally interested manufacturers, as well as from less personally interested architects, we may miss much practical information of real value. It is the men who actually work with a material who ought to,—and generally do,—know most about it. We are all aware "there is nothing like leather"; still, if we wish to reach a good understanding, even of leather, we must not pillory the leather-makers; and I do not suppose Mr. Potter meant, or wished, his remarks to have that effect.

As this letter is long enough, I reserve till next week my reply to Mr. Sutcliffe's thoughtful communication, which will involve a diagram or two, probably requiring time for your printer to execute.

FRANK CAWS.

#### BACTERIA IN WATER.

SIR,—Permit me to supplement your useful articles on water supply by a few facts touching the bacteriological side of the subject.

It is generally recognised by Koch, Klein, and other investigators, that disease in the animal body is not so much caused by pathogenic micro-organisms as by the alkaloidal action of the poison ptomaines they elaborate; therefore we need, even more than destruction of the parasite, destruction

of its products also. It is thus that bacterium termo and its kindred of the putrefactive group acts, and it is not correct, as quoted in the article, to say such organisms are "not capable of communicating disease to man." Further, it is well established that chemical agents do not act similarly on dissimilar organisms,—some are killed, whilst others retain their action. The destructive effect of the putrefactive microbes is often illustrated in cases of poisoning by tainted foods, and in a recent report in the *Home Secretary* I communicated the hypothesis that the late Mr. Maybrick, of Liverpool, not improbably died of such disease: certainly no one can deny that the acute and post mortem symptoms were exactly those of ptomaine poisoning. The summer diarrhoeal epidemics, too, are caused by activity of cadaverous parasites obtaining lodgment in the intestinal canal, where they luxuriate especially in the milk diet of infants. This fact I prognosed long before discovery of the organisms, and met it by antiseptic treatment. Thus much for the injurious working of putrefying organisms operating under conditions favourable to growth.

True, it is too frequently the practice of young microscopists to report that a given quantity of such a water or sewage contains so many organisms without indication of their nature, thus reducing the value to zero. Every microbe or colony of organisms may be identified by painstaking investigation. This is assuredly so as regards the disease organisms, large numbers of which are now differentiated.

We realise the wondrous ways of Nature in controlling the intensity of harmful micro-organisms; one is restrained and attenuated by a dry atmosphere, another by cold, the next by a spell of hot weather. Other species die by exposure to the sun's rays; many are warred upon by other bacteria; whilst probably all genera of the pathogenic are consumed by paramoecia and other groups of the higher organisms. Again, prophylactic action of the fluids of the healthy body destroys many organisms. Finally, others of a highly dangerous type are at once killed in passing into the sewer or cesspit!

To these diverse ways of disposing of a redundancy of bacterial life, man has added many varieties of so-called disinfectants, as Dr. E. Klein, F.R.S., our greatest authority, calls them; he adds, "which for the purpose are useless and deceptive, involving a waste of otherwise useful materials."

Dr. Frankland's dictum, quoted in the article, that because common bacteria are destroyed by certain agents, harmful bacilli are similarly killed, is antiquated and false, as is well known to those familiar with the subject.

Take, for instance, the carbolic acid of commerce,—which, by the way, paradoxically contains little or no carbolic acid,—one part in 400 of water at once destroys all putrefactive organisms as well as the common aerial moulds. But Von Esenbach reports that carbolic acid in the proportion of 1:20 does not kill anthrax spores until after twenty days' submersion. On the other hand, the innocuous Periodate, lately reported on by Dr. Klein, instantly kills cholera bacilli and typhoid fever bacilli when diluted 1:5,000, which is not the limit of dilution. Investigations in my laboratory, at present unpublished, show that all putrefactive microbes and the poisonous ptomaines they create are destroyed when Periodate is used as 1:250,000; although, strictly, the aerial moulds are not much affected by it,—in favourable conditions even growing more vigorously in suitable culture when diluted 1:5,000 in presence of Periodate. But these moulds are harmless, and may even be necessary to the digestive functions, as we are always swallowing and inhaling them.



Thus, it is shown to be fallacious to test the action of a supposed antiseptic or disinfectant against organisms possessing neither septic nor infective properties; still more so to infer pathogenic destructive powers to a chemical preparation because it restrains innocuous organisms; and yet this is but too frequently the course pursued by many investigators, to the mystification of the public. Let the patient student be not dismayed by the apparent anomalies of the various schools of researchers, chemical or bacteriological, whose methods and meanings may be untravelling and understood by careful study. The future will reveal to the inquiring mind, now known to the expert, practical methods of eliminating hurtful microbes from water used by the household for potable purposes, or by the mariner and traveller who draws supplies from the malarious shores of the ocean, as well as for the effective treatment of sewage for deodorisation or disinfection.

RICHARD WEAVER.

#### PROVINCIAL NEWS.

**Exeter.**—On the 10th inst. the new Middle School for Girls, which has been erected by the Governors of the Exeter Episcopal Trust as a permanent home for the establishment in lieu of its present location in Queen-street, was formally opened. The Trust is an old one, having its origin in a fund started in 1709 by Bishop Blackall for educational purposes in connexion with the Church of England. Up to the present time the school has been located in the old Bankruptcy Court, in Queen-street, but this was never regarded as other than a temporary resting-place; the Governors from time to time considered various sites with a view to building, and at length they selected as a site a portion of the lands of the Trust abutting on the Pennsylvania-road, just above Hill's-court. The new school-buildings are from the designs of Mr. James Jerman, F.R.I.B.A., Exeter, and have been erected by Mr. William Gibson, also of that city. The building is Renaissance in style. The walls are of dark local brick—supplied by Messrs. Hancock—with Box stone dressings. The main entrance is of Box stone. The ground-floor is divided by a corridor extending the whole width of the building. On the front, to the south of the main entrance, there is a room for the head-mistress, and a classroom, while on the north side there are two class-rooms, each of these apartments being 24 ft. by 20 ft. On the opposite side of the corridor are cloak-rooms, offices, and a strong-room for the safe custody of deeds and papers, while in a southern wing on the ground-floor will be found the Kindergarten, 30 ft. by 18 ft., and a cloak-room. The first floor is approached by a broad stone staircase with iron railing, and it leads to a corridor similar to the one on the ground-floor. On one side of this corridor is the chief school,—a lofty room, with open-timbered roof. This room is 73 ft. by 24 ft., and at the southern end there is a dining-room, 24 ft. by 20 ft. The latter is shut off from the school by revolving shutters, so that when necessary the two rooms can be thrown into one. On the other side of his corridor, at the rear of the building, there are cloak-rooms and offices, while on the southern wing, over the Kindergarten, there is a classroom, and close by there are sitting-rooms for the assistant-mistress and student-teachers. The corridors are laid with encaustic tiles, manufactured by Messrs. Webb, of Worcester, and the floors of those on the upper story are of concrete, carried on iron cross girders. The interior walls are stuccoed and finished with alcazarium. The school and class-rooms also have dados of varnished deal, and the walls are of a pale green tint. In the corridors the walls are of a French grey tint. All the rooms are provided with fireplaces, rather for appearance than actual use, as the building will be heated throughout by hot-water pipes supplied on boilers situated in the basement. Messrs. Pippell Bros. & Row supplied the hot-water apparatus, and Messrs. Willey & Co. the gas-fittings. The carved work on the front and in the principal room was carried out by Mr. Harry Hems.

**Farnworth (near Bolton).**—What are described as "New Salvation Army Citadel buildings," are about to be erected for General Booth in Albert-road. The "citadel" will be of brick, and approached from Albert-road by a flight of steps, leading to four spacious terraces, two of which again lead to a deep gallery, octagonal in form, and extending across the front and round two sides of the building. The gallery intersects two tiers of boxes on each side,

capable of accommodating twenty-five persons, and these, in turn, are connected with the speakers' platform and amphitheatre-stage, the latter being formed in a recess behind a proscenium wall. Separate side entrances and staircases are provided for the boxes. The other front entrances lead to a commodious foyer communicating with the auditorium and left and right wing seats. In the side walls two extra exits will be provided, which are to be opened only from the inside in case of panic. There are offices, guard-rooms, a heating-chamber, and the usual appurtenances, at the sides and behind the amphitheatre recess. For the week-night meetings the building will be so arranged that seating accommodation for 400 persons can be provided, though the full accommodation will be 1,200. Outside, the elevation to Albert-road is to be of a castellated character, finished with turrets and battlements. The work is being carried out by local builders (Messrs. Taylor Bros., of Albert-road), who have obtained the contract in open competition, under the superintendence of the architect, Mr. J. Williams Dunford, of 101, Queen Victoria-street, London, E.C., whose resident clerk of works is Mr. Strepton. The total cost of the erection will be over 2,000*l*.

#### The Student's Column.

##### WATER-SUPPLY.—XI.

###### RIVER POLLUTION.

**R**IVERS form convenient supplies for large towns, but they are liable to all sorts of contamination. From their source to the sea they collect impurities, some of which, being solid matter, are mechanically suspended by the motion of the water, so that the greater part can easily be removed by the agency of subsiding reservoirs and filtration. Water drained from hilly regions is, from having soaked through spongy peat beds, frequently of a pale-yellow colour, which tint it retains for a long time, but apart from its objectionable appearance it is perfectly good and wholesome. Other decayed vegetable matter collected in the river basin, however offensive it smells, is not a very dangerous form of pollution. The drainage from well-manured agricultural lands, together with animal excreta in general, and especially town sewage, most of which (more particularly the last-mentioned product) are purposely discharged into streams, form elements seriously calculated to prejudice the quality of river water; therefore it may be well for us to consider the effects of these organic substances on a large scale. As explained in a previous article, animal excreta are exceedingly unstable in their chemical constitution, becoming rapidly resolved into harmless compounds in the presence of oxygen. On being discharged into a river, this animal refuse finds the required oxygen, especially if the water is much agitated through being shallow, and having a rocky bottom, or by its passing over weirs. Portions of the noxious matter are abstracted from the water by fish and other animal life, whilst the growth of aquatic vegetation further assists in absorbing it. The free oxygen, however, has the most salutary effect. Many cases are on record where sewage has been emptied into a running stream, but it was impossible to detect this fact on examining the water a few miles lower down from the point of the discharge, so rapidly and effectively had Nature worked its purification. From this, it may be gathered that river water, even after being strongly impregnated by the worst forms of animal contamination, is rapidly purified by the processes of Nature. Of course there is a limit to the purifying action on such pollution, the river could not deal with an unlimited quantity; and from the disgusting nature of town drainage, and even out of respect to the opinions of those learned chemists who believe in the "previous sewage contamination" theory, it is highly advisable not to import more of the objectionable substance into rivers than can possibly be helped. In the presence of our advanced knowledge respecting the treatment of sewage, there is no excuse for local authorities to dispose of town drainage by discharging it into the nearest waterway. We may mention, however, that where sewage is destroyed by chemical precipitation, although a great deal of good is done by removing the suspended solids, the remaining

fluid is still obnoxious. Where the sewage is applied to the land by irrigation or filtration, the case is different; nearly all authorities agree that when this is properly carried out, the quality of the water as subsequently resulting from percolation, &c., is practically unaffected.

Rivers running through mining or manufacturing districts being so often the receptacles of all kinds of refuse, both liquid and solid, are frequently fouled to such a high degree as to be of no use for water supply purposes. In designing a scheme, it is essentially necessary to obtain some information respecting the nature of the manufactories in the catchment area or gathering ground.

##### HARDNESS OF WATER.

From the disintegration of rocks, both at the surface of the ground and at some depth, water derives much mineral matter, which more or less affects its quality. These mineral substances are chemically dissolved therein, and are sometimes present in such great quantity as to render the water unfit for ordinary drinking purposes, but are, nevertheless, useful medicinally. In dealing with mineral matter in solution in ordinary water, derived either from springs or rivers, we have practically only to consider the salts of lime. Rain water contains a due proportion of carbonic acid, which it derives from the air, and any rock containing much carbonate of lime, such, for example, as chalk or oolitic freestone, is readily attacked by this acid. Carbonate of lime is only very slightly soluble in water; but the carbonic acid converts the lime into a bi-carbonate, which is quite soluble and runs off with the water into the nearest rivulet, or else soaks into the ground to issue forth eventually as springs, or to be found in wells. It may happen that the lime is also in part derived by the same action in percolating calcareous rocks during its sojourn underground. The addition of these lime salts imparts the quality known as *hardness*; and a water is said to be hard, moderately hard, or soft, according to the proportion of lime found in it. It is questionable whether it is better to use hard or soft water for large town supplies, as authorities lean either way. Large cities have sometimes gone a long distance to obtain hard water, although soft was much more easily procurable, and *vice versa*. The fact is that each kind has its peculiar uses.

Most persons living in the east and south-eastern portions of England would at once admit, because they are used to it, that hard water is much more palatable than soft, being sparkling and crisp to the taste; but the inhabitants of the western portion, and in general where soft water is used, deny this; so that really it is a matter of taste. Attempts have been made to prove that the physique of the population, and the general health, are not so good in towns where soft water is used, but these have signally failed; for whatever diseases can be traced to it are more than counterbalanced by the calculus diseases which, in the opinion of high authorities, are caused by hard water. At the same time, there can be no question that soft water has the power of absorbing a greater quantity of organic impurity and gases than hard water, whilst the latter keeps better in large quantities. Lead and iron are much more readily attacked by soft water, and its action on the former metal has sometimes led to poisoning from this cause. The action takes place more particularly on the clean, bright metal when new, than when it is subsequently encrusted by a dusky film. For manufacturing purposes, soft water is unquestionably the better. The lime in hard water causes much more scale inside boilers, and the choking of hot-water pipes is often due to the deposition of that mineral within them. The reason of this is well known. When water is boiled, the carbonic acid in it is rapidly driven off, and the lime, having in consequence lost its support, is deposited, in the manner indicated, on the sides of the vessel, or other contrivance holding it. Boiling, however, will not remove all the hardness, only the carbonate being taken away, certain other salts of lime still remaining, as a rule. Water is said to be either of *temporary* or *permanent* hardness, the former being its appellation before being boiled, and the latter afterwards.

Soft water is better for domestic purposes,—cooking, &c. It is immeasurably superior, also, for washing, as it makes a good lather, whilst hard water is more inclined to curdle or decompose soap by combining an alkali with the lime. The *degree of hardness* is arrived at in proportion



to the power of water to decompose soap of a certain composition. All these points have been thoroughly threshed out by engineers and chemists, and have had a large share in influencing the selection of many sources of supply drawn upon at present for the use of some of our largest communities. At first, it might seem somewhat trivial to make much of the superior advantage of soft water for washing purposes, but when we reflect on the matter we find that, on the contrary, it is well worth consideration. The supply of Glasgow from Loch Katrine (the extension work of which is still progressing), may be instanced as an example of the comparative advantages of the one kind over the other, in regard to this point. The water of the lake is much softer than that of the Clyde, from which the city formerly obtained its supply, and although it has cost an enormous sum of money to make this change, it has been shown that the rate charged upon the inhabitants for the better supply was practically paid by the saving effected in soap, dye-drugs, and certain other chemicals, but especially the first-mentioned article. Manchester has been cited as another case in point; whilst the late Mr. Bateman was of opinion that notwithstanding the enormous initial cost of the enterprise, London could be supplied with soft water, by his scheme, from the mountainous districts of North and Central Wales, and that the expense would be more than defrayed in the end, owing to the saving in so many ways, but especially in regard to soap. We shall refer again to this matter when speaking of water-supply to the metropolis.

Hard water may be made softer in many ways. We have shown that this can be done by boiling the fluid. This, of course, is not practicable on a large scale. Clark's process is well-known. It consists, principally, in adding lime-water to the hard water; the free carbonic acid in the latter combines with the lime in the former, forming a carbonate, which together with the carbonate already in the hard water are thrown down, thus eliminating its chief hardening properties. This process is perfectly successful, either on a large or small scale, but, as it is said to add so much to the cost of the supply, it has not been generally adopted. Within recent years modifications known as the Porter-Clark and the Atkins processes have received much attention. In these the precipitation of the lime is much facilitated, and the whole method of softening is much more expeditiously carried out, and in a more convenient manner than by the older method. It would not be difficult to mention other inventions having the same object, such as the application of spongy iron, filters, &c. Suffice it to say that if soft water is absolutely necessary or more convenient for any manufacture in a town which is already supplied with hard, it can easily be produced.

Calcareous water is also softened naturally by exposure to the air, when its carbonic acid disappears, and lime precipitation is the result.

### Books.

*Iron and Steel Manufacture.* By ARTHUR H. HIGGINS, Principal of the School of Metallurgy, Birmingham and Midland Institute. London: Macmillan & Co.

THIS handy little book, consisting of fifteen chapters, is well worth perusal by engineers, as it deals in a very able manner with the fundamental principles of the various processes employed in the manufacture of iron and steel, and gives a practical account of both the chemical and mechanical properties of these metals. The present time, as the author reminds us, is "an age of steel," and, this being so, we welcome any book which describes, in good language and practical form, the latest that is known upon the relative advantages of iron and steel; although there are some manufacturers who, having invested capital upon extensive machinery and plant, may be indifferent to such a publication. Sir Joseph Whitworth proposed to designate iron and steel, as employed in works of construction, by its tensile strength in tons per square inch of section, coupled with a record of the amount of elongation attained prior to fracture with a use of a standard test-piece. This plan has been followed by practitioners in different specifications, and occasionally, in addition, the amount of contraction of area at the fracture is also specified. The chemical

combinations and the mechanical treatment being left to the manufacturer, the designer of any constructive work remains satisfied if the specified results of strength upon test-pieces of a given size are obtained. So long as iron alone had to be considered, this might suffice; but in these days, the practitioner ought to know more, and to be able to state why he employs wrought-iron, cast-iron, or steel in any given situation. The author's specified tests are very good for each of these three classes of material, and his definition of the most general metallurgical terms should be read by all those who were interested in the articles on "Iron" which appeared in our "Student's Column" last year. The author modestly states in his preface that "the book is not intended to supersede any of the larger manuals on the subject, but rather to prepare the student for a more advanced course of study." The first chapter is interesting for its historical matter, and the succeeding chapters each conclude with a set of from nine to twenty-three useful questions, intended to test the proficiency of the reader when studying the pages. The book is sufficiently illustrated as an elementary textbook, and concludes with a concise and well-arranged index.

*The Law relating to Tenement Houses and Flats for Residential and Business Purposes: including Taxation and Rating thereof, with an Appendix of Forms and a Digest of Cases relating to the Inhabited House Duty.* By WALTER CLODE, Barrister-at-Law. London: W. Clowes & Sons, Limited. 1889.

THE increase in the number of residential buildings, known popularly as "flats," makes the present time opportune for the publication of a legal work on this subject. At the same time, it is as well to remember that, for business purposes, "flats" have long been in existence, and the law is the same in the one case as in the other. But that a work dealing with the entire body of law on this subject, and written in a sufficiently popular style to be intelligible to laymen, was required there can be no doubt. Mr. Clode's book seems to fulfil all the necessary requirements, though it might have with advantage been more concise. There is a too great parade of learning observable in it, and American cases are frequently cited which do not seem to be very much to the point. For example, the writer lays down the following proposition as regards the duties of the porter: "The rule seems to be that while engaged upon his general duties he is the landlord's servant, so as to make him liable; while engaged upon any special duties for a tenant he is that tenant's servant, so as to make him liable" (p. 50). This statement is correct: the illustrations are an American case about leaving open a tap, which appears to turn rather on a question of improper construction, and one as to the management of the lift, which again is somewhat vague. Apart from these blemishes, the book is well done; the contents are carefully separated into chapters dealing with such subjects as the staircase, hall, passage ways, and lift, which are the subject of Chapter VIII. Of considerable practical value are the chapters on the Inhabited House Duty and on Rating. We have done no more here than indicate the character of the book; it would be of little use to pick out passages for citation, since any one who may be concerned with the subject will now be in a position to refer to this work for the elucidation of such difficulties as may present themselves.

*Blackie's Modern Encyclopedia of Universal Information.* Vols. I. and II. With numerous pictorial illustrations and a series of maps. Edited by CHARLES ANNANDALE, M.A., LL.D. London: Blackie & Son. 1889.

THE first two volumes of this encyclopedia are now complete, carrying it down to near the close of letter C; and if it is carried through steadily and without inordinate delay, we may congratulate the publishers and editor on having produced one of the best popular encyclopedias on a comparatively small scale which has been brought before the public. The range of subjects treated is exceedingly large, and though of course no subject of importance can be at all fully treated in an encyclopedia on this moderate scale, the book seems to furnish what is required from a popular encyclopedia—a concise and intelligible statement of the meaning of each word that is inserted, or the outline of each subject that is treated. So large a subject as Architecture can of course only be gone

into in the most general way in a work of this kind, but under the article "Architecture" a praiseworthy attempt has been made to give an intelligible sketch of the central history of architecture in the course of about four pages, and the article is at all events quite correct as far as it goes. The author, if limited to this space, should, however, have endeavoured to give a general idea of what architecture means (he does commence with that), with examples of its typical forms of construction and design drawn from the most important styles; i.e., he should have treated of architecture in the abstract, rather than have attempted to deal with architectural history, which is too large a subject for such a work, and only two or three links in the chain are arbitrarily selected for illustration; the method is wrong, though the execution of the article, granting that method, is good. In some other classes of subjects, not strictly coming within the scope of our criticism, we have observed also a very good treatment of the subject, giving the main facts in a concise manner. The pictorial illustrations are not very much; most of them look like old cuts; but the maps appended are very good, and form a valuable addition to the book. The encyclopedia is admirably printed, in clear double-column pages, and the binding is effective and in good taste. The volumes are in small quarto form, convenient for the hand. Mr. Annandale, the editor, has already done a piece of excellent work for the general public in his one-volume dictionary of the English language; probably one of the best small dictionaries of the kind that has been produced; and his undoubted success in that work promises well for the encyclopedia, which so far appears an exceedingly satisfactory and useful publication.

*Our English Villages: their Story and Antiquities.* By P. H. DITCHFIELD, M.A. F.R.H.S. London: Methuen & Co. 1889.

THIS is not a history of any special villages; but a small book giving a suggestive sketch of the various kinds of objects of interest especially in the way of antiquities, which may be looked for in and about the neighbourhood of old English villages. The book originally appeared in the form of essays in Canon Erskine Clarke's *Parish Magazine*, and is addressed to the class of readers who form the bulk of the population in most country parishes, with the object of setting them thinking a little about the history and associations of the place they live in, instead of about "mostly naught," like the rural labourer in *Punch*. The author in his opening chapter runs over some of the objects of interest which may be found in connection with many country villages. The manor-house perhaps stands on the site of a much older house, carrying us back to Norman times and the feudal system; the names of the fields may have a good deal of historical meaning; and what is the curious formation on a neighbouring hill, which looks like an earthwork? "we will presently examine that more closely, and find out by whom it was constructed." The Magpie Inn, which is much too large for its business now, was a stirring place before the railway, when it was a regular coaching inn; the reader is invited to try and realise what the change has been. There may be gravel-pits near the village in which old flint implements will possibly be found. These possible subjects of interest are expounded more in detail, and the reader gets hints how and where to look for them.

The author is a little too much of a *laudator temporis acti* now and then, as those who busy themselves about things of the past generally come to be. He speaks of the want of village games and sports now, "except when some energetic rector or curate starts a cricket club." The village green, the source of so much innocent happiness, is no more; and recent writer has observed that the ordinary existence of agricultural labourers is so dull that in East Anglia they have almost forgotten how to laugh. There may be a sad truth in this last sentence; but if the writer could go back to the village-green sports of former days he might be astonished to find how bores they were in reality, though Maypole dances look so well in pictures.

However, Mr. Ditchfield may be congratulated on having done something towards the chance of increasing the interest and lessening the dullness of life in country villages. A little book is admirably suited for those whom it is addressed, and we recommend



the notice of country clergymen who are desirous of any assistance in opening the minds and extending the interests of their humbler parishioners.

**A List of Parish Churches retaining Special Medieval Features—Glass Vestments, Plate, &c.** Compiled by HENRY LITTLEHALES, London: Rivington, 1889.

In this little book Mr. Littlehales has done a most useful piece of work. It is not claimed that it is exhaustive, and it is probably far from being so; but it gives, under the heading of counties, a large list of churches in which various medieval relics exist, with a brief note of the nature of the relic in each case, which cannot fail to be a great assistance to those who are on the look out for such relics, or who do not wish to pass over any that may come in their way.

The author notes in his preface that he will be glad of any corrections or additions.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

12,729, Metallic Roofing. G. H. O. Bolken (Stuttgart).

The improvements which are the subject of this patent consist in the use of spring clamps, which allow the sheets to be removed from the roof and packed for transit. On one side of each sheet is a rebate fitting into a corresponding rebate on the other side of sheet. The covering of the roof is managed as follows:—The sheets in the first row are secured to battens so that the rebate of one sheet laps over the contiguous rebate of the next sheet. The sheets in the second row are similarly laid, but so as to break joint with those of the first row. Spring clamps are fitted upon the battens, and the heads of the rivets caused to engage with the slots therein. In this manner a perfectly firm covering for the roof is maintained.

13,158, Heating Buildings. J. Lawson.  
According to this invention, air and water are both heated by a furnace on the ground, and conveyed by suitable pipes to a chamber placed over the heads of an audience, and thus the air of the chamber is made comfortably warm without draught.

14,734, Air-Inlet Ventilator. B. Russell.  
The front flap over the ventilator which is the subject of this patent, instead of being vertical, as in the old make of Sheringham ventilators, is recessed back at the bottom so as to fall open by its own weight when the regulating cord is released. It can be made to open right or left hand, and is hung at any convenient point removed from its centre.

16,687, Improvements in Sash-fasteners. J. Dunn.

The sash-fastener which is the subject of this patent is made very much in the form of those in general use, but it is claimed that in the manufacture and arrangement of parts great economy is effected by the shape and position.

10,902, Chimneys, &c. J. B. Tonge.  
This is a modification of previous patents, 7,957-88 and 12,748-88. Instead of using movable flaps or the interception of down draughts, curved curves or passage-ways are used. These prevent rain coming in, and yet effectively exhaust the air, or provide efficient ventilation.

11,117, Extracting Cowl or Ventilator. J. D. Fryer.

According to this invention, a revolving cowl is used, the spindle of which is placed in a hollow tube socket, the top of which is widened out, so that a number of hardened metal balls surround the spindle at this point. The top of the revolving spindle terminates in screw-shaped pieces of metal, turning openings where each piece of metal is turned up into the air. One of these screw pieces is hinged, so that the bearings of the revolving spindle may be oiled with ease, and an ornamental knob may be used as a finish to the cowl.

#### NEW APPLICATIONS FOR PATENTS.

Aug. 28.—13,410, E. Thomas, Ventilators and chimney-cowls.—13,422, T. Downie, Treads of Steps & Stairs, &c.—13,449, H. Lake, Saws.

Aug. 27.—13,453, R. Peel, Top Bars for Fire-places.

Aug. 28.—13,579, R. Wilford, Automatic Fastenings for Windows with Sliding Sashes.—13,581, J. Pidd, Water-waste Detector.—13,589, A. Fitton, Spring Cupboard-door and Casement-fastener.

Aug. 29.—13,618, J. Lede, Ventilator.—13,625, Brindley, Lifting-catches, &c.—13,642, F. Cowley, Lifting Window-fastener.—13,649, J. Weiss, Fastener for Handles of Tools.

Aug. 30.—13,671, T. Fawcett, Brick-making and pressing Machine.

Aug. 31.—13,749, H. Aitken, Treatment of Timber.—13,764, J. Tall, Sash-frames, Sashes, &c.—13,765, J. Tall, Doors, Shutters, &c.—13,767, F. Lane, Horizontal Sawing Machinery.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

9,915, F. Wells, Combined Supply, Overflow, and Waste Fittings for Basins, Baths, &c.—10,333, A. Thornalley Hoffman, Brick Kiln.—10,694, A. Curtis and A. Yeates, Cowl or Ventilator.—11,494, W. Bodin, Flushing Cisterns.—11,645, R. Scott, Cisterns for Flushing Water-closets.—11,792, A. Bates, Traps or Gullies.—11,959, J. Stenner and Others, Chimney Cowl and Ventilator.—12,213, J. Haskins, Wooden Revolving Shutters.—12,232, E. Olander, Floor-plates and Floors for Bridges, Buildings, &c.—12,397, H. Owens, Opening, Closing, and Securing Casements, &c.—12,665, R. Hadden, Water-proof Material for Walls, &c.—12,672, S. Chandler, Chimney-top.—12,730, T. Hancock, Closing and Securing Gates and Doors.—12,867, H. Whiteley, Draught and Dust Excluders for Doors.—13,098, W. Edwards, Fastening or Fixing Ironwork to Stonework or Woodwork.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to Opposition for Two Months.

13,167, W. Jago, Bakers' Ovens.—14,941, A. Gauge, Electrical Burglar Alarms.—15,510, J. Turner, Combination Door-chain and Bolt or Bar.—15,613, T. Penaro, Water-waste Preventing Cisterns.—2,021, E. Edwards, Holding open Windows in any desired position.—8,620, R. Combs, Girder, &c.—10,498, E. Wright, Locks or Door Fastenings.—10,518, C. Hobbs, Distemper or Whitewash Brushes.—10,979, H. Munday and H. Walker, Gate Fittings.—11,658, G. Bastucchi, Plastering Walls and Ceilings.

#### RECENT SALES OF PROPERTY:

##### ESTATE EXCHANGE REPORT.

SEPT. 4.—By FULLEN, HOBBS, SONS, & CARSELL, Purfleet, Essex.—The St. Louis Park Mills, area about 10 acres, f. .... 15,000

High Barnet.—1 to 12, Underhill Cottages, f., r. 2168 p.s. .... 1,160

City.—74 and 76, Fore-street, f., r. 216 p.s. .... 1,000

223A, 146, r. 4452, 112, p.s. .... 1,000

By FAREBROTHER, ELLIS, CLARK, & CO. Camberwell.—245, 247, and 249, Camberwell-road, f. .... 2,100

Wimbledon.—34, Palham-rd., f., r. 438 p.s. .... 550

SEPT. 6.—By J. J. BARRILL, Plumstead.—67, Llanover-rd., f., r. 216 p.s. .... 280

Upton Park, Jeppson-rd.—A plot of land, f. .... 40

By WYATT & SON (at Chichester), Sussex, East Pollard.—F. residence and stabling ... 1,500

Singleton.—Four c. cottages, r. 238, 17s. p.s. .... 555

Huxton.—Two f. cottages, r. 210, 8s. p.s. .... 190

SEPT. 6.—By HANDS & BRADLEY, Belgavia.—63 and 64, Ebury-st., u.t. 33 yrs, g.r. 218, r. 2146 p.s. .... 2,030

Newington Causeway.—24, Union-st., u.t. 14 yrs, g.r. 21, 4s., r. 433 p.s. .... 160

[Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.t. for estimated rental; u.t. for unexpired term; p.s. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

**The Bank of Ireland, Dublin.**—The *Daily Express* says that in a short space of time a very marked improvement will be effected in the exterior of the Bank of Ireland, which has of late presented a very dilapidated appearance when compared with the renovated National Bank opposite, and the new building of the Munster and Leinster Bank, next door to the National Bank. For some time past, however, a hoarding has been erected outside the railings of the Bank of Ireland, and a number of men, in the employ of Messrs. Kennan & Sons, have been engaged in taking away the old railings, which have occupied their position for many years. The new railings are designed by Messrs. Millar & Syms, architects. The whole work is of Irish design and of Irish manufacture, the stone for the foundation having been obtained from the well-known quarries of Ballyknocken. The new railings will not be carried around the building at present.

**The English Iron Trade.**—The English iron market is still active, and its tendency is once more decidedly upwards. Business in pig-iron continues on the old lines; quiet, but steady, in some districts, but unmistakably animated in Scotland and the north-west of England. Scotch makers' iron is very scarce, owing to a large local consumption, and producers are constantly raising their prices. Bessemer iron in the north-west has gone up 2s. 6d. a ton during the week. Elsewhere quotations are fairly well maintained. Trade in manufactured iron is increasing, and rates are from 2s. 6d. to 7s. 6d. a ton higher. The demand for steel is very heavy, the consequence being that ship-plates have been advanced 2s. 6d. a ton, rails from 2s. 6d. to 5s., billets 5s., and blooms 2s. 6d. Shipbuilders remain very busy, and engineers keep well employed.—*Iron.*

#### Miscellaneous.

##### A Proposed London Dock and Wharf Trust.

At the weekly meeting of the Balloon Society, held at St. James's Hall, on the 6th inst., a lecture was delivered by Mr. W. H. Lefevre, C.E., the president of the society, on "A London Dock and Wharf Trust." Mr. Merritt occupied the chair. After a brief opening address by the chairman, the lecturer observed that the protracted strike of the dock labourers marked a new era in the struggle between capital and labour. The real origin of it was the insane cut-throat competition between the dock companies and the wharfingers, intensified by the keen contest between shipowners and merchants, and the superabundant dock accommodation now in existence. One important aspect of the strike was the position of the shareholders in the dock companies, many of whom were widows and orphans of very limited means. There were about 1,500 shareholders in the East and West India Dock Company, and some 3,000 in the London and St. Katharine Dock Company, who were in the unenviable position of receiving no dividend and exercising no control over their property. Attention had been called to the growing tendency of the trade of the port of London to pass further and further down the river, in order to accommodate the ever increasing draught and length of the immense vessels now becoming so common, and it was therefore clear that what London wanted was deeper water. That might be obtained by inaugurating a thorough system of dredging from London-bridge to Gravesend, similar to what had already taken place on the Tyne and the Clyde, aided by an embankment on both sides of the river, so as to cause the tide to ebb and flow quicker. With regard to what a Harbour Trust could do, the reply was that in some ports it had done everything, as was instanced in the case of the Tyne, the Clyde, and some other rivers. It was evident in existing circumstances that something must be done if England were to continue to be the depot of the world's commerce, with London for its centre. The control of the Thames Conservancy might be confined to the river above the bridges, and a London Dock and Wharf Trust might be formed for the port of London, to which the London County Council should contribute one moiety for deepening the River Thames from London-bridge down to the sea. It was not an impossible thing to accomplish to take the docks of London at what they cost, and consolidate them all into one trust. Until quite lately the dividends paid by the dock companies of London upon the total capital invested worked out at about the same rate per cent. per annum as the interest paid by the Mersey Docks and Harbour Board on its total debt. Mr. Martin Wood moved the following resolution:—"That the vast shipping interests of the port of London urgently demand the establishment of a Dock and Wharf Trust, to be controlled by responsible commissioners duly elected." This was seconded by Mr. White, F.S.A., and, after some discussion, was carried by a large majority, as was also a second resolution calling upon the Corporation of London and the London County Council to promote a Bill in the next session of Parliament for the formation of a London Dock and Wharf Trust, similar to those in existence in the Clyde, Mersey, and Tyne.

**Edinburgh International Electrical and General Exhibition.**—A meeting of the Edinburgh International Exhibition Council was held on the 4th inst., at the offices, 40, Frederick-street, Sir Thomas Clark presiding. The final classification of exhibits was agreed upon. There will be three great divisions. The first is to comprise electrical engineering and inventions, and is to contain six sections dealing with the production of electricity, electrical conductors, electrical measurement, application of electricity, bibliography and electrical history. The second division will be devoted to general inventions and industries, and will contain twenty-two sections. These will comprise exhibits in mining and metallurgy, gold-mining and the production of the precious metal, rural industries, architecture, hygiene, decorative art, &c., music, clothing, and accessories, foods and drinks, education and liberal arts, engineering and machinery, navigation, chemical and allied industries, women's industries, and artisans' industries. The third division is to be devoted to the fine arts.



**The Forthcoming Art Congress in Edinburgh.**—A meeting of the General Committee of the National Association for the Advancement of Art was held in the Council Chamber, Edinburgh, on the 4th inst., Mr. J. M. McCandlish, W.S., presiding. A letter was read from the Marquis of Lorne accepting the office of President of the Association for the year, and agreeing to deliver the inaugural address. Professor Flint also wrote complying with the request of the Association to preach the special sermon in St. Giles' Cathedral. Professor Baldwin Brown was appointed Editor of the Transactions. It was intimated that subscriptions to the guarantee fund, including the sum of 105*l.* from the Edinburgh Town Council, amounted to £497.12*s.* Donations to the funds intimated or paid amounted to 45*l.* 3*s.* 6*d.* The titles of several of the papers proposed to be read in the various sections were announced. Among them were the following:—By Mr. Hole, R.S.A., "Responsibility of the Public in the Development of the Arts"; by Mr. W. D. McKay, R.S.A., on "Old versus Modern Methods of Painting"; by Mr. A. Roche, Glasgow, on "Finish in Art"; by Mr. J. L. Wingate, R.S.A., on "Drawing as a Language for the People"; in the Sculpture Section, by Mr. Onslow Ford, A.R.A., president of the section; Mr. George Simmonds, hon. secretary; Mr. Alfred Gilbert, A.R.A.; Mr. G. A. Lawson, Mr. E. Roscoe Mullins, Mr. J. Stirling Lee, Mr. D. W. Stevenson, R.S.A.; Mr. Hiram Rhind, and Mr. Geo. Webster. In the Architectural Section, papers are proposed on "The Art Education of the Public, including in Schools"; "Landscape Gardening"; "Characteristics of Scottish National Architecture and its Evolution"; "Land Tenure," &c. In the Applied Art Section, a paper on "Art in Elementary Schools" is to be read by Miss Burton; another subject in the same section is "Home Industries in Donegal," and among the contributors are Mr. W. Morris, Mr. Walter Crane, Mr. Newburgh, Glasgow; Mr. Scott Morton, Mr. Thomas Bonnar, and Mr. W. S. Black.

**Loss of Light through Windows.**—According to our contemporary *Iron*, some interesting experiments have been undertaken by Herr Herzberg, with the co-operation of Herr G. Schulze, chief engineer of the Berlin works of Messrs. Frederick Siemens & Co., for the purpose of ascertaining the loss of light in passing through window-glass of various kinds in general use. The experiments were conducted with a Bunsen photometer, in which two Argand gas-burners of equal illuminating power were placed at the two ends of the graduated bar. After equality of illumination of the screen had been established, a plate of the glass to be tested was interposed between one of the end lights and the screen, and the extent of the displacement of the latter thus necessitated for the re-establishment of equality of illumination on both sides gave the measure of the opacity of the glass. A simple translucent but not transparent glass showed a loss of 27 per cent. of light. Cathedral glass, such as is used in stained-glass work as a basis being clear, but with a slight ground tint, showed a loss of 12½ per cent. Plain cathedral glass with a white tint also showed a loss of 12½ per cent. Plain white Rhenish "double glass" gave a loss of 10 per cent. Plain thin mirror glass obstructed 10 per cent. of light. The two last together, with an interval of 6 centimetres between them, showed a loss of 21 per cent. Cathedral and Rhenish "double glass" together, with the same interval, showed a loss of 23 per cent. A ground glass with cut stars together with a white background, such as is found in house fanlights, obstructed 60 per cent. of light. A new clean piece of ground glass without stars, together with the dusty white glass background as in the preceding experiment, showed a loss of 40 per cent.

**The Engineering Chair in the Heriot-Watt College, Edinburgh.**—At a meeting of the Heriot-Watt College Committee, on Monday last, it was agreed that the names of Mr. William E. Dalby, London and North-Western Railway Works, Crewe, and Mr. Richard Stanfield, Royal Mint Laboratory, London, should compose the short list to be submitted to the Heriot-Watt Governors for the vacant Chair of Engineering and Mechanics, caused by the appointment of Professor Beare to the Professorship of Engineering and Mechanical Technology in University College, London. The Governors met on Tuesday, when the appointment was made, Mr. Stanfield being elected by eight votes against seven recorded for Mr. Dalby.

**Opening of the Bryden Memorial Hall, Saltcoats.**—The memorial hall erected in connexion with the Mission Coast Home as a tribute to the memory of Mr. William Bryden and those associated with him in the founding of the Home—Mr. James Smith and Mr. Thomas Corbell—was formally opened on the 5th inst. A striking feature of the new building is an octagon tower about 65 ft. high beside the entrance, on which are carved in panels the monograms of the founders of the Home. The entrance is through a massive arched doorway, resting on granite columns. On the ground-floor, to the right of the entrance, there is a recreation-room, 23 ft. long by 15 ft. broad, for the use of women. The hall is comfortably furnished and well lighted by three high windows, two of which look on the street, while the other has a sea view. On the other side of the building are a number of dormitories, each about 9 ft. square, plainly but comfortably furnished. A substantial stone staircase in the tower leads to dormitories above similar to those on the ground-floor. The whole of them are heated with hot-water pipes, and there are lavatories on each flat. It is intended that the dormitories in the new buildings are to be occupied by women. The Memorial Hall faces the sea, and connects with the front building by an inner hall, lighted from the roof with a fine tinted lantern window. The hall is 33 ft. long and 17 ft. broad, with a lofty ceiling 18 ft. high. It is to be used as a reading and recreation-room for male patients. There are five large windows, from three of which a magnificent view can be had of the Ayrshire coast and the Firth of Clyde. The cost, including furnishings, will be 1,900*l.* The architects were Messrs. H. & D. Barclay, Glasgow.

**The Paris Exhibition.**—It is stated that it has been finally determined to close the Paris Exhibition on October 31. Whilst speaking of the Exhibition, we may mention that on Tuesday evening last, at the Royal Victoria Hall, Waterloo-road, Professor Malden, formerly of the Polytechnic Institution, delivered, for the first time anywhere, his new lecture on Paris and its Exhibition. It was illustrated by about 130 large views thrown on the screen by the lantern. Most of these views were exceedingly good, and several of them were from instantaneous photographs, showing the streets of Paris, and parts of the Exhibition and grounds, thronged with people. A fairly large proportion of the views were devoted to showing the architectural aspects of Paris and the Exhibition, and the "History of the Human Habitation" series was freely sampled. Mr. Malden's remarks were, as a rule, pertinent and suggestive, although, like most other people, he overdid his encomiums of the Eiffel Tower, which, by the way, was shown by several views, some to a large scale, clearly exhibiting the construction. The lecture is, it was announced, to be repeated on Monday, Tuesday, and Wednesday next at the same place, and workmen and others in London who cannot spare the time or the outlay necessary for a trip to Paris may be glad to see something of the Exhibition through the medium of the lantern and screen.

**A Proposed New Watering-place in North Devon.**—Arrangements are in progress for the creation of a new watering-place on the North Devon coast, near Bideford. It is to be called "Sauntun Sands." The water supply is described as abundant in quantity and irreproachable in quality, the situation is said by a local paper to be "lovely in the extreme," and the place is stated to possess climatic advantages far superior to most of the popular health resorts in the Kingdom. "It has a direct south aspect, is completely sheltered from the north and easterly winds, and combines the temperature of Torquay with a magnificently bracing air, has sea-scapes and land views such as are unequalled probably in the south-west of England." There is a fine stretch of sand four miles in length available as a bathing-place. The idea of this new venture originated with Mr. J. Arthur Wallington, of Basingstoke, the manager and surveyor of numerous landed estates. Sauntun Sands is to be, if not a copy of Bournemouth, in Kent, built in much the same fashion,—that is to say, the dwelling houses will be constructed on the bungalow principle, and in the majority of cases will be detached, and stand in their own grounds. Building operations are about to commence, Mr. Dart, builder, of Crediton, having taken the contract for erecting the inevitable hotel.

## PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	7	0	0	7	15	0
Teak, E.I.	load	12	0	0	12	0	0
Reguira, U.S.	foot cube	0	2	0	0	2	0
Asb, Canada, 1st	load	3	10	0	3	10	0
Birch	load	3	10	0	3	10	0
Rim	load	4	0	0	4	0	0
Fir, Danistic, &c.	load	2	10	0	2	10	0
Oak	load	2	10	0	2	10	0
Canada	load	5	10	0	5	10	0
Pine, Canada red	load	3	0	0	3	0	0
" "	load	4	0	0	4	0	0
Lath, Danistic	fathom	4	10	0	4	10	0
St. Petersburg	load	5	0	0	5	0	0
Wainscot, Riga, &c.	log	2	15	0	2	15	0
Deal, Finland, 2nd and 1st, std. 100	load	9	0	0	9	0	0
" "	4th and 3rd	7	0	0	7	0	0
Riga	load	7	0	0	7	0	0
St. Petersburg, 1st yellow	load	11	0	0	11	0	0
" "	2nd	10	0	0	10	0	0
" "	whit	7	0	0	7	0	0
Swedish	load	8	0	0	8	0	0
White Sea	load	11	0	0	11	0	0
Canada, Pine, 1st	load	12	0	0	12	0	0
" "	2nd	11	0	0	11	0	0
" "	3rd, &c.	8	0	0	8	0	0
" "	Spruce	7	0	0	7	0	0
" "	2nd and 3rd	7	0	0	7	0	0
New Brunswick, &c.	load	6	10	0	6	10	0
Battens, all kinds	load	6	0	0	6	0	0
Flooring Boards, 2½ in. & 1 in. prepared, First	load	0	11	0	0	14	0
Second	load	0	8	0	0	10	0
Other qualities	load	0	5	0	0	4	0
Cedar, Cuba	load	0	4	0	0	4	0
Honduras, &c.	load	0	4	0	0	4	0
Mahogany, Cuba	load	0	4	0	0	4	0
St. Domingo, cargo average	load	0	4	0	0	4	0
Mexican	load	0	4	0	0	4	0
Tobacco	load	0	4	0	0	4	0
Honduras	load	0	4	0	0	4	0
Brazil, Bahia	load	0	4	0	0	4	0
Rose, Rio	load	15	0	0	20	0	0
Bahia	load	14	0	0	18	0	0
Satin, St. Domingo	load	0	4	0	0	4	0
Porto Rico	load	0	4	0	0	4	0
Walnut, Italian	load	0	4	0	0	4	0

## METALS.

IRON.		ton	£.	s.	d.	ton	£.	s.	d.
Pig, in Scotland	ton	0	0	0	0	0	0	0	0
Bar, Welsh, in London	ton	8	0	0	8	0	0	0	0
" "	at works in Wales	5	10	0	5	10	0	0	0
" "	Staffordshire, in London	0	0	0	7	10	0	0	0
COPPER.		ton	£.	s.	d.	ton	£.	s.	d.
British, cake and ingot	ton	47	10	0	47	10	0	0	0
Best selected	ton	48	10	0	48	10	0	0	0
Sheets, strong	ton	66	0	0	66	0	0	0	0
Chili, bars	ton	42	16	0	42	16	0	0	0
Yellow Metal	lb.	0	5	0	0	5	0	0	0
LEAD.		ton	£.	s.	d.	ton	£.	s.	d.
Pig, Spanish	ton	12	13	0	12	13	0	0	0
English, com. brands	ton	12	17	0	12	17	0	0	0
Sheet, English	ton	14	0	0	14	0	0	0	0
ZINC.		ton	£.	s.	d.	ton	£.	s.	d.
Billiton	ton	32	0	0	32	0	0	0	0
Strait	ton	32	0	0	32	0	0	0	0
Australian	ton	31	0	0	31	0	0	0	0
English Ingot	ton	31	0	0	31	0	0	0	0
Bars	ton	31	0	0	31	0	0	0	0
Sheet	ton	27	0	0	27	0	0	0	0
Zinc-English sheet	ton	24	0	0	24	0	0	0	0

## OILS.

Linseed	ton	21	15	0	22	0	0
Cocunut, Ceylon	ton	27	10	0	28	0	0
Ceylon	ton	24	0	0	24	0	0
Palm, Lagos	ton	22	0	0	22	0	0
Rapeseed	ton	32	0	0	32	0	0
" "	ton	31	0	0	31	0	0
Cottonseed, refined	ton	27	0	0	28	0	0
Tallow and Oleine	ton	20	0	0	20	0	0
Lubricating, U.S.	ton	5	0	0	5	0	0
" "	ton	7	0	0	7	0	0
Tar—Stockholm	barrel	1	4	3	1	4	3
Archangel	barrel	0	15	9	0	15	9

## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 Noon on Thursdays.]

**AVONMOUTH (near Bristol).**—For tank foundations and timber jetty, for the West of England Petroleum Association. Mr. C. M. Jacobs, engineer, 89, Bishopsgate-street, London.—*Accepted* ... £2,975 0 0  
A. J. Beaven, Bristol (accepted) ... £2,975 0 0

**BATH.**—For the erection of premises for boilers and machinery for new electric light works (as per Contract No. 1), and for building chimney-stack and setting range of boilers (Contract No. 2), for Mr. H. G. Massingham, Mr. T. W. Gardner, architect, Barton-street, Bath. Quantities supplied:—

	No. 1.	No. 2.
C. Whibley	£1,024 8 0	£268 10 0
E. Charnock	978 0 0	513 0 0
J. Long & Sons	950 0 0	620 0 0
Hayward & Wooster	944 19 0	495 10 0
J. B. Walcott	885 0 0	619 0 0
T. Laver & Co.	885 0 0	450 0 0
T. Morgan	1,120 0 0	—

**BRIGHTON.**—For erecting house at Rottingdean, near Brighton. Mr. William Buck, architect, Hoveham:—  
Pannett Bros., Hoveham ... £760 0 0  
Rowland, Hoveham ... 740 0 0  
C. Cook, Crawley ... 619 0 0  
Floyd, Lewes ... 600 0 0  
Peters, Hoveham ... 589 0 0  
Whithead, Hoveham ... 544 0 0  
Baker, Seaford ... 625 0 0  
Taylor, Brighton ... 520 0 0  
Jeal, Rottingdean (accepted) ... 515 0 0



## COMPETITIONS, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITIONS.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Proposed New Town Hall	Yeovil Corporation		Oct. 25th	ii.
Municipal Buildings	Sheffield Corporation	600l.	Dec. 2nd	ii.

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Cast-iron Water Mains	Tottenham Local Board	J. E. Worth	Sept. 17th	ii.
New Vestry Hall and Offices	St. Martin-in-the-Fields Vestry	R. Walker	Sept. 19th	ii.
Works at Coalville, Bromsgrove, Ancoats, &c.	M. R. Co.	B. Blake, Haddock, & Co.	Sept. 21st	xiv.
Purchase and Pulling-down Building Materials	Croydon Land &c. Co.	Official	Sept. 23rd	xiv.
Roadmaking and Paving Works	Willesden Local Board	O. Claude Hobson	Sept. 24th	xiv.
New Works, Bristol Lunatic Asylum	Bristol, City of	H. Crisp & Oakley	do.	xiv.
New Shop Front, &c., Paddington, &c.	London Dairy Co. Lim.	T. Mullett Ellis	Sept. 25th	xiv.
Broken Granite	North Walsham L. B.	Official	Sept. 26th	xiv.
Widening Bridge, &c.	Stockport County Boro	A. M. Fowler	do.	xii.
Alterations to Shelter Hall, &c.	Brighton Town Council	G. R. Andrews	do.	xii.
Erection of Visitors' Room, Ashford School.	West Lond. Sch. Dist.	Official	Sept. 27th	xii.
New Coastguard Station, Deal	Admiralty	do.	do.	ii.
Superstructure of Lunatic Asylum	London County Council	G. T. Hine	Sept. 28th	xii.
New Post-office, Barrow-in-Furness	do.	C. H. Howell	Sept. 30th	xii.
Sewerage and Sewage Disposal Works	Bingley Local Board	A. E. Preston	do.	ii.
Storage Reservoir, &c.	Teasdon Water Co.	do.	do.	ii.
Pipe Sewers, &c.	St. George U. S. A.	W. Clouman	do.	xii.
Stores	G. W. R. Co.	Official	do.	xii.
Broken Granite, Granite Sillings, &c.	Dover Town Council	do.	Oct. 1st	xiv.
Waterworks	Market Harborough, &c. Local Board	J. B. Eversard	do.	ii.
Erection of Baths, Plumbing Works, &c.	St. Helen's Corporation	G. J. C. Broom	Oct. 2nd	xiv.
Construction of Portion of Aqueduct	Manchester Corporation	G. H. Hill	Oct. 3rd	ii.
Re-construction of Cornwall	G. W. R. Co.	Official	Oct. 8th	xii.
Sewerage and Sewage Purification Works	Kingston E. S. A.	W. H. Hope	Oct. 9th	xii.
Construction of Reservoirs	Mountain Ash Loc. Bd.	J. Mansergh	Oct. 12th	xiv.
New School Buildings	Governors of Perse Sch., Cambridge	W. M. Fawcett	Not stated	xiv.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Inspector of New Buildings and Drains	Southport Corporation	2l. per week	Sept. 16th	xviii.
District Surveyors (3)	Lancashire C. C.	200l. each	Sept. 17th	xviii.
Clerk of Works	do. Local Board	3l. per week	Sept. 24th	xviii.
Borough Surveyor	Brighton Town Council	600l.	Sept. 25th	xviii.
Road Foreman	Handsworth Local Bd.	2l. per week	Not stated	xviii.

BRISTOL.—For alterations to Clifton Club. Mr. E. Henry Edwards, architect, Bristol.—  
A. J. Bevan (accepted) £1,588 0 0  
[Lowest of three invited tenders.]

CHADWELL HEATH (Essex).—For alterations and repairs to the "White Horse" public-house, Chadwell Heath, Essex, for Messrs. Ind, Coops, & Co., Limited. Mr. John Hudson, architect, 80, Leaman-street, E.C.—  
Gladding, Mills-end.....£729 0 0  
Barnes, Ilford.....715 0 0  
Death, Chadwell Heath.....690 18 0  
Hammond & Son, Romford (accepted) 688 0 0

CHILWORTH (Surrey).—For an addition to the old Manor House, Chilworth, Surrey. Mr. F. Hammond, architect, 1, Circus-place, London-wall.—  
Dove Bros.....£295 0 0  
Eberington.....939 0 0  
Wood.....928 0 0  
Martin, Wells, & Co.....725 0 0

EDMONTON.—For bringing out front, and other alterations and repairs to the "William IV." public-house, Lower Edmonton, N., for Messrs. Furze & Co. Mr. John Hudson, architect, 80, Leaman-street, E.C.—  
Wynman (unsuccessful tender), Edmonton £550 0 0  
\* Accepted.

HORSHAM.—For building two shops, Horsham. Mr. William Buck, architect, Horsham.—  
Potter, Horsham.....£2998 0 0  
Pannett Bros., Horsham.....950 0 0  
Peters, Horsham.....875 0 0  
Rowland, Bros., Horsham.....798 0 0  
Shaw, Horsham.....671 0 0  
Pledge, East Grinstead (accepted) ... 667 0 0

ILKESTON.—For building Methodist New Connexion Chapel at Ilkeston, Derbyshire. Mr. A. H. Goodall, architect, Market-street, Nottingham. Quantities by the architect.—  
J. Wainwright, Ilkeston.....£1,092 0 0  
Chas. Monk, Stapleford.....1,040 0 0  
Emerson & Franks, Nottingham.....1,242 17 0  
W. Savage, Nottingham.....1,020 0 0  
W. Fletcher, Beeston.....1,004 0 0  
Thos. Outbath, Nottingham.....975 10 0  
John Manners, Ilkeston.....968 0 0  
John Cooper, Nottingham.....964 0 0  
G. Youngman, Long Eaton.....953 0 0  
Evans & Woodcock, Nottingham.....849 0 0  
J. Oacroft, Nottingham.....922 12 8  
B. Keeling, Nottingham.....916 0 0  
A. B. Clarke, Nottingham.....920 0 0  
F. Shaw & Son, Ilkeston (accepted) 867 0 0  
J. T. Burton, Old Basford, Nottingham 854 0 0

IPSWICH.—For 70,000 mangel wood-paving blocks, 9" x 3" x 4", delivered at Wolsey-street, Ipswich, for the Corporation.—

Per 1,000.  
Acme Wood-paving Co., London.....£8 0 0  
Brunswick Rock Asphalt Co., London.....8 0 0  
Skelton & Co., London.....5 13 6  
Jevason & Son, Norwich.....5 12 6  
Sharp & Co., Sutton Bridge.....5 12 6  
English Brothers, Sutton Bridge.....5 6 0  
G. H. Bullock, Aintree (for beech blocks).....4 18 6  
W. Brown & Co., Ipswich (accepted) ... 4 17 6

JOHANNESBURG (Transvaal).—For erecting a new Stock Exchange, for the Johannesburg Estate Company, Limited. Messrs. Lennor Canning and Fredk. G. Good, C.E., architects, Johannesburg. Quantities by the architect.—

Portland Cement Concrete Foundations.  
Isaac Royce.....£9,887 0 0  
Abrey & Co.....4,982 6 9  
J. M. Cullinan.....4,984 0 0  
Light.....4,600 0 0  
A. L. Lawley (accepted) .....4,575 0 0  
McCull & Robertson.....4,548 0 0

Superstructure.  
McCull & Robertson.....£39,346 0 0  
Light.....34,490 0 0  
J. M. Cullinan.....31,250 0 0  
H. H. Lawley (accepted) .....30,800 0 0  
Abrey & Co.....30,549 0 0

[All of Johannesburg.]

KIMBERLEY (Notts).—For erecting seven houses at Kimberley, Notts. Mr. A. H. Goodall, architect, Market-street, Nottingham. Quantities by the architect.—

John Attenborough, Nottingham .. £1,570 0 0  
W. Fletcher, Beeston.....1,443 1 8  
Shaw & Brasington, Kimberley.....1,430 0 0  
J. Cooper, Nottingham.....1,360 0 0  
A. B. Clarke, Nottingham.....1,350 0 0  
Evans & Woodcock, Nottingham.....1,345 0 0  
H. Matthews, Kimberley.....1,330 10 0  
Barlow & Whitaker, Nottingham.....1,316 0 0  
Thos. Outbath, Nottingham.....1,310 0 0  
W. H. Smith, Nottingham.....1,260 0 0  
J. T. Burton, Old Basford, Nottingham 1,250 0 0  
J. A. Munke, Hucknall Torkard.....1,240 0 0  
J. Dove, Hucknall Torkard.....1,235 0 0  
W. Buxton, Kimberley.....1,209 10 0  
F. Shaw & Son, Ilkeston (accepted) 1,185 0 0

LONDON.—For building dwellings, Hereford-road, Baywater, W. Mr. Arthur Young, architect.—  
Nightingale.....£7,238 0 0  
Patman & Fotheringham.....7,149 0 0  
Holland & Hansen.....7,038 0 0  
Dove Bros.....6,975 0 0  
C. Wall.....6,593 0 0  
Stimpson.....6,560 0 0  
Burman.....6,495 0 0  
Smythson.....6,457 0 0  
Kynoch.....6,400 0 0  
Lawrence.....6,400 0 0  
Allen & Sons.....6,375 0 0  
Johnson.....6,370 0 0  
Peto Bros.....6,393 0 0  
Wm. Oldrey & Co.....6,724 0 0

LONDON.—For the erection of three dwelling-houses, &c., Nos. 54, 56, and 58, Roselynn-street, Hampstead, for Mr. John Dudson. Mr. Chas. Bell, architect, 3, Salters' Hall-court, Cannon-street, E.C. Quantities supplied by Mr. H. Longrove.—  
Ward & Lambie.....£6,197 0 0  
Anley.....5,830 0 0  
Staines.....5,777 0 0  
Bowden.....5,675 0 0  
Wall.....5,537 0 0  
Green & Lee.....5,393 0 0  
Burford.....5,385 0 0  
Dearing & Son.....5,377 0 0  
Allen.....4,960 0 0

LONDON.—For additions to No. 1, Granville-park, Blackheath, for Mr. H. Marriott. Mr. Leonard V. Hunt, architect, 35, Queen Victoria-street, E.C.—  
Wood, Greenwich.....£239 0 0  
Kennard, Lewisham (accepted) .....190 0 0

LONDON.—For erecting a house in Heath-street, Hampstead, for the Wells and Camden Charity Trustees. Mr. Henry S. Legg, architect, Christ's Hospital, London.—  
Dove.....£2,175 0 0  
King.....1,975 0 0  
Burford.....1,835 0 0  
Wall Bros.....1,875 0 0  
Allen & Son.....1,775 0 0

LONDON.—For alterations, &c., to the People's Hall, 272, Whitechapel-road, to convert same into a Cheap Food and Shelter Depot for General Booth. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, London, E.C.—  
Corbass, Leytonstone.....£1,300 0 0  
Doubleday, King'sland.....1,145 0 0  
Martin, Battersea (accepted) .....995 0 0

LONDON.—For alterations and repairs to No. 11, Agass-street, Strand, for Mr. H. J. Haire, Mr. John Job Wood, architect, 79, Castle-street, Battersea Park.—  
Hulton.....£250 0 0  
Hay & Son.....165 0 0  
Barker.....163 15 0

LONDON.—For painting and repairs to eleven houses, Brady-street, E., for Mr. Chas. James. Mr. John Hudson, architect, 80, Leaman-street, E.C.—  
Conisell Bros, Bethnal-green.....£197 0 0  
Howard, Bethnal-green.....184 0 0  
Easton & Co., Whitechapel.....178 0 0  
Gladding, Mills-end.....178 0 0

LONDON.—For the erection and completion of a new Postal Sorting Office, Seven Sisters-road, South Tottenham, for the Commissioners of H.M. Works and Public Buildings. Mr. Henry Tanner, architect, 15, Whitehall-place, S.W.—  
Thomas Anthony, Brentford.....£1,145 0 0  
\* Accepted.

LONDON.—For alterations and additions to factory, Graham-street, City-road, for Messrs. Carlisle & Clegg. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C.—  
Tarrant.....£1,980 0 0  
Turtle & Appleton.....1,925 0 0  
Lawrence & Son.....1,925 0 0  
Woodward & Co. (accepted) .....1,810 0 0

LONDON.—For alterations to house and stables, No. 15, Lower Berkeley-street, Portman-square, W., for Mr. A. J. Blount. Mr. F. M. Elgood, architect, 93, Wimpole-street, W.—  
Bartholomew & Co.....£1,108 0 0  
Clarke & Mannoch.....849 0 0  
Simpson & Son.....847 0 0  
Geo. Shaw (accepted) .....760 0 0

LONDON.—For the erection of Free Methodist church, Markham-road, Walthamstow. Mr. E. O. Homer, architect, 98, Gresham-street, E.C.—  
Wagstaff & Sons.....£2,296 0 0  
Stains & Sons.....2,089 0 0  
Grover & Sons.....1,895 0 0  
Cheesum & Sons.....1,878 0 0  
Green & Lee.....1,850 0 0

LONDON.—For the erection of new premises, 394 and 396, Euston-road, N.W., for Mr. E. M. Rully. Mr. A. Frampton, architect, 62 and 63, Basinghall-street, E.C.—  
H. Cooper.....£4,841 0 0  
W. Fitts & Sons.....4,411 0 0  
W. Scrivener.....4,144 0 0  
A. & W. Gamar, Peckham.....3,770 0 0

LONDON.—For alterations and repairs to No. 128, Harley-street, W., for Mrs. Alexander. Mr. F. M. Elgood, architect, 93, Wimpole-street, W.—  
Clarke & Mannoch (accepted) .....£731 10 0

LONDON.—For erecting new vestries at St. Andrew's Church, Bethune-road, Stoke Newington. Mr. Arthur Blomfield, A.R.A., architect. Quantities not supplied.—  
J. M. Macey & Sons.....£249 0 0  
John Goldwells & Son.....600 0 0  
Dove Bros.....585 0 0  
J. Cheesum & Sons.....425 0 0

**SURBITON.**—For building new house at Surbiton, for Mr. Minion Crawford. Mr. Wm. Kidner, architect, 23, Old Broad-street, E.C. Quantities by Mr. James Barnett, 80, Cannon-street, E.C.:

J. F. Collinson, Teldingdon .....	23,980	0	0
Robt. Ariss & Co., Putney .....	3,375	0	0
C. Oldridge & Sons, Norbiton .....	3,773	0	0
Adkins Bros., Surbiton .....	3,667	0	0
J. H. Jarvis, East Molesey .....	3,685	0	0
C. & T. Adkins, Surbiton .....	3,600	0	0
S. J. Scott, London .....	3,687	0	0
Turtle & Appleton, Clapham .....	3,585	0	0
Watson, Ascot .....	3,430	0	0

**SUTTON.**—For additions to "Worcester House," Sutton, Surrey, for Mr. J. J. Halford. Mr. Frederick Culyer, architect, 15, Great George-street, Westminster.—Baichin & Shopland, Sutton\* ..... 2387 0 0  
\* Accepted.

**UPTON-PARK.**—For the erection of house and shop, in Park-road, Upton-park, with stable and coachhouse, and putting new shop-front to adjoining house, for Messrs. H. W. Hopwood & Son. Mr. John Hudson, architect, 80, Leaman-street, E.C.:

T. Little, Whitechapel .....	2897	0	0
J. & H. Cocks, Mile-end .....	782	0	0
Conisell Bros., Bethnal-green .....	729	0	0
W. Gladding, Mile-end .....	728	0	0
A. Eaton & Co., Whitechapel .....	719	0	0
Bush & Son, Upton .....	680	0	0
J. W. Wyles, Upton (accepted) .....	630	0	0

**WOLVERTON (Bucks).**—For additions to envelope works, Wolverton, for Messrs. McCorquodale & Co., Limited. Mr. H. Phelps Drew, architect, 99, Gloucester-road, London, S.W. Quantities by the architect:—

Miekin, St. Albans .....	21,831	0	0
Norton, Chelsea .....	1,579	0	0
Worrall, Wolverton .....	1,686	0	0
Robinson, Bradwell (accepted) .....	1,517	0	0

**WORKSHOP.**—For building new maltings, foreman's house, entrance-gates, and boundary-walls, &c., for Mr. Wm. Stones. Mr. E. W. Farebrother, architect, Grimby:

Jno. Rollett & Son, Workshop .....	217,547	0	0
James Harrison, Workshop .....	14,150	0	0
Hett & Sons, Workshop .....	13,250	0	0
John Wilson, West Retford .....	13,169	0	0
Wm. Storey & Son, Bourne, Lincolnshire .....	12,985	10	8
John Chambers & Sons, Sheffield .....	12,889	0	0
Joseph Ghy & Co., Grimby .....	12,658	10	0
Thomas Lowe & Sons, Barton-on-Trent .....	12,350	0	0
Fench Hind, Nottingham .....	13,347	0	0
Wm. Holden & Co., Stalybridge .....	13,280	0	0
James White, Sheffield .....	12,200	0	0
John Greenwood, Mansfield .....	12,198	0	0
Geo. Longden & Son, Neepsend, Sheffield .....	11,800	0	0
John Lister, Aston, Rotherham .....	11,781	10	0
Evans & Woodcock, Nottingham .....	11,778	0	0
N. Vinkers, Nottingham (accepted) .....	11,650	0	0

*Alterations of the "Feynars Tavern."*—Mr. W. Evans, of Upper Holloway, writes to complain that his tender was placed at the top of the list for this job. He says that, in point of fact, he was third down on the list. He says his tenders were:—For alterations, &c., 1,188.1; for billiard-room, 650, making a total 1,838.1. We inserted the list as we received it.

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# The Builder.

VOL. LVII. No. 243.

SATURDAY, SEPTEMBER 21, 1890.

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### Railway Carriages at the Paris Exhibition.



RAVELLERS who are chiefly acquainted with the French railways from Boulogne and Dieppe to Paris, will naturally arrive at the conclusion that the railway carriages in France are far

inferior to those in use even on some of our southern lines; if, however, they visit the railway carriages exhibited in the Paris Exhibition they will have cause to change their views, and to think that a good deal of attention has been paid to the comfort of the passenger on some of the principal Continental railways, notably, we think, on the Paris, Lyons, and Mediterranean Railway, whose exhibit comprises five first-class carriages of various types, and one third-class carriage. The first carriage which comes under our notice is of the first-class, long-bodied, bogie type, with end platforms and entrances, and with a corridor running down the centre, that is to say, there are two seats on one side of the corridor and one on the other. The frames are of plate placed at the outside of the carriage; they are parallel over the bogies, but deeply belled between them. The bogie frames, which are of H section, are placed between the main frames and inside the wheels. The bogies are 12 ft. 11½ in. long; they are provided with four wheels each, which are placed 4 ft. 4½ in. apart from centre to centre, the distance between the centres of the bogies being 47 ft. 10½ in. The number of sittings provided is forty-seven. There are four compartments, containing sixteen seats, intended for smoking; these compartments are shut off from the rest of the carriage by sliding doors; all the rest of the carriage is open. Two lavatories are provided, and there are two sets of apparatus for heating the carriage with hot water. The lighting is by gas. The length of this carriage over the frames is 73 ft. 4½ in. Its weight, when empty, is 35 tons 4 cwt.; with fuel and water, 36 tons 6½ cwt.; and when full, 38 tons 11½ cwt.; and the dead load carried per passenger when the complement is complete is 1,730 lbs.

The ordinary six-wheeled, fixed-wheel base, first-class carriage, is entered from the side; the number of sittings is thirty-two, in four compartments. The length over frames is

33 ft. 2½ in.; the weight, empty, is 14 tons 8 cwt., and full, 16 tons 5 cwt.; and the dead load hauled per passenger is 980 lbs.

A somewhat similar carriage to that first described is one in which the corridor is at one side for half the length of the carriage, and on the other for the rest of the distance, a cross gangway at the centre of the length affording access from one to the other. In this carriage all the compartments are provided with sliding doors, and, besides the end entrances, there are doors on the central cross gangway. Two lavatories and two sets of heating apparatus are provided; and the number of seats is forty-eight. The length of this carriage over frames is 76 ft. 3½ in. Its weight, when empty, is 35 tons 18½ cwt.; when full, 37 tons 7½ cwt.; and the dead load hauled per passenger is 1,741 lbs.

The sleeping-carriages are two in number, and are entitled respectively, "Fauteuils-Lits," and "Lits-Salon." The first-named is arranged for forty-two seats, and six beds; four lavatories are provided, and four sets of heating apparatus; the entrances are at the sides, and the lavatories are placed between the compartments. Length over frames, 63 ft. 6½ in.; weight, when empty, 34 tons 10½ cwt.; when full, 35 tons 16½ cwt.; and the dead load hauled per passenger carried is 1,671 lbs.

The "Lits-Salon" is the most luxurious carriage exhibited; it has three compartments only, each about 8 ft. 6 in. square, and in each compartment are three seats, so arranged that at night the backs pull forward and become beds, in which are mattresses; the bed linen is stored behind the seats. A lavatory is provided for each compartment, and the carriage can be heated as desired; the entrances are at the sides. These carriages are carried on six wheels; the length over frames is 35 ft. 2½ in.; the weight empty is 16 tons 15½ cwt.; when full, 17 tons 19½ cwt.; and the dead load hauled per passenger carried is 4,366 lbs.

The third-class carriage is of the six-wheeled type; it is divided into five compartments, the divisions of the centre one running to the roof, of the others only half height. The number of seats provided is fifty, the length of the carriage over frames is 29 ft. 6 in. Its weight, when empty, is 10 tons 13½ cwt.; when full, 14 tons 2½ cwt.; and the dead load hauled per passenger is 477 lbs.

Let us compare these carriages with those exhibited by the Midland and the North-Western Railway Companies.

The Midland Company's carriage is one of their six-wheeled bogie composite type. There are three first-class and three third-class compartments, besides a compartment for luggage, and one for the guard. There are seats for sixteen first-class and twenty-eight third-class passengers, or forty-four sittings in all. Every compartment, with the exception, strange to relate, of that provided for first-class smoking travellers, has its own lavatory, but no heating apparatus is supplied. The length of the carriage is 56 ft. Its weight, when empty, is 25 tons 3½ cwt.; when full, 29 tons 11½ cwt.; and the dead weight hauled per passenger carried is 1,282 lbs.

The London and North-Western carriage is of the saloon, sleeping, standard type; it is carried on two fixed axles, 16 ft. between centres, and on two axles arranged to swivel from a radius bar, and placed 32 ft. between centres. There are four sleeping apartments, lighted by gas, and heated; two compartments provide accommodation for four, and two for two passengers. There are thus twelve beds in the carriage, and an attendant travels with it. Besides the sleeping accommodation, seats are provided in one of the vestibules for smoking, and there is a separate lavatory for each compartment. The length of the carriage is 42 ft.; weight, when empty, 22 tons; when full, 23 tons 3 cwt.; and the dead weight hauled per passenger carried is 4,107 lbs.

The Chemin de Fer du Nord exhibits a first-class, four-wheeled, sleeping-carriage, divided into three compartments, one of which is an ordinary compartment to hold eight passengers, the other two being sleeping-carriages also designed to carry eight passengers,—sixteen in all. The sleeping compartments communicate by a passage, off which are the lavatories, one for each compartment. The carriage is provided with Prudhomme's electric communication, which also applies the air-brake. The compartments can be warmed as desired. The length of the carriage over frames is 28 ft. 2½ in.; its weight is 12 tons 7 cwt.; the dead weight carried per passenger in the ordinary compartment is 770 lb., and in the sleeping compartments, 2,640 lb.

The sleeping accommodation in this carriage cannot be compared with that of the "Lits-Salon," or of the London and North-Western Railway carriage, as the actual number of beds is only six and two sofas, and the length per passenger is obviously much restricted.

The Paris and Orleans Railway exhibit two



first-class carriages. One is of the ordinary type used on the line, and is made up of four compartments, each to seat eight passengers, thirty-two seats in all. These carriages are lighted by Shallics & Thomas's mineral oil lamps, which burn from twelve to fifteen hours. The length of the carriage is 29 ft., its weight is 11 tons 6½ cwt., and the dead load per passenger is 792 lb. The other carriage exhibited by this Company is of the long-bodied bogie form, with end enclosed entrances and side corridor. The number of seats is forty-two, in seven compartments: the arms between the seats lift up, and the seats can be drawn out so as to form couches. The length of this carriage is 63 ft. 8½ in., its weight is 32 tons 8½ cwt., and the dead load per passenger is 1,727 lb.

The exhibit of the Société Anonyme Internationale consist of one first and one third-class carriage of the standard gauge and one second-class carriage adapted to the metre gauge and of the latest type adopted by the Société Nationale de Chemins de Fer Vicinaux. The first-class carriage is six-wheeled, it is seated for forty passengers, and its length is 38 ft. 5½ in.; the third-class carriage is similar in construction, and seats eighty passengers; its length is 41 ft. 9½ in. The first-class carriage is fitted with the Westinghouse, the third-class with a screw brake. These carriages are framed in pitch-pine, the exterior of the first-class carriage being finished in varnished teak. The interior of the same carriage is furnished in the cloth adopted by the Belgian States Railway; the cornices and ceilings are in silk rep, and the whole is relieved with Italian and American walnut mouldings. The third-class carriage is finished in pitch-pine. The second-class carriage has four wheels, with central corridor and end platforms; it is 23 ft. 10½ in. long, and is intended to seat twenty-four passengers. The woodwork is varnished teak and pitch-pine inside, and teak and oak painted and varnished outside; there is no upholstery.

The Société Anonyme des Ateliers de Construction de Malines exhibit a long-bodied composite bogie carriage. The first-class compartments, of which there are two, are upholstered in velvet; the ceiling is covered with a silk stuff called coteline; and the panels at the backs of the seats are covered with Lincrusta-Walton. Two of the second-class compartments are upholstered in bronze velvet, and the third in English grey velvet; the ceilings are covered with American cloth, and the passage is decorated with green rep. The seats of the first-class compartments are movable, and form couches when required; both classes are supplied with lavatories, and are warmed with steam from the locomotive passing through pipes and cylinders under the seats. The lighting is by gas, and the brake in use is the Westinghouse. The weight of this carriage is 21 tons 12½ cwt., and the dead load carried per passenger is 2,014 lbs.

L'Usine Raghuo exhibits two carriages: one a six-wheeled composite carriage, fitted with the Westinghouse brake, and containing two first-class compartments and a *coupé* to seat twenty passengers, and three second-class compartments with thirty places; the other carriage is of the first-class, in two compartments. The length of the first-named carriage is 35 ft. 10 in., its weight is 14 tons 18½ cwt., and the dead load per passenger is 669 lbs.

The carriages exhibited by the Boni Guelma metre gauge railway are somewhat peculiar in construction, there being a corridor along one side of the carriage for half the length, and on the other side for the rest of the distance; but this corridor is uncovered, and only protected by a rail, so that the carriage has a somewhat three-cornered appearance. The carriage is divided into one first-class compartment with six seats; one first-class *coupé* with three seats; and four second-class compartments, with forty seats—forty-nine in all. A lavatory is provided, and the brake used is the Smith & Hardy vacuum. The length of the carriage over frames is 42 ft. ½ in., and its weight is 13 tons 19 cwt. The dead load per passenger carried is 636 lbs. The other carriage exhibited by the same company

is also a composite bogie carriage, divided into two first-class compartments, with twelve seats, one first-class saloon with twelve seats; and one second-class compartment with eight seats,—thirty-two in all; a lavatory is also provided. This carriage has a central corridor and end platforms; its length, over buffers, is 36 ft. 5 in., and its weight 8 tons 9 cwt.; the dead load carried per passenger is 591 lbs. The first-named carriage was made by the Société Dyle et Bacalan at Bordeaux, the second by the Compagnie Française de Matériel de Chemin de Fer at Ivry.

The metre-gauge carriage exhibited by the Chemin de Fer du Sud is a composite bogie end platform carriage, seated for forty-six passengers, — fifteen first and thirty-one second class. The first-class is divided into two compartments, one for smokers and the other for non-smokers. Teak, in boards, is used both inside and out, and the ceilings are painted a light colour. The brake used is the Eames-Soulerin, combined with the pressure apparatus devised by M. Stilmant. The length of this carriage is 37 ft. ½ in., its weight is 9 tons 5 cwt., and the dead-load per passenger carried is 451 lb. In a similar carriage of the second class, to seat fifty-six passengers, the dead load per passenger is 352 lb. The carriage exhibited was built at the works of the Société de la Bievre at Lyons.

The upholstery and finish of the English carriages is about equal to that of the Continental ones, and the iron work is superior to theirs. It is remarkable that no Continental carriage exhibited is fitted with six-wheel bogies; this, we think, is a mistake, especially when the great length of their carriages, 76 ft. 3½ in. over frames, is considered, as at high speeds the four-wheeled bogie does not ride nearly so easily as that fitted with six wheels does.

It may be interesting to compare the lengths of the different types of carriage per passenger carried, and also the dead weight hauled per passenger, it being understood that the full complement is taken in each case, and that the figures are arranged in order of length per passenger, beginning with the longest:—

	Length per passenger.	Dead load per passenger.
Lits-salon, first-class, side entrance carriage, P.L. and M. Railway .....	46-94 in. ...	4,316 lbs.
Sleeping carriage, first-class, with corridor, attendant, and heating apparatus, L. and N.W. Railway .....	42-00 in. ...	4,107 lbs.
Sleeping carriage, first-class, side entrance, Northern Railway of France .....	28-20 in. ...	2,640 lbs.
Composite, side-entrance carriage, Société Anonyme des Ateliers de Construction de Malines	— ...	2,014 lbs.
Side corridor, first-class carriage, P.L. and M. Railway .....	19-07 in. ...	1,741 lbs.
Centre corridor, first-class carriage, P.L. and M. Railway .....	18-74 in. ...	1,727 lbs.
Side corridor, first-class bogie carriage, P. and O. Railway .....	18-20 in. ...	1,727 lbs.
Fauteuils-lits, first-class, side-entrance carriage, P.L. and M. Railway ..	17-75 in. ...	1,611 lbs.
Side-entrance, composite carriage, Midland Railway .....	15-28 in. ...	1,282 lbs.
First-class, side-entrance carriage, Northern Railway of France .....	14-10 in. ...	770 lbs.
Central corridor, metre gauge, composite carriage, Boni Guelma Railway .....	13-65 in. ...	591 lbs.
Side-entrance, first-class carriage, P.L. and M. Railway .....	12-46 in. ...	980 lbs.
Second-class, metre gauge carriage, Société Anonyme Internationale ...	11-94 in. ...	—
First-class, side entrance carriage, Société Anonyme Internationale ...	11-54 in. ...	—
Side corridor, metre gauge, composite carriage, Boni Guelma Railway .....	10-29 in. ...	636 lbs.

	Length per passenger.	Dead load per passenger.
Composite metre gauge carriage, Southern Railway of France .....	9-65 in. ...	451 lbs.
Side-entrance composite carriage, Usine Raghuo	8-60 in. ...	669 lbs.
Second-class, metre gauge carriage, Southern Railway of France .....	— ...	352 lbs.
Side entrance, third-class carriage, P.L. and M. Railway .....	7-03 in. ...	477 lbs.
Side entrance, third-class carriage, Société Anonyme Internationale ...	6-26 in. ...	—

These figures are, we think, instructive, and tend to show what sacrifices the railway companies are making for the accommodation of the travelling public (at what cost to the said public who travel on Continental railways we are unable to say), and may afford some information to our readers as to the why and wherefore of the tendency of railway companies to foster third-class traffic.

It will be seen that, in order to provide communication between compartments, the length of the carriage per passenger carried has to be increased from 12-5 in. to 18-75 in., or by exactly 50 per cent., and that the dead load hauled per passenger carried is increased from 980 lbs. to 1,730 lbs., or by 76 per cent.; that a first-class passenger travelling in a corridor carriage occupies 18-75 in. of train length, and requires 1,730 lbs. of dead weight to be hauled with him; in a side-entrance first-class carriage, without lavatories, he occupies 12-5 in. of length, and requires 980 lbs. of dead weight; in a *Lits-Salon* the same figures are 47 in. and 4,316 lbs. respectively; in an English sleeping-car they are 42 in. and 4,107 lbs., while the third-class passenger travelling in a side-entrance carriage without lavatories only occupies 7-03 in. of length and carries 477 lbs. of dead weight with him.

If we take 1d. per mile as the charge for carrying a third-class passenger in one of the Paris, Lyons, and Mediterranean carriages of that class, then, *pro rata*, the charge for carrying passengers in the other carriages instanced should be:—

	By length occupied.	By weight hauled.
Lits-salon, P.L. and M. Railway	6-60d. ....	9-03d.
Sleeping-carriage, L. and N.W. Railway .....	8-37 .....	8-61
Sleeping-carriage, Northern Railway of France .....	3-98 .....	5-53
Composite, side-entrance carriage, Société Anonyme des Ateliers de Construction de Malines .....	— .....	4-22
Side corridor, first-class carriage, P.L. and M. Railway	2-70 .....	3-65
Centre corridor, first-class carriage, P.L. and M. Railway	2-64 .....	3-62
Side corridor, first-class carriage, Paris and Orleans Railway .....	2-57 .....	3-62
Fauteuils-lits, P.L. and M. Railway .....	2-50 .....	3-32
Side entrance, composite carriage, Midland Railway .....	2-16 .....	2-69
Side entrance, first-class carriage, Northern Railway of France .....	1-99 .....	1-61
* Central corridor, metre gauge, composite carriage, Boni Guelma Railway .....	1-93 .....	1-24
Side entrance, first-class carriage, P.L. and M. Railway	1-76 .....	2-06
* Second-class, metre gauge carriage, Société Anonyme Internationale .....	1-63 .....	—
First-class, side entrance carriage, Société Anonyme Internationale .....	1-63 .....	—
* Side corridor, metre gauge, composite carriage, Boni Guelma Railway .....	1-45 .....	1-13
Composite, metre gauge carriage, Southern Railway ...	1-36 .....	0-95
Side entrance, composite carriage, Usine Raghuo .....	1-21 .....	1-40
* Second-class, metre gauge carriage, Southern Railway	— .....	0-74
Side entrance, third-class carriage, P.L. and M. Railway	1-00 .....	1-00
Side entrance, third-class carriage, Société Anonyme Internationale .....	0-38 .....	—

\* These are metre-gauge carriages intended to be run at comparatively low speeds, and are lighter than main line carriages; the length occupied is, however, large in comparison with the weight hauled.



From these figures we see that the introduction of the corridor carriage and the lavatory is very expensive, the extra charge by length being as 1.76d. is to 2.65d., and by weight as 2.06d. is to 3.65d., while the Lits-Salon costs from 6.50 to 9d. in the same ratio. It must further be remembered that third-class carriages fill better than those of the higher class, and that the latter carriages are more costly to construct, in terms of the passenger unit, than those of the third class, and it thus becomes obvious that the figures given above do not fairly represent the difference in cost of carrying a first or a third-class passenger, and that the ratio should be increased by some unknown quantity.

#### THE FORTH AND CLYDE SHIP CANAL.

**T**HIS project, from time to time critically examined in the columns of the *Builder* (see September 6, 1884, and March 9, 1889), is now announced as having taken definite shape, preparatory to approaching Parliament for the necessary sanction. The Bill, it is expected, will be introduced next session. During the six months which have elapsed since our last reference to this most important scheme, there has been no more than mere desultory allusion made to it in public, but all the while the design has been steadily maturing in the hands of a private syndicate of promoters, chiefly belonging to Glasgow and Edinburgh, although partly drawn from more distant quarters. Messrs. D. & T. Stevenson, Edinburgh, are named as the engineers to whom have been entrusted the preliminary preparations, consisting of route surveys, plans, and estimates of cost. Nothing is as yet in completed form, but there can be no question as to the genuineness of the attempt about to be made, whatever may prove to be the reception accorded to the Bill when presented before the Legislature. It is believed that the route chosen will be that which the circumstances of this remarkable crossing of the Scottish Midlands naturally invites, namely, along the central depression extending from the Clyde in the neighbourhood of Glasgow to the Forth at or near the Port of Grangemouth. This is also, as it so happens, and as has already been pointed out in former articles, the narrowest crossing of the isthmus, the distance from deep water to deep water barely exceeding twenty-five miles. One section of critics of the Forth and Clyde scheme has always taken it for granted that operations would consist simply in an enlargement of the Old Forth and Clyde Canal; but this view of the matter was from the beginning untenable, not to say absurd, and to the initiated it is not surprising to learn that the engineers do not expect to utilise the old work to any extent worth mentioning, although they will no doubt be obliged to become the unwilling purchasers of it, at an estimated value, in fairness to the Caledonian Railway Company, the present owners. The old canal, while holding generally to the central valley above mentioned, follows nothing like the shortest route; it winds about a good deal, suiting itself to the varying contours of the surface, and it seeks Clyde waters, not at Glasgow, but twelve miles below, where at the time of construction the nearest deep water was to be found. The conditions are entirely revolutionised now, and the existing work, in its extravagant length of fully thirty-five miles, in the insignificant dimensions of its channel, and in its numerous shifts of level (thirty-nine altogether from the Forth to the Clyde—twenty up and nineteen down), is an altogether obsolete contrivance of the ship-canal order, although taking quite the foremost rank on the year 1768, when first entered upon.

Various estimates as to the cost of a ship-canal of the highest class between the two Scottish estuaries have been hazarded, the range being from seven to ten millions for a work on the same principle as the Suez Canal,

giving unimpeded passage to war vessels and to ocean merchantmen of the heaviest tonnage. Government has been looked to wistfully for the initiative in this gigantic and costly undertaking, but hopes have never been seriously entertained that any Ministry was likely to take it up, and the company of promoters at present is, therefore, a private and independent one, although there may be some expectation of partial Government aid in the future, if not in actual money, in facilities at least for getting it subscribed or otherwise raised. Last month's naval manoeuvres around the coasts brought the importance of a shorter passage for war ships than that round by the Pentland Firth, or by the English Channel, once more into prominence, and a naval authority engaged in these evolutions has since been quoted as pronouncing emphatically on the high value, especially in the event of war, of a lockless canal between the Forth and the Clyde, capable of giving passage to ships of the navy. This authority, it is understood, has intimated to the promoters his intention of exerting the influence at his command towards the realisation of a scheme of so much national importance. During the past six months public views as to the traffic which a ship canal at this point would be likely to attract have undergone considerable change, and from the indulgence of undue pessimism there has been in some quarters a strong tendency towards the opposite extreme. In the matter of through-going tonnage particularly, some extravagant estimates have been entertained. But, after discounting these liberally, there remains the prospect of a really very considerable traffic of this sort, founded on east and west ocean route conditions and probabilities, already alluded to in a former article. With regard to Glasgow and what may be called the local, as distinguished from the through-going, traffic, the influence of a direct ship channel to the German Ocean, the east coast ports, and London, might readily, in its results, prove altogether beyond expectation. At present its facilities are not much greater than will be those of Manchester when her canal is finished, and they are of like kind; a Forth and Clyde Canal would immensely increase, if not double, these, and not only would the water distance to London be lessened by well on for one-half, and the Clyde port brought within a closer touch than either Manchester or Liverpool, but the old navigable bearings would be so overturned as to place Glasgow within shorter sailing distance of the Metropolis than even Bristol, Cardiff, or Swansea. Not only so, but vessels from Liverpool or Manchester bound for London, with cargo or in ballast, would find the round by the new Scotch canal and down the east coast no longer than the Land's End and English Channel route, if not a few miles shorter; and they might in certain contingencies of wind and weather prefer the former, even with canal dues to pay.

#### EGYPTIAN ANTIQUITIES AND BUILDING-TOOLS.

**M**R. FLINDERS PETRIE has again brought to London an interesting and important collection of Egyptian antiquities, the result of his recent excavations in a district between the Nile Valley and the Fayoum, about forty miles south of Cairo. The collection is arranged in two rather inadequate rooms in the building known as Oxford Mansion, where it is terribly crowded, and where the objects run some risk of damage from the large number of visitors, who, during part of the day at least, have hardly room to move about. The objects recovered date from several different periods, from the twelfth dynasty up to that of the Ptolemies; but by far the most important are from a town of the age of Usertesen II., of the twelfth dynasty, and from another town founded in the time of Thothmes III., and existing until that of Menepthah, or, according to Mr. Petrie's dates, from about 1450 B.C. to 1190 B.C.

The earlier town and some of the objects found there should have a very special interest for readers of the *Builder*, for the place appears to have been built and used as the dwelling-place,—and possibly at the same time as the prison,—of the workmen engaged in the erection of the pyramid of Usertesen and its temple, and to have been deserted on the completion of those buildings; and an important part of the objects found consists of a collection of mechanics' tools. The town was laid out in parallel streets, which butt up against the town wall and form blind alleys, and from a number of indications Mr. Petrie draws the conclusion that it was largely inhabited by foreigners, probably slaves or prisoners of war. Some of the tools which these men used about 4,500 years ago may now be seen in a perfect state in the smaller room in Oxford Mansion, and others are there in a more or less dilapidated condition, but quite recognisable. There are a number of little flint saws,—flakes of flint with neatly-notched edges, which were probably mounted in wood; also a complete saw made out of a bivalve shell: a hole is made in the shell so that the fingers can grasp the thick edge of it, which is bound with reeds, while the thin edge is notched to form the blade. There are, besides, flint knives and hatchets and flakes and scrapers of flint, the exact use of which is not stated. A bronze chisel is to be seen, and a pointed bronze pin in a wooden handle, which looks like a bradawl, but is called by the non-committal name of "a piercer." Then there is a set of tools of almost pure copper, which were found altogether in a basket, and look almost new; it consists of two axe-heads of different sizes, which have ears at the backs for binding them to the handles; two adze-heads so fashioned as to be easily bound to such wooden handles as the one which hangs on the wall a little nearer the door; a knife-blade, and a chisel. Near these are a set of moulds of burnt clay in which such tools were cast, and an unfinished casting for a knife-blade. On the wall there hang, besides the adze-handle, a hammer-handle, and a number of bow drills of wood, with swivel tops and holes at the bottom, in which flint points were probably fixed; also two wooden mallets, one of the Indian club shape often seen in the wall-paintings, and the other of the same shape as a modern mason's mallet. Another most interesting exhibit is a brick-mould,—also very much like a modern one, but a little larger, though not of the gigantic size attributed to it by the *Times*. Near this are some plasterers' floats,—again almost facsimiles of modern ones,—and some plummetts, which only differ from those of to-day in being of stone or alabaster instead of metal. There are also measuring-rods, which are quoted as part of the evidence that the workmen were foreigners, for none of them have reference to the standard Egyptian cubit, and on a table are a number of wooden cramps of the double dovetail form, taken out of blocks of masonry, and wooden bolts of various sizes which were found in the ruins of doors, and some of which are grooved and cut in a manner which show they were part of something like a lock. Some reed baskets hanging in another part of the same room are almost exactly like those in which English mechanics carry their tools, and might quite readily be mistaken for them. Near the window of this room are laid out a number of objects from beneath the foundation stone of the temple of Usertesen, consisting of several sets of models of workmen's tools, models of what are supposed to be stones for grinding grain, and strings of carnelian beads, which it is suggested, for want of a better explanation, may have been current money.

Among the other exhibits in the room may be mentioned hoes, rakes, sickles, and other agricultural implements, nets, balls of twine, pieces of rope, &c., brushes, spindles, sandals, stone saucers for grinding colours, and a number of the more familiar kinds of objects, such as fragments of altars and tables of offerings, pottery, sculptured slabs, statuettes, combs, necklaces, beads



and scarabs, sewing-needles, and hair-pins. In the second room are exhibited a small number of tools of the period of the great Theban dynasties; they differ but little in form from those of the period some eleven centuries earlier, which have already been described, but flint has disappeared, and bronze has taken the place of copper. This room contains quite a large collection of pottery, funerary statuettes, mummy-cases and masks, Canopic jars, and other objects of great beauty and importance, but which wear a more or less familiar aspect after the exceptionally interesting collection belonging to the earlier period.

## NOTES.

**M**R. WOOTTON ISAACSON has intimated in the daily papers that he proposes to introduce a Bill next Session making it obligatory that when a house in a town is to be let or sold there shall always be a certificate from a competent sanitary inspector that the premises are in a proper sanitary state. This proposal has naturally elicited the inquiry as to why such legislation should be confined to towns. A correspondent in the *Standard* plaintively inquires why a person who proposes to be a tenant in a country house should not be protected in the same manner. The same person also gave an account of his having taken a house in the country which was found, after two members of his family had been taken seriously ill, to be in quite an unhealthy state. This is cited as an instance of the necessity for such legislation in respect of country houses. Long ago we insisted in these columns on the necessity of some legislation making it either incumbent on all persons who kept lodging-houses to produce, if required, a certificate that the premises were in a proper sanitary state; or, at the least, that the Local Authorities at watering-places should issue certificates to keepers of such lodging-houses as had been inspected and approved by the Sanitary Authority. But there is an immense difference between lodging-houses and ordinary dwelling houses in town and country, and such legislation as Mr. Isaacson proposes is somewhat too grandmotherly in its nature. As a matter of fact, at the present time any person who proposed to become a tenant or purchaser of a house, whether in town or country, is in a position to protect himself as regards the sanitary condition; he can always have the house inspected by a competent person, and if it is not in a good sanitary condition, he can either decline to take it or make such terms as will allow him to put it into a proper state for himself. Further than that, a would-be tenant or purchaser can always ask whether the premises which he desires to take are in a proper sanitary state. If he receives a reply in the affirmative, and it proves to be untrue, he has an undoubted right to damages for misrepresentation. It is quite true that not a few actions of this character have been brought and have failed, but this has resulted from the fact that the lessor has not been proved to have made the representations relied on. There is, therefore, no practical need for the legislation which Mr. Isaacson contemplates; it would be legislation for the benefit of the careless and improvident, and not for the benefit of a provident and sensible man. The latter, as we have said, will always have premises inspected or obtain representation from their owner.

**T**HE case of lodging-houses is entirely different. The owner of such a house lets it out often in rooms, often many times to different persons in the course of the year. Often, also, rooms are necessarily taken in a hurry, and it should be the duty of a person who offers rooms for occupation in this manner to be able to give evidence, by the aid of a certificate, that they are in a proper sanitary state. The opportunities for inspection and the time are much more limited in lodging-houses. The fee for inspection, which

is trivial in the case of a house which is to be taken even for a short time, is proportionately large in the case of a room which is to be occupied for a few weeks. In fact, the more the question is looked at, the more necessary will certificates appear in the case of lodging-houses, and the more vitally do they appear to differ from ordinary dwelling-houses. We have spoken of lodging-houses alone; it goes without saying that every hotel-keeper should be bound to have his house inspected by a proper sanitary officer at least twice a year. A traveller may be poisoned by a night in a badly-drained house without the least possibility of preventing it. Nor should any licence for a new inn ever be granted until the licensing authority are satisfied that it is in a proper sanitary state. This rule should apply to the smallest and largest houses, for the passing haymaker resting for a night at a small country inn is just as much entitled to protection from illness as the wealthiest American who spends his dollars in a West-end palace. Legislation on the lines which we have indicated is practical and urgently required. That which Mr. Isaacson contemplates is the reverse. In any case, that which we have pointed out comes first, and we hope that some Members of Parliament, as the question of sanitary legislation is now before the public, will endeavour to carry a clear and common-sense measure which shall protect travellers at hotels and those who have to occupy lodging-houses, not only in the seaside and other health-resorts, but in the metropolis and other large towns.

**B**Y direction of the Charity Commissioners for England and Wales, the Trustees of Dr. Daniel Williams's Charity have agreed to sell for 15,000*l.* the library buildings in Grafton-street, by University College, and an adjoining house, No. 18, which has served for a librarian's residence, having access, at the rear, to the library. This library was established, for a period of 2,000 years, under the will of Daniel Williams (who died in 1716) for the use of Nonconformist ministers. It was first housed in Redcross-street, Cripplegate, in a building provided by dissenters, and was there augmented by the Harris and Bates bequests. About 25 years ago encroachments by the Metropolitan Railway Company's extension towards Aldgate and the Tower involved the removal of the books to Queen-square, Bloomsbury, where they remained during some seven or eight years. Meanwhile had been erected the existing premises at a total cost of 11,000*l.*, including 4,000*l.* for the site, after the designs of Mr. T. Chaffield Clarke, architect. The new buildings were opened in 1873. Dr. Williams appointed that his library should be free to persons of all denominations; and the twenty-three trustees have always been liberal in the matter of even lending such books as may not be in constant requisition. The founder also provided for the support of certain theological students at Glasgow University, the payment of poor Dissenting ministers, and various kindred benefactions. He was successor to Richard Baxter, whose portrait was deposited in the library,—at Pinmakers' Hall, Old Broad-street, which meeting-place is also associated with Dr. Watts's memory. The library contains a large number of volumes containing Roundhead sermons and tracts, whilst among the curiosities preserved here were the mask of Cartouche, the notorious Frenchman, and the glass bowl said to have been used for the baptism of Queen Elizabeth.

**I**N his opening address as President of the British Association, Professor Flower dwelt on the importance of bearing in mind and providing for the two distinct objects for which museums should be arranged: that of general instruction and interest to the public at large, and that of study by those who have a more serious and more intellectual interest in the objects displayed. It is a pity that Professor Flower did not take the opportunity of criticising the false economy by which the special adaptation of the Natural History Museum for these two

purposes, which had been duly arranged by its architect, was put a stop to. Mr. Waterhouse had arranged, behind the rows of glazed cases in which objects were to be exhibited to the public, private corridors for students only, from which, under proper inspection, the cases could be opened from the rear and specimens examined (and compared, with only the slightest possible interference with their public exhibition. This arrangement, made with a full practical sense of what was required in such an institution, was not allowed to be carried out, we believe from no better motive than economy in building.

**F**ROM the condensed report in the *Times* of Mr. D. G. Hoey's paper, read at the British Association meeting on Saturday last, on "Improved Dwellings for the Poor," it appears that the author proposes to bridge over the gulf between remunerative rates of rental and the possibilities (or impossibilities) of paying them, by accepting "what cubic space can be got," and practically extending it, as far as atmospheric conditions are concerned, by the use of a system of ventilation which will change the air so fast as to materially reduce the usually-accepted minimum of cubic space per individual. This is to be effected by means of a stove, which is not, however, described in the newspaper reports of the paper. Mr. Hoey takes the arrangement of space on board ships as a model:—

"The plans proceed on the principle of the state-cabin on board ship. Given a bare room, 15 ft. by 13 ft. by 13 ft. high, the door 2 ft. 6 in. in middle of 11 ft. end, leaves 4 ft. 3 in. on each side, enclosed by a partition 6 ft. from the door, forming two bed-closets, or cabins, 6 ft. by 4 ft. 3 in. by 7 ft. high. The partition is carried up to the ceiling, enclosing another bedchamber, 11 ft. by 6 ft. by 6 ft. high. The cabins are each fitted with two berths, 6 ft. by 21 in., leaving floor-space 6 ft. by 2 ft. 6 in., furnished with lockers and seat and cupboard. The bedchamber above has a bed 6 ft. by 4 ft. and floor-space 6 ft. by 5 ft. and 4 ft. by 2 ft., with 11 ft. range of lockers and a large cupboard. The space left for the family-room is 11 ft. by 9 ft., and 13 ft. high. There are numerous other provisions for convenience and comfort, including a cheap, economical stove, that burns any slack to white powder, does the cooking, the warming, and, the ventilating all at once, and every other provision has been made, down to the minutest particular, for economising space and cost of erection and of working. The stove has been tested and proved capable of giving a renewal of the atmosphere every hour, twice the 300 cubic feet supposed to be sufficient for a whole night; so that, whilst, without such arrangements, the adequate space of the statute is a delusion and a snare, with them any space, legally adequate or not, may be kept at all times, and without intermission, in atmospheric purity and comfort."

We shall be glad to have further details from Mr. Hoey as to his plans; but we fear that it is quite chimerical to expect the very poor in this country to put up with or look after a system of ventilation intended to keep the air of their dwellings in a healthy condition. They will either utterly ignore it, or, if they understand sufficiently how to do so, they will stop it. If it could be arranged to work automatically and so that no one could interfere with it, that would be the only chance. But the problem of economic provision of habitations for the poorest classes in our large towns is, we fear, a kind of Danaid's sieve: there is no bottom to it. When there are more people in a certain space than can possibly make a decent living in it, the provision of sanitary dwellings at a remunerative rent is practically an impossibility. It is an alternative between pauperism and emigration: we mean by pauperism furnishing people with dwellings at unremunerative rents, which is pauperising in principle, though it is one of the milder forms of the evil. This may tide over the time until in a generation or two the influence of better education has put a check on improvident marriage. But it is only a tiding-over; and, unfortunately, the further it is carried the more demand there is likely to be for it.

**I**N the current number of *L'Architecture* is printed a memorial to the French Minister of Instruction from a number of



Diocesan Architects of France (the signatures to it include the well-known names of MM. Baudot, Vaudremier, Corroyer, and Boeswillwald, inspectors of "travaux diocésains") in favour of the establishment of more systematic instruction for architects in the Mediæval architecture of France, the dealing with which is the special work of Diocesan Architects, and demands special knowledge and training. The memorial apparently points to the establishment of a special branch of study of Mediæval architecture in connexion with the École des Beaux-Arts, in which it is complained that the study of Mediæval architecture is neglected. In the same number appears a long paper by M. Charles Garnier in opposition to this idea, maintaining that the duty of the École is to teach principles of architecture, not special styles; that if there is a special class for one style there should be one for every other style of any importance; that young students are only too disposed naturally to "vagabonder" in their studies, and that the training of the École as at present established gives the architect the intellectual power of understanding and dealing with any style of architecture to which circumstances may direct his special attention. M. Garnier says:—

"La logique réclame toujours ses droits, et, si l'on veut étudier l'architecture du douzième siècle, il semble qu'il doive être aussi utile d'étudier la sculpture et la peinture de cette époque. Les arts d'une même période ne sont-ils pas solidaires? et, si l'on refuse aux architectes actuels la compétence archéologique, il faut bien aussi la refuser à ceux qui, élevés dans les mêmes doctrines, pourraient devenir leurs collaborateurs. Il est bien vrai que Viollet-le-Duc a confié les principales figures de la cathédrale de Notre-Dame à Toussaint, deuxième prix de Rome et classique très convaincu. Il est bien vrai aussi que ces figures sont parfaitement en harmonie avec le style de la cathédrale; mais Viollet-le-Duc a peut-être eu seulement la main heureuse, et son choix ne doit pas détruire les principes de prudence et de garantie. Il faudrait donc fonder à l'École des beaux-arts, sous peine d'être incohérent, un enseignement de l'art de Cimabué et d'Oragna, et un enseignement de celui de Nicolas de Pise. Mais naturellement il faudrait aussi faire un cours pour compléter ces époques: il y aurait un cours de costumes du temps de Constantin; un autre du temps de François I<sup>er</sup>; puis on irait aussi logiquement à faire poser des modèles revêtus de robes à pauciers, de culottes à ponts, ou coiffés de feutres empapachés. Oui, créés seulement à l'École des beaux-arts un chaire architecturale de moyen âge, et vous verrez bientôt les jeunes peintres, ardents et quelque peu paradoxaux, réclamer, avec toute apparence de justice, la création d'un musée de la mode et l'établissement d'un magasin d'accessoires, que vous ne pourriez logiquement le leur refuser: car l'Élat, qui a fait restaurer la galerie des Cerfs et les peintures du Primatice à Fontainebleau, qui vient de faire remettre à neuf le plafond de Lemoine à Versailles, qui, de temps à autre, fait mettre des nez ou des oreilles aux statues mutilées, et qui a laissé regretter celles de la Madeleine, devrait alors avoir pour les peintres et les sculpteurs, tout comme pour les architectes, une école d'artistes spéciaux ayant étudié le caractère particulier de toutes les toiles et de tous les marbres qui se détériorent."

As far as concerns the general instruction given in the National School of Art, it appears to us that M. Garnier's logic is difficult to answer. Perhaps the question might be met by attaching to the appointment of Diocesan Architect a condition that the candidate should offer some proof, by drawings or writing, of his special knowledge of the Mediæval style.

MR. HENNIKER HEATON has given notice that next Session he will call attention to certain facts concerning the department of the Postmaster-General. Some of these have been pressed upon the attention of the Government before, but the present indictment,—as it might almost be termed,—consisting of no fewer than fifty clauses, contains some new and interesting information. The anomalies of Colonial postage is a favourite theme of Mr. Heaton's, and in this connexion he compares the cost of a ton of letters (1,792s.) and a ton of newspapers (37s.) to Australia. Another comparison is used which is certainly striking, but hardly fair. "It costs the public 5s. to send 200 letters to Australia, but a parcel of the same weight will go in

the same steamer for 3s. 6d." There is no reference whatever to the cost of collection and distribution of the 200 letters, and such a comparison seems valueless. The following is more to the point, and is only one among several similar instances. "A letter posted in France for New Caledonia is only 2s. 6d., whereas a letter to Australia (1,000 miles nearer England), by the same route, from the United Kingdom, is charged 5s." Letters from France and Germany to British India can also be sent for just one-half the charge from England. Attention is also drawn to the fact that single post-cards can be purchased for their face value in all civilized countries except England. Certain reflections are made upon the manner of publishing the accounts of the Department, and also upon its administration. It is stated, for instance, that at least 100,000 papers are confiscated every year, their senders not complying with the various regulations of the Post-office; and that, although the Telegraph Department is credited to the extent of 2,000l. a year for the sale of waste paper, nothing at all is credited to the General Post-office for this waste paper. In other countries such forfeited literature,—or part of it, at least,—is sent to the hospitals; but nothing of this kind is done in England, and as it is hardly likely that the papers are destroyed, they should be accounted for in some way. The concluding clause of the "indictment" justifies our use of this term. It is concise,—the shortest, indeed, of the fifty,—and runs thus:—"The permanent officials in the Post-office obstruct and object to every one of these reforms!" Mr. Henniker Heaton has experienced the fate of most reformers, but he is not easily discouraged, and possesses the essential qualification of perseverance in no ordinary degree.

THE paper by Mr. W. Santo Crimp, read at the Institution of Civil Engineers, and now issued as a pamphlet, "On the Movement of Sewer-Air," gives an account of a series of experiments made by the author on a special length of sewer in the Wimbledon district, in order to ascertain the direction and extent of the movement of air in the sewer at different times of the year and under various temperatures and atmospheric conditions. The facts given lead almost inevitably to conclusions at variance with some theories about "sewer-gas" which have been for a good while accepted. The simple faith has been largely held and acted on, that sewer-air ascends habitually to the highest outlet of the system. Mr. Crimp's readings of anemometers placed in the sewer showed in the first place that currents of sewer-air were frequently too feeble to cause an anemometer to work (as we should have expected to be the case), so that in some cases only negative results were obtained; "but on the other hand," says Mr. Crimp, "the positive results were such as to show beyond doubt what is the principal agent causing movements of sewer-air"; and that agent, we are told, is the wind. We give the following extract from the paper, which is worth the careful attention of every one who is practically interested in the subject:—

"With regard to the question of temperature as causing movements of sewer-air, it has generally been supposed that the movements were principally due to that cause. If the assumption were a correct one, the sewer-air would pass upwards in winter, and downwards in summer,—that is, speaking generally. The movements would be most rapid when the difference between the temperature of the air and that of the sewer-air was greatest. Now, in the author's experiments, the greatest difference was found to be in October, when it averaged 8° 4', yet during that month the uphill currents were too feeble to affect the anemometer except upon three days. During the same month downhill currents were registered on twelve days.

In the exceedingly calm and foggy December, the difference was 7° 55', yet the results as regards uphill currents were altogether of a negative character, whilst downhill currents were registered on nine days. February, again, shows a difference of 7° 55', and whilst uphill currents were registered on nineteen days, downhill currents were found to prevail on every day; moreover, the movements

were exceedingly active compared with those of the other months referred to.

The results obtained during February and March are in striking contrast, and it is obvious that the effects of temperature are weak compared with those of some other agent. The drag of the sewage, if of any appreciable degree, would have made itself apparent during the calms of December and in other months. The author would at once say that the experiments had not long been in operation before he found that the wind was practically the only agent capable of producing movements that could be registered by an anemometer. Numberless cases could be quoted from the mass of detail accumulated in making these experiments, but a few must suffice."

A number of examples are then given as to the direction and strength of the wind on certain days, and the registered movement of air in the sewers, at the same times, which we have not space to quote in detail, but the general result of which is thus summed up:—

"During the entire series of experiments the actual volume of air recorded as passing downhill exceeded that recorded as passing uphill by very nearly one-third, whilst downhill currents were recorded on 273 days as against uphill currents on ninety-seven days. The cases given could be multiplied if desirable, but throughout the whole series of experiments the same effects of the wind were observable; the direction of the sewer-air currents was determined by that of the wind, whilst the currents were either strong, or weak, or imperceptible, accordingly as the wind was fresh or light, or calms prevailed."

IN response to an invitation, we have visited the workshop of the "Guild and School of Handicraft," and have examined the objects produced there, some of which the Guild is sending to the coming Arts and Crafts Exhibition. The Guild, we are told, is an association of workmen which was founded some eighteen months ago, and is carried on upon the co-operative system, under the direction of Mr. C. R. Ashbee, who himself produces the designs for the whole of the work. The members of the Guild, who work in the shop during the day, are expected to teach in the school in the evening. The work done is of various kinds,—wood-carving, joinery, metal-work, plaster modelling, and decorative painting being most prominent; but the designs are all of a class which was exceedingly prominent at the exhibition in the New Gallery last year, which appears to be inspired by recollections of Blake, and is familiar to readers of a publication called "The Hobby Horse." We are far from thinking that the style is a bad one; but it is one that can appeal to but a small section of the public, and for which the demand is, and is likely to remain, strictly limited. If the Guild desires to avoid failure it will have to watch the drift of public taste with more than ordinary care, and be prepared to put the skill of its members at the service of other styles if necessary. Meanwhile, some of the objects we saw at the workshops,—notably some *gesso* panels and hammered copper dishes,—are admirable in design and execution, and promise well for the success of the institution.

THE *Times* of last Monday contains an interesting and reassuring account of the restorations and repairs which have been so long in progress at the Palace of the Doges in Venice, and which are now all but complete. Twenty years seems a very long period to devote to the repairs of a single building, but when that building is one of the great architectural monuments of the world, as celebrated for its beauty as for its unique character and design, care and skill in dealing with it are of such importance that, provided they are lavished without stint, no one will grumble at a little delay in completing the work. Whether the Ducal Palace of Venice is worthy of quite all the sentiment that has been so freely expended upon it or not, it is at least a monument in which all the civilised world takes a very deep interest, and which all the world will be glad to hear has been treated with such reverential care. The loss of the original capitals of the arcades is a subject for great lamentation, and it is possible that the extreme section of the imprac-



ticable anti-restorers will try to make their removal a crime; but it was evidently unavoidable, unless the building was to be permanently disfigured with heavy timber shoring until even that should be insufficient to keep it standing. Copies of the caps (provided they are as good copies as the time and trouble expended upon them would point to) are probably the best substitutes for the old ones that could have been found. Bad is the best, of course; no copy can ever be quite the same thing as an original, but they at least produce the nearest attainable effect to that aimed at by the designer of the building. The copying of the weather-stains is, of course, a piece of utter puerility.

ANYONE in search of the picturesque might do worse than pay a visit to the once busy and wealthy port, though now the sleepy and poor inland town, of Sandwich, in Kent. The narrow, crooked streets, bordered by overhanging and often dilapidated gables; the great market-place, where the grass grows between the paving-stones; the gateway opposite the little bridge over the river, once flanked by massive turrets, but now patched with weather-boarding; the bits of carved oak door-frames and angle-posts of the houses; but, above all, the spacious but now (at least in two cases of the three) ruinous churches, all tell a piteous tale of departed glory, but afford delightful material from which to fill the pages of one's sketch-book. The most interesting relic is, perhaps, the Church of St. Peter, which stands in the middle of the old town, with the south aisle rootless, all the monuments in ruins, and the greater part of the rest of the fabric only held together by frequent repairs and by rebuilding little bits as money can be collected for the purpose. Of the original structure nothing is left, but there are still fragments of Norman work and, indeed, of work of all subsequent periods. Some of the windows have been very fine ones, but except in the case of one, which is built up, very little of the old tracery remains. At the south-east corner of the church is a small building supposed to have been an "anchorage," with a vaulted crypt under it, originally reached by a newel staircase, now in ruins. The large Church of St. Clement has been very thoroughly restored, and is, consequently, less interesting than that of St. Mary, at the opposite end of the town, which bears all the traces of its very tragic history in its walls. To say nothing of burning by the Danes in almost pre-historic times, and other subsequent disasters, the tower of this building fell in the fifteenth century, and again in the seventeenth, and on the latter occasion destroyed nearly the whole of the church. The south arcade was never rebuilt; and one roof now covers the nave and south aisle, as well as the chancel and the adjoining chapel of St. Lawrence. The north arcade was rebuilt in wood, and the remains of the tower piers razed to the floor-level. The only bell is now hung in a wooden turret over the south porch. Some attempt has been made at restoration, but it appears to have consisted, partly at least, in cleaning the plaster off the walls at the east end of the church, revealing some very rough masonry, among the stones of which may be recognised various bits of moulding and ornaments from other parts of the church, that have been used up in the rebuilding,—probably after the last fall of the tower.

SANITARIANS who went to church last Sunday morning and listened to the well-known narrative, in the first lesson for the day, of the healing of Naaman the Syrian, might perhaps be tempted to suggest whether there were not a practical rather than a mystical meaning in the advice given by the prophet to the invalid, to "wash seven times." It is very possible that the leprosy of Naaman was mainly owing to habitual neglect of cleanliness, or at least that he would never have fallen a victim to it if he had been a man of sanitary habits. It is true that a special efficacy appears to have been attributed to the waters of Jordan in

particular; but this might have been only to point the moral, that the thorough use of water, even that of a humbler river than Abana or Pharpar, was the great desideratum. There is a curious similarity between the temper in which Naaman received this homely advice, and the manner in which the religious folk of Scotland, a quarter of a century back, received Lord Palmerston's reply, when they sent to him to ask why he had not appointed a national fast-day on account of the cholera, and were told that the most important thing was to keep themselves and their dwellings clean and set their drainage right. Many thousands of our population, suffering from disease and discomfort arising from preventable dirt, might still find a practical application in the remonstrance made to the Syrian captain:—"My lord, if the Prophet had bid thee do some great thing, wouldest thou not have done it? How much more then when He saith unto thee, 'Wash, and be clean!'"

#### THE AMINES PROCESS OF SEWAGE TREATMENT AT WIMBLEDON.

A PUBLIC demonstration of the application of the "Amines" process of sewage treatment took place at the Wimbledon Sewage Farm on Wednesday last, when Herr Hugo Wollheim, the patentee, endeavoured to utilise the disinfecting properties of a mixture of trimethylamine and lime in the treatment of sewage.

Trimethylamine may be regarded as an ammonia in which the three atoms of hydrogen are replaced by three molecules of methyl, the formula being  $N(CH_3)_3$ . This compound, the use of which is so essential a feature of the so-called "Amines process," occurs ready formed in herring-pickle or brine, from which it can be separated by distillation with potash. The smell of this peculiar compound is that of herrings in a state of dubious freshness.

At Wimbledon the process adopted is of a very simple character. Lime is worked up in a mill with water to a thin milk, and herring-brine, obtained from Billingsgate, is added in the proportion of three grains to every seventy of lime,—the resulting seventy-three grains being the calculated amount required to disinfect and precipitate one gallon of average Wimbledon sewage, which is purely a dwelling-house product. We presume the quantity would have to be varied for sewage containing manufacturing refuse.

The mixture of lime and herring-brine is run into the crude sewage, which then passes into settling tanks, where in the course of half-an-hour the sewage settles, and a strongly alkaline effluent is produced, of clear yellowish appearance, rich in organic matter, and possessing an odour that has been variously described,—one enthusiastic believer in the process declaring that it has all the delightful freshness of the sea-breeze. When we say that to our sense of smell the odour was suggestive of that indefinable one that hangs about a fairly well-flushed urinal, it will be understood that in our opinion the sea-breeze has reason to complain of the simile.

At Wimbledon the effluent is utilised for irrigation purposes, and the sludge is sold for one shilling per ton, which, considering the enormous proportion of lime that it contains, and its consequently strongly alkaline character, would seem to be quite as much as it is worth. The inventor states that the non-petrescent character of the sludge would make it peculiarly suitable for filling up low-lying lands without previous pressing or drying. If an extended experience sustains this claim, it will certainly be a point in favour of the "Amines" process; at present the only experience to guide to such an opinion is the naturally-imperfect, because limited, one gained by exposing a few tons of wet sludge for a few weeks at Wimbledon, when it was found that its bulk fell from 8 in. to 2 in., and a dry cake was produced, which was certainly free from offensive character.

A very serious point to be considered is the powerfully alkaline character of the effluent, due to the somewhat startling quantity of lime that it is found necessary to mix with the herring brine. At Wimbledon it is said that no bad effects upon the crops have followed its use, but the evidence here, again, is very imperfect, for we understand that the Amines process has only been worked intermittently and alongside of the Wimbledon Local Board's own process of lime treatment and irrigation. Until

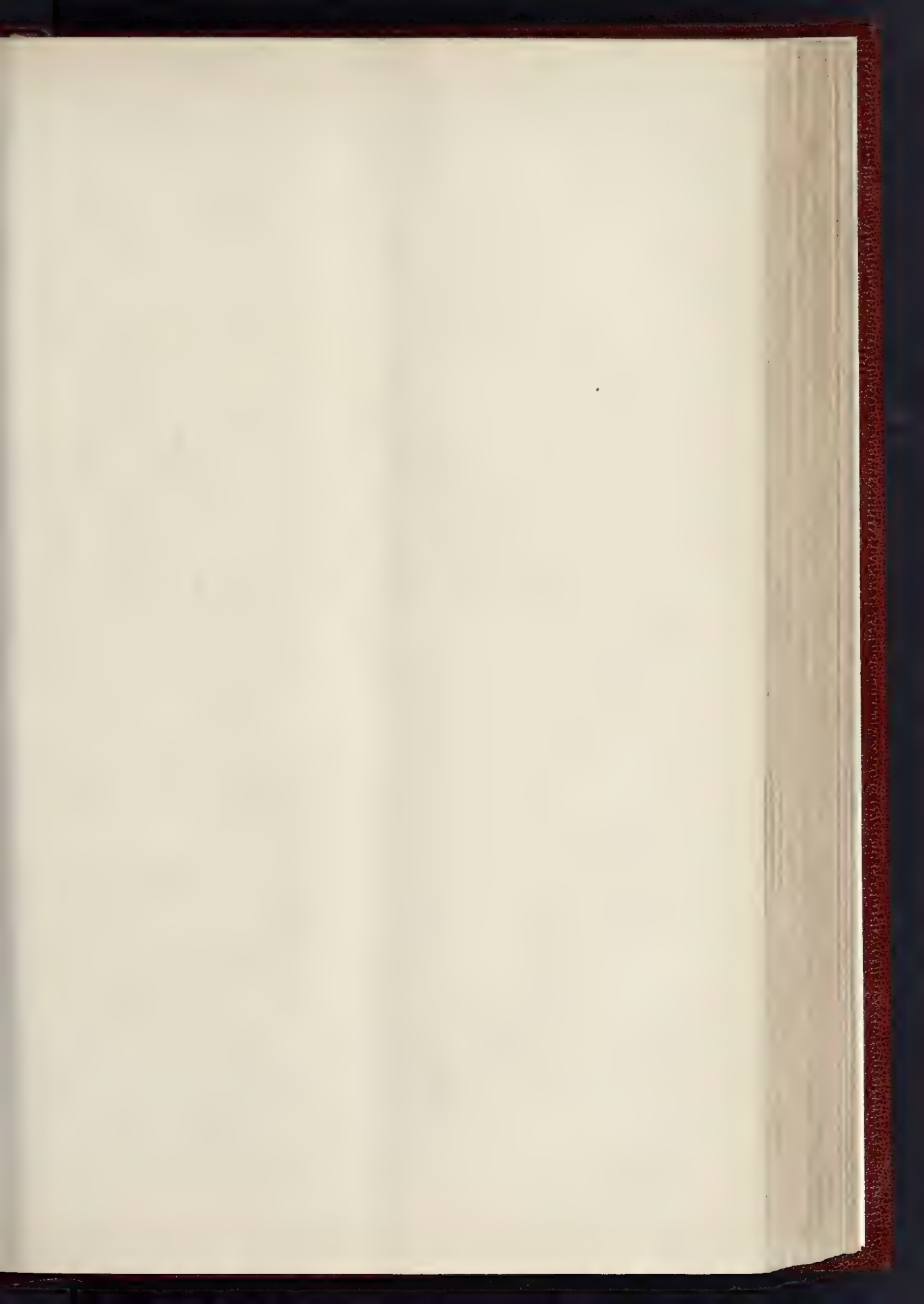
the Amines process has been in sole possession for some months it will be obviously impossible to say whether the effect will be deleterious or the reverse. But it is contended that the effluent is so free from offensiveness that it can be run into streams or water-courses without injury to the fish or the neighbourhood. No very valuable corroborative data was produced in support of this contention. It was certainly contended that dilution with river-water would prevent all evil results, but this is precisely the sort of argument that is urged by every one who wants to run something of doubtful quality into the neighbouring river. The disinfecting quality of the Amines compound still remaining in the effluent may be great; but, supposing a considerable town discharges all its effluent treated by the Amines process into a sluggish stream of moderate volume, the effect of the Amines compound would, before it reached the outfall, become exhausted, while the alkalinity of the effluent not being lessened very greatly by dilution would destroy fish life and increase the tendency to putrefactive fermentation. We make these remarks in no carping spirit, but simply because we consider that the process, as tried at Wimbledon, has yet to prove its value. It has some good points, but it is handicapped by several very doubtful ones, and, while wishing the Amines Syndicate every success in their endeavour to solve an important problem, we would strongly advise them to test the process for a very much longer time and under much more trying circumstances than obtained at Wimbledon, before taking the step, which we suppose they are naturally contemplating as the result of this public exhibition of their experiment, of inviting public support in the formation of a limited liability company.

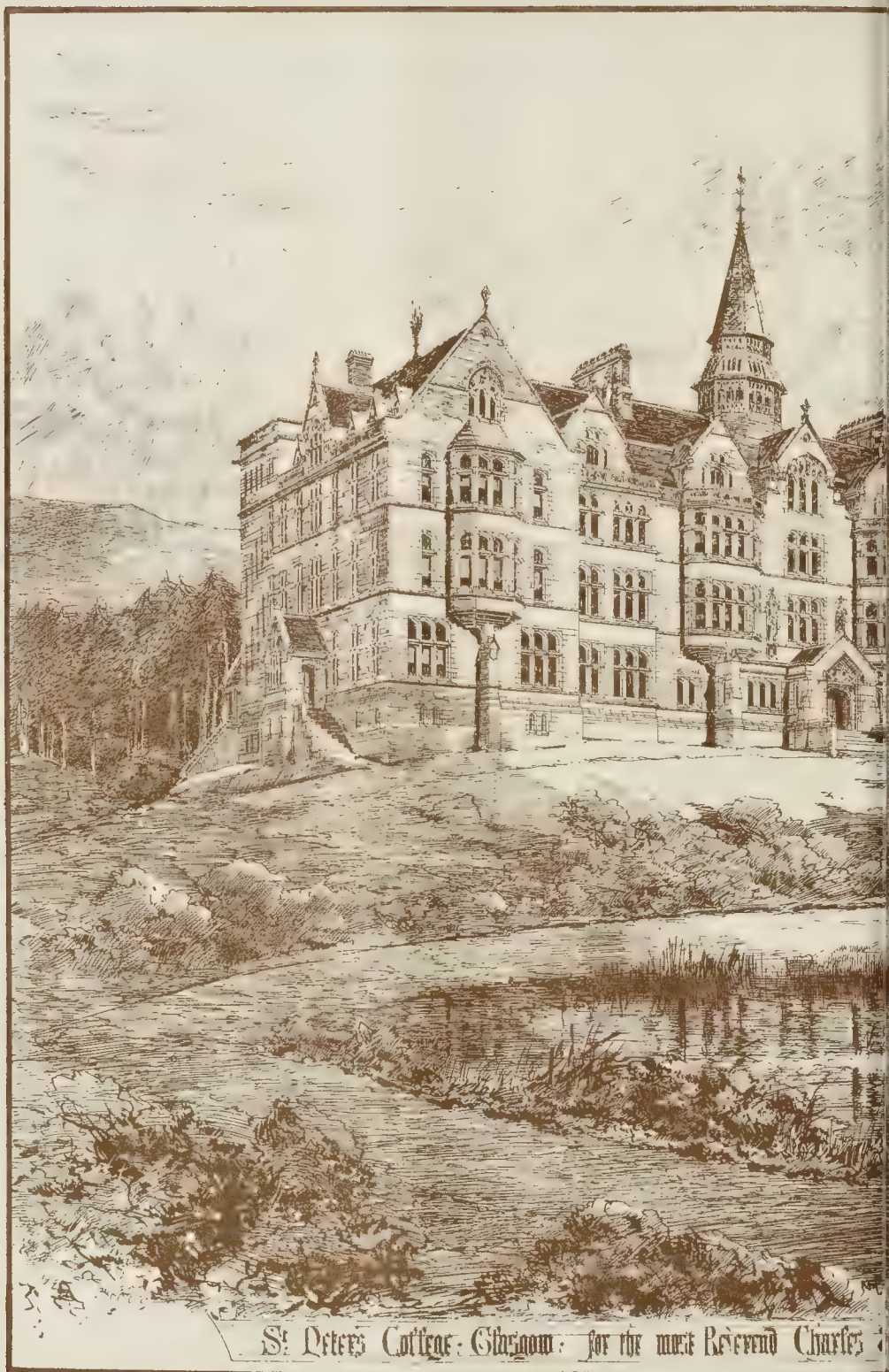
A question which was very freely asked, and about which it was difficult to get any very definite information, was as to the extent of the herring-brine supply. Suppose several large towns adopted this process, and suppose, too, the herring fishery was a failure for a season, what could take the place of the brine? Visitors were told on Wednesday that brewers' grains, waste liquor from the beet-root industry, and other by-products, would serve the same purpose, but no experiments were quoted or authority given that such would be the case. Herring brine evidently possesses some special advantage, as it is used exclusively at Wimbledon; and as one large town might contract to take all the available brine, the working of the process would have to be confined to that town, the local authorities of which would ever watch with nervous anxiety the condition of the herring fishery.

A good deal is made of the sterility of the effluent, and considering that it is vouched for by so eminent an authority as Dr. Klein, F.R.S., the fact demands respectful consideration. But, after all, as it is not held that any actual destruction of organic matter takes place, but that the organic matter is merely for a certain time sterilised, it seems to us that the sterilisation is merely a postponement of the inevitable fermentation and oxidation of the dissolved organic matter. If beef-broth is boiled it is sterilised; if ordinary drinking-water is forced through unglazed porcelain, or air is filtered through cotton-wool, all germs can be removed; but expose the boiled broth, the water, or the air, in unsterilised vessels of ordinary cleanliness, and they will shortly abound in germs once more. There are germs and germs; the mere fact that the effluent at a given moment is free from them is of no particular importance unless it can also be clearly shown that the dissolved matter in the effluent is not of a character to nourish and develop those that it will inevitably receive from the air, and everything, in fact, that it comes in contact with. As the Amines process provides an effluent admittedly rich in organic matter, very unequivocal evidence should be produced that such an effluent will not, under varying conditions of temperature, air-exposure, and dilution, undergo putrefactive changes.

Reference is made, in a pamphlet on the process, to the prolonged effect of the dissolved disinfecting agent, whatever its exact nature may be; but, obviously, this must depend very largely upon the nature of the sewage and its degree of dilution. A few laboratory experiments at Somerset House, or anywhere else, will not settle this point; only the proof afforded by an extended experience derived from a large series of experiments on sewages of widely-differing kinds, would justify any local

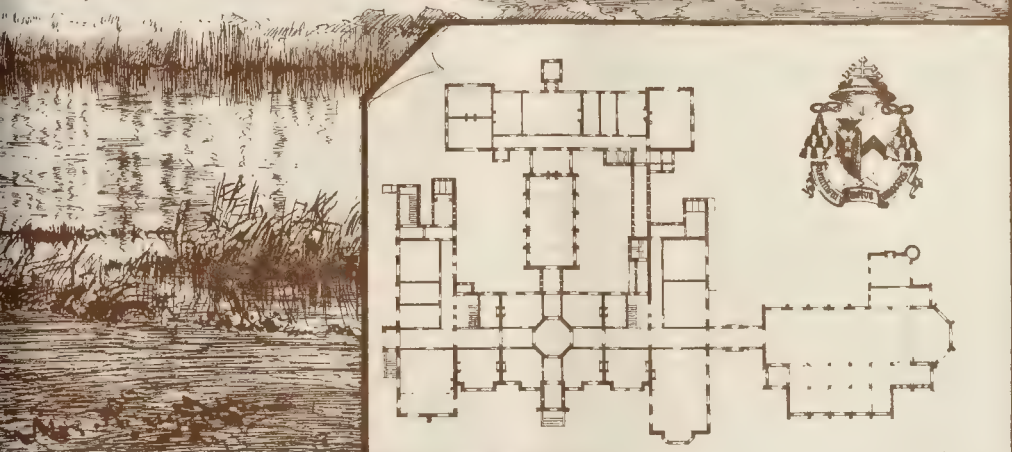
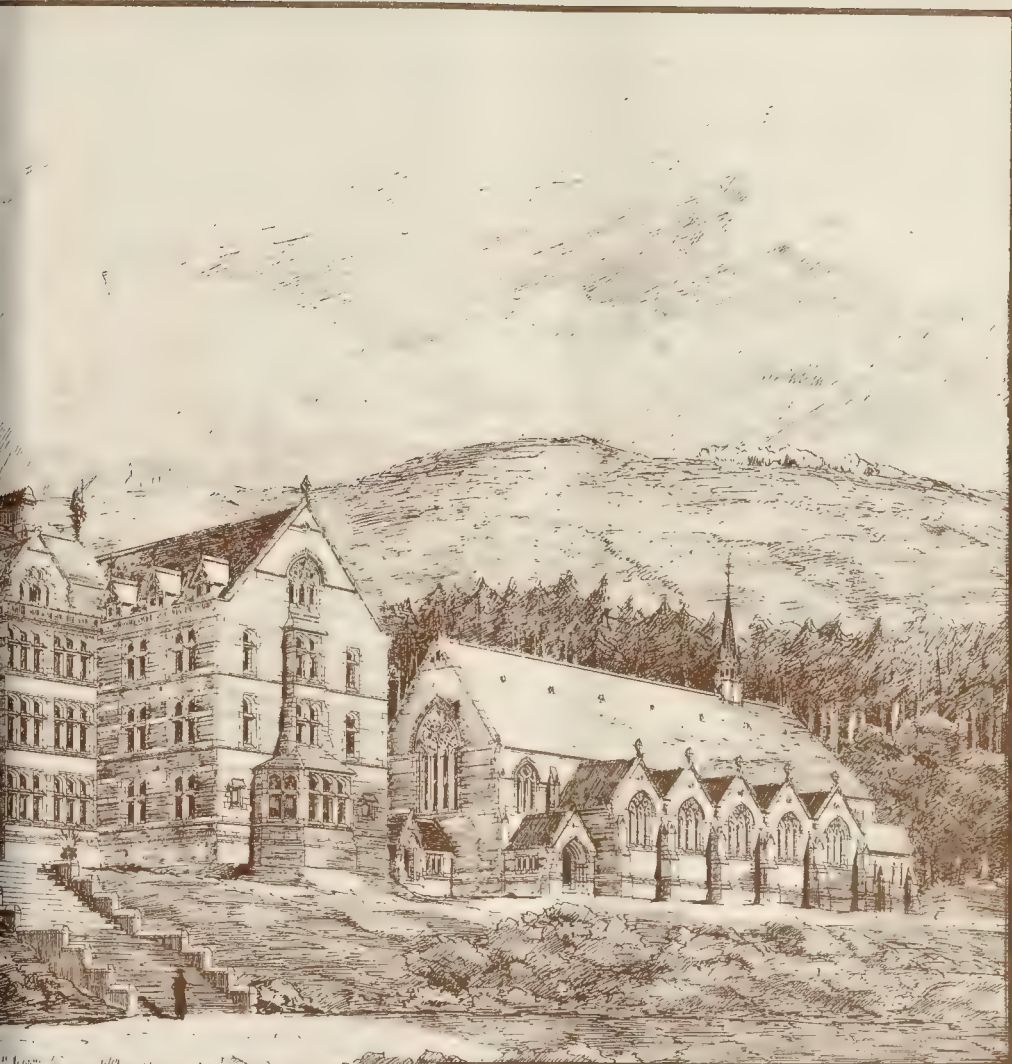






St. Peter's College: Glasgow: for the most Reverend Charles





Archbishop of Glasgow's Palace and Palace House Westminster.







House at Buffalo, N.Y.—Messrs. Silsbee &amp; Marling, Architects.

## HOUSE AT BUFFALO, N.Y.

This view represents a house built from the designs of Messrs. Silsbee & Marling, architects, of Buffalo.

The exterior is shingled. The interior is finished with pine, except the stairs, which are in cherry wood.

## ANCIENT FONTS IN COUNTRY CHURCHES.

THERE is a surprising number of fonts of Norman workmanship to be found in country churches in good preservation, notwithstanding their antiquity. These fonts, we must remember, are the work of masons who had to put out their fires at eight o'clock and remain in darkness till the dawn of day; and who had no surnames; and no means of going from place to place but on foot, or at most on horseback. They are large and massive and reflect, so far, the sobriety of the lives of those who made them. Their cumbersome nature made them not so easy to displace as some of those wrought in the succeeding centuries, such as we occasionally find disregarded in out-of-the-way places, in gardens, or perhaps in farm-yards, on account of having been supplanted by modern work. They were also richly carved, which may have been another reason why they were preserved through the successive reparations that may have taken place in the churches to which they belong. There was also in many cases some idea of sanctity attaching to a special font, which led to its preservation when the whole of the church was rebuilt. They are most frequently of a circular form, with four or more columns, sometimes surrounding the stem, though occasionally they are square. French antiquaries can point to another early form, in which the "cuve," or bowl, is made long and narrow, to permit an infant to be laid in it, as in the font in the Cathedral of Amiens. But in our own country these two forms were in general use till the octagonal and hexagonal treatment was adopted at a somewhat later period. In most

instances these old fonts were raised upon one or two steps, though in some of the earliest examples the sturdy stem rises abruptly from the paved floor. When they were furnished with covers they were mere flat lids. It was not till the fifteenth and sixteenth centuries that these covers became such a special feature, and were elaborately carved and painted, and suspended over the fonts to which they belonged by chains from the roof.

In the neighbourhood of Aylesbury there are several Norman fonts. Northamptonshire, Lincolnshire, Cornwall, and Cumberland are also especially rich in examples. At Belton, in Lincolnshire, there is a specimen of late Norman work, on which the Norman mason rudely carved a rebus upon the name of the place, a man ringing two bells, suspended by ropes from a beam above him. In Rothbury church, among the hills and moors of Northumberland, where the Coquet winds in fantastic curves, there is a curious font. Though the bowl is dated 1664, the stem is covered with antique carvings representing animals, foliage, and the peculiar intertwining ropework identified as the work of Saxon masons. This was accounted for about thirty years ago, when in the progress of alterations, portions of a Saxon cross were found beneath the floor, which proved to be part of the same cross of which the stem of the font was made. Thus those who made the discovery were able to piece out the fact that in 1664 a font was made by using a fragment of an ancient Saxon cross for a stem and procuring a new bowl for it.

In the thirteenth and fourteenth centuries the octagonal form was frequently adopted. Like other details it was lighter than that previously in use. It also provided a larger number of panels for ornamentation and for heraldic purposes. On a small octagonal font in a church at Ingram, near the Cheviots, are the Percy arms and the date March 11, 1662, evidently a record of the fact that it was a gift from a Percy to the church. The Percy symbols may also be seen on a font at Alnham, dated 1664.

In the fifteenth century inscriptions were also added. There is one on the font in Threkingham Church, Lincolnshire, that has never been satisfactorily deciphered, abbreviations and obliterations producing a puzzle to which no indisputable key has been found in modern times. Eglington Church, Northumberland, which is set in a bit of picturesque scenery, with a lakelet, a burn that comes down dashing over large rocks, and a cordon of hills, has a font with an inscription. Like the last-mentioned, this puzzles many readers. It says WASH AND B EULEN 1663 ☩ MASSON, which, being properly divided, is Wash and

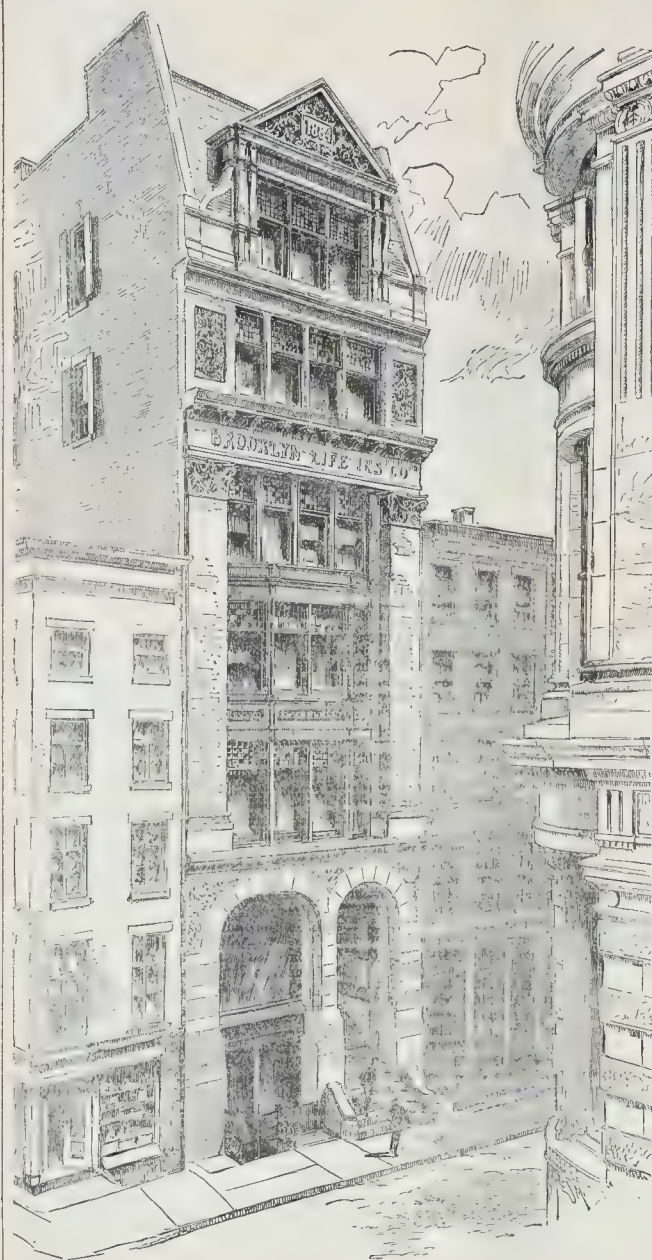
be clean, 1663. The monogram, doubtless, is that of the unorthographical mason. St. Mary's, Beverley, has a splendid font, 3 ft. 8 in. high, with a diameter of 3 ft. 10 in., which is inscribed round the rim, *Pray for the souls of Wyllem Perijfaes draper and his wyvis which made this font of his yper costen the day of Marche ye yere of our Lord MCMXX.* A Latin inscription is spread over seven sides of an octagonal font in Bourne Church. This reads, *Sup. omnis nom. I.H.S. est nom. gde.*

In many churches the ancient bases have been retained beneath new fonts. In Widdington Church, sacred to the memory of the doughty hero in Chevy Chase, who fought upon his stumps after the loss of his legs, there have been three fonts on the same circular raised base. The two that have been displaced are still remembered in the neighbourhood. Sometimes the font of one church has been transferred to another. A late vicar of Northampton-Tweed presented a new font to Ancroft Church, whereupon that formerly used there was passed on to Chillingham Church, where we may still see it with the initials of the Ancroft donor, R. M. W., upon it.

Here is Chillingham Church. It stands within bow-shot of Chillingham Castle and of Chillingham Park, where the wild white cattle still roam in undisputed possession of the original territory of their ancestors. The churchyard is green, and the little church is clad with ivy up to its tiny belfry for one bell. Within the porch is the ancient Norman entrance into the sacred edifice. There is a south aisle to the chancel, apparently made to receive a lordly altar tomb, which would have otherwise filled up the church too much. On this large monument lie two handsome effigies, representing a knight and a lady, with two angels kneeling at their feet. The font is placed at the west end of the church, and nearly in the centre of the nave. On it is incised, besides the initials mentioned above, "God bless this church. An. Dom. 1670."

Sometimes the condition of fonts, and sometimes their absence, is mentioned in the old visitation books. An entry relating to Alnwick, in 1608, for instance, mentions that several requisites are needed, among which is a covering for the font. The fine old church must have been stripped bare about this momentous time, for the same entry records that there was no seat for the minister, and that there were no cloths for the communion-table, neither were there any tablets setting forth the Ten Commandments and the degrees of affinity. We must infer, however, that the font was spared, as a cover was wanted for it, though the present one is modern. In the last century, when Alnwick





The Brooklyn Life Insurance Company's Offices, New York.—Mr. C. F. Merry, Architect.

Castle was embellished in the taste of the day, the church was also treated in the same fashion, and the old font may have been then removed.

**The Brighton Borough Surveyorship.**—Mr. G. R. Andrews, the Borough Surveyor of Brighton, has resigned that office, having obtained a much more lucrative appointment (£1,200. per annum). It is only six or seven months ago that Mr. Andrews was elected to succeed Mr. P. C. Lockwood at Brighton, he having for ten or eleven years previously held a similar appointment at Bournemouth.

#### THE BROOKLYN LIFE INSURANCE COMPANY'S OFFICES, NEW YORK.

This building had to be erected on a plot of ground of only 25 ft. 8 in. frontage, and the object was therefore to gain sufficient height to give the accommodation required, and the light, without sacrificing stability. The angles of the front are therefore strongly accentuated both structurally and architecturally.

The basement is of granite; the first story of Belleville brown stone; above this brick, with decorative details in terra-cotta. The architect was Mr. C. F. Merry, of New York.

#### Illustrations.

##### VIEWS OF CANTERBURY CATHEDRAL.

THESE views of the central tower and north-west angle of the eastern transept of Canterbury Cathedral are reproductions from delicate pencil sketches by Mr. H. Wilson. The central tower is, perhaps, the finest monument of the fifteenth century in this country, and was admired even by Mr. Fergusson, whose critical taste, as a rule, did but scant justice to Gothic architecture. It is but 233 ft. high, though it looks larger. The other sketch shows a part of the exquisite work of William of Sens, executed at the latter end of the twelfth century,—probably some of the earliest work in the Pointed style in this country. The foreign origin is particularly noticeable in the square capitals and plain, heavy roll-mouldings.

##### ST. PETERS' COLLEGE, GLASGOW.

This building, which is for the Ecclesiastical students of the (Roman Catholic) Arch-diocese of Glasgow, has just been commenced on a beautiful site at Bearsden, near Glasgow. The building will accommodate fifty students, each to have separate rooms, and will contain chapel, reception-rooms, library, lecture-halls, professors' rooms, refectory, kitchen, and servants' offices.

The College is being erected at the expense of the Most Rev. Charles Eyre, Archbishop of Glasgow, from the designs of Messrs. Pugin & Pugin, architects, of Westminster. Mr. John Devlin, of Glasgow, is the contractor, and Mr. Geggie the inspector of works.

Dumfriess stone is being used for both dressings and facing, the former polished, and the latter rock-faced. The roof will be covered with green slates.

##### MUSEUM IN THE PUBLIC PARK, BARODA.

This elevation, showing an application of the Hindu style to a modern public building in India, was exhibited at the Royal Academy this year, and was commented on at some length in our remarks on the architectural drawings at the Royal Academy.\* The architect is Mr. R. F. Chisholm, of Bombay.

##### CEILING, DRURY LANE THEATRE.

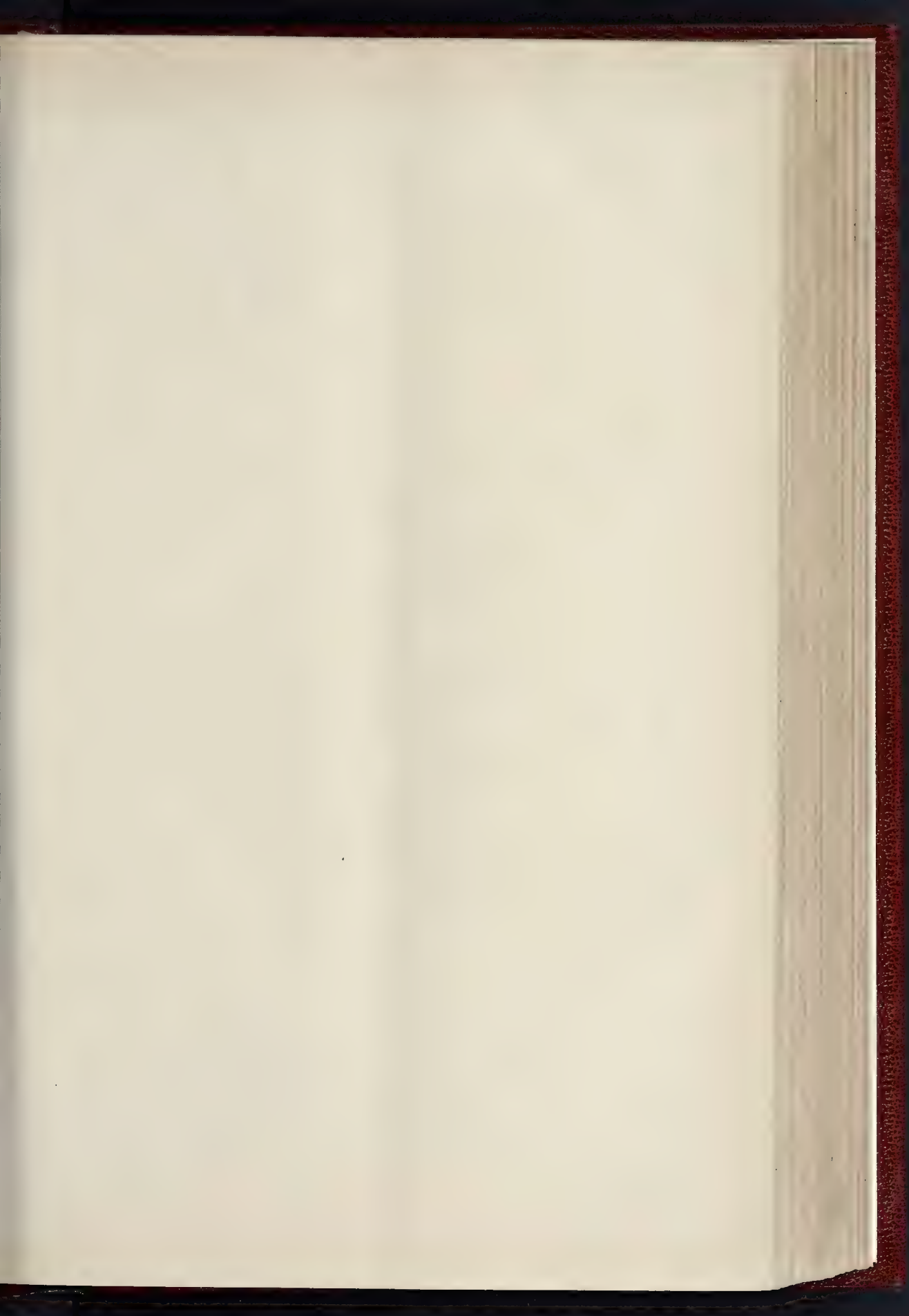
DRURY LANE Theatre has been undergoing a complete re-decoration during the recess, this part of the work being carried out by Mr. J. M. Boekbinder. The box-fronts have been re-gilt, but otherwise they remain as before, except that of the grand tier, upon the face of which cartouches enclosing shields bearing the names of famous composers and dramatists have been placed. The entrance-hall, the rotunda, the staircases, the foyer or saloon, and, indeed, the whole of the auditorium portion of the house, has been materially brightened up by the works now completed, which have been carried out in the short space of eight weeks. The stained glass in doors and fanlights of the principal entrance are by Messrs. Moore & Co.

We have been asked to publish the illustration of the treatment of the ceiling, which is given in this number, reproduced from the monochrome study of the design. The general tone of the ceiling is light, the prevailing colours being cream, buff, and grey, with red and blue sparingly introduced. The mouldings, which are not new, have been re-gilt. The "cameos" in the oval spaces consist of grisaille figures on a turquoise-blue ground. The new cove or frieze which runs round the ceiling has a Prussian-blue ground, on which are painted groups of musical instruments and shields bearing the names of celebrated actors who have walked the boards of "Old Drury." This cove or frieze covers over the trellis-like pattern which was until lately the sole decoration of this part of the ceiling.

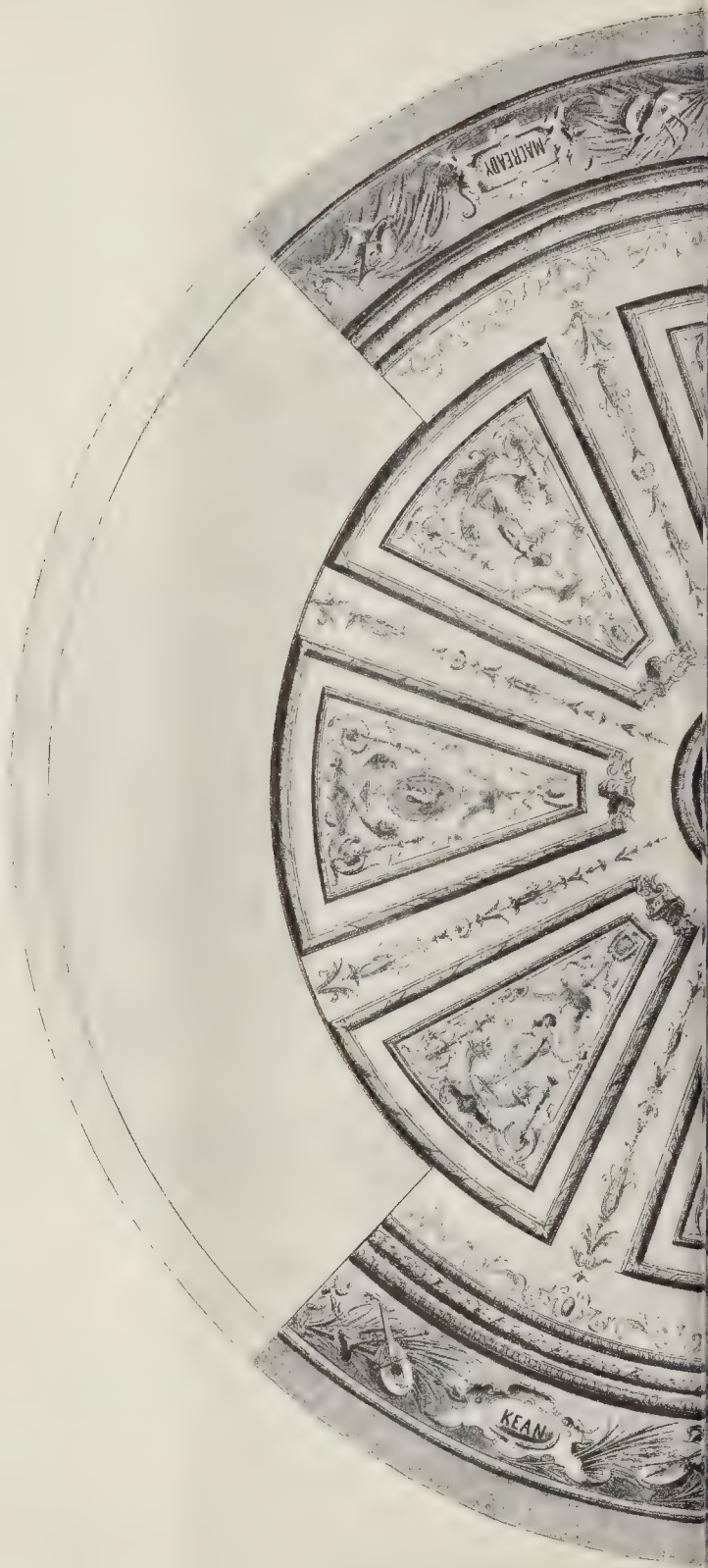
**The Junior Engineering Society.**—Professor John Perry, D.Sc., F.R.S., has accepted the presidency of this Society for the ensuing (ninth) session, which he will inaugurate by the delivery of an address on "Mechanical Engineering in Electrical Industries."

See page 351, ante.

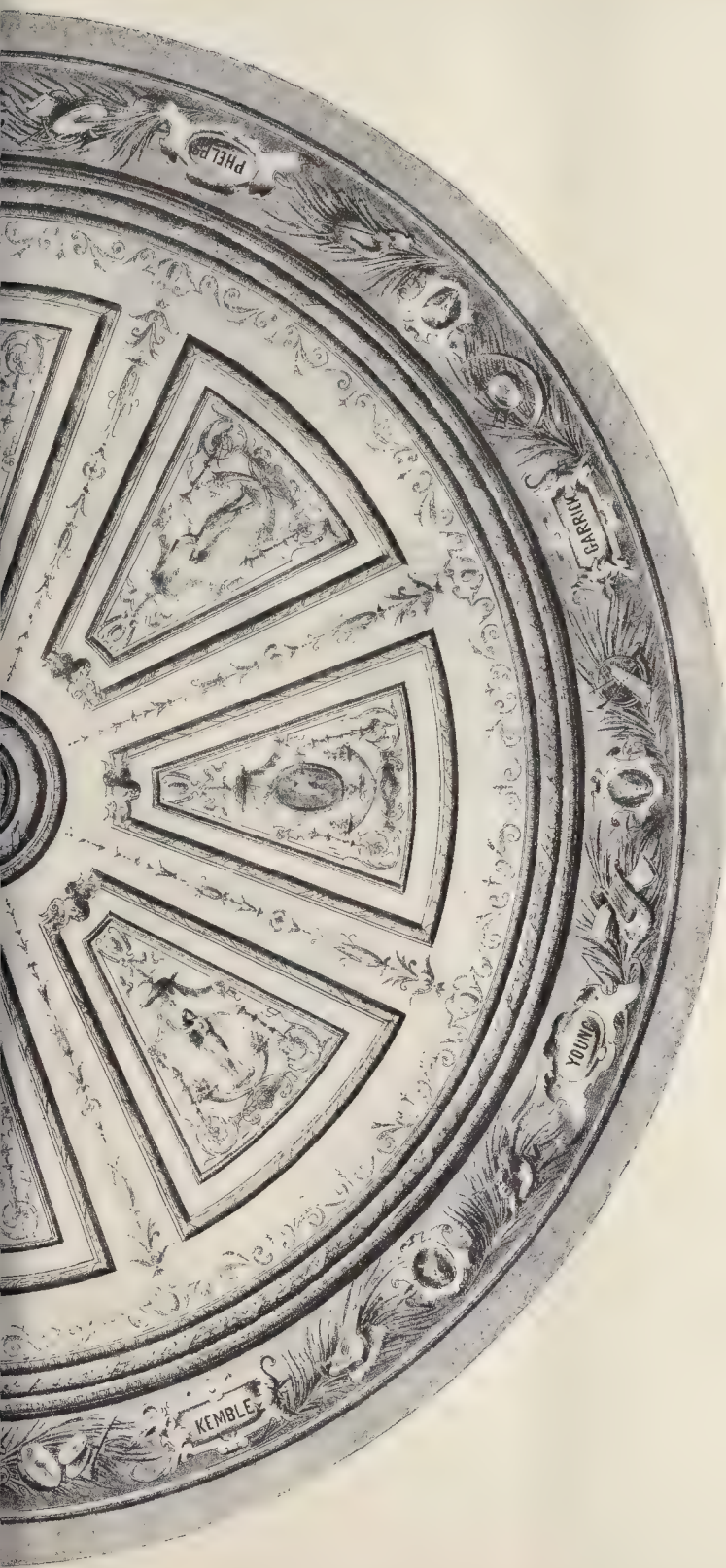




THE BUILDER, SEPTEMBER 21, 1882.





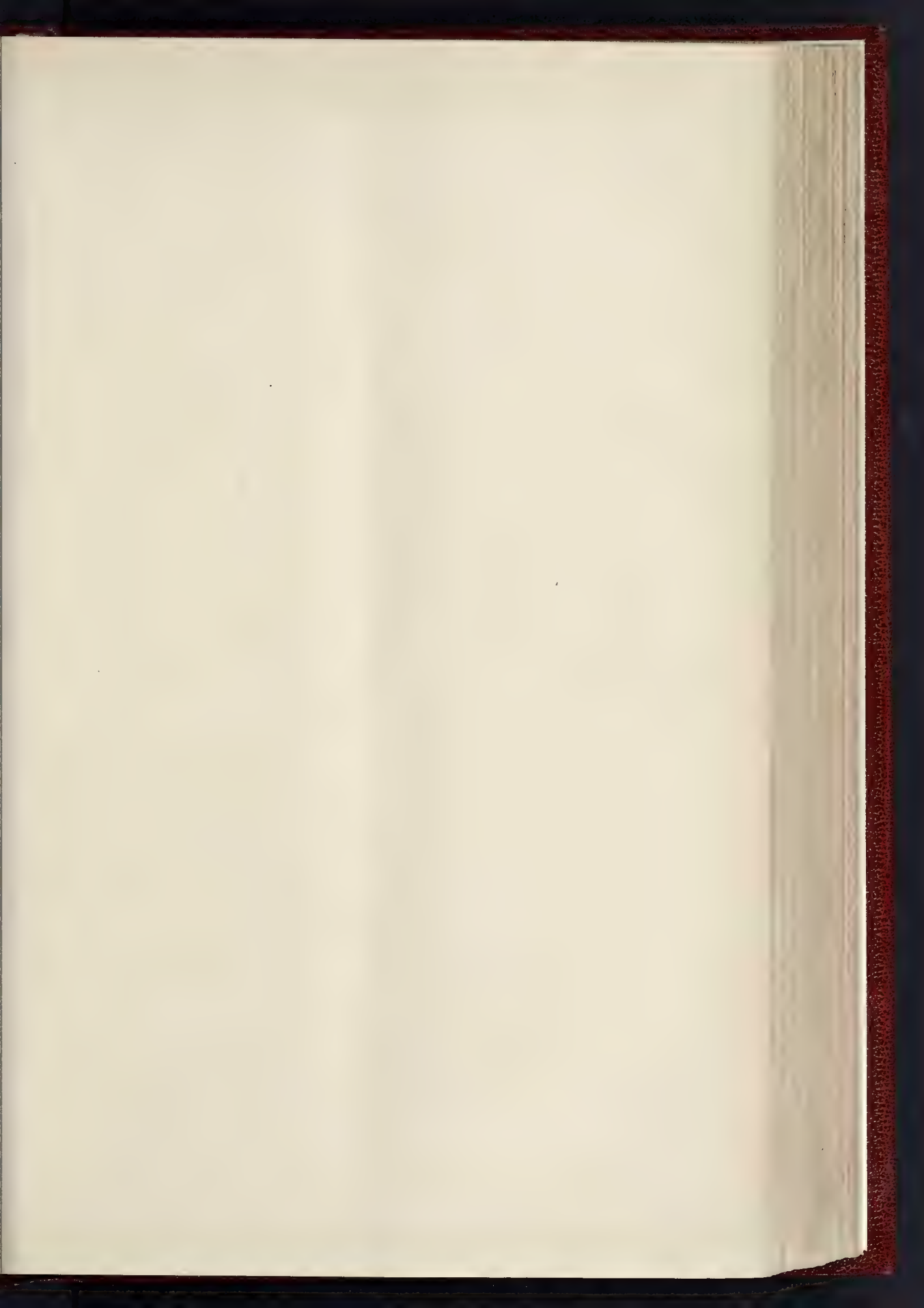


THE THEATRE, DRURY LANE, LONDON, 1841.

CEILING DRURY LANE THEATRE. MR. J. M. BOBKEINER, DIRECTOR.









CANTERBURY TOWER.—FROM A DRAWING BY MR. H. WILSON.





Canterbury  
Cathedral

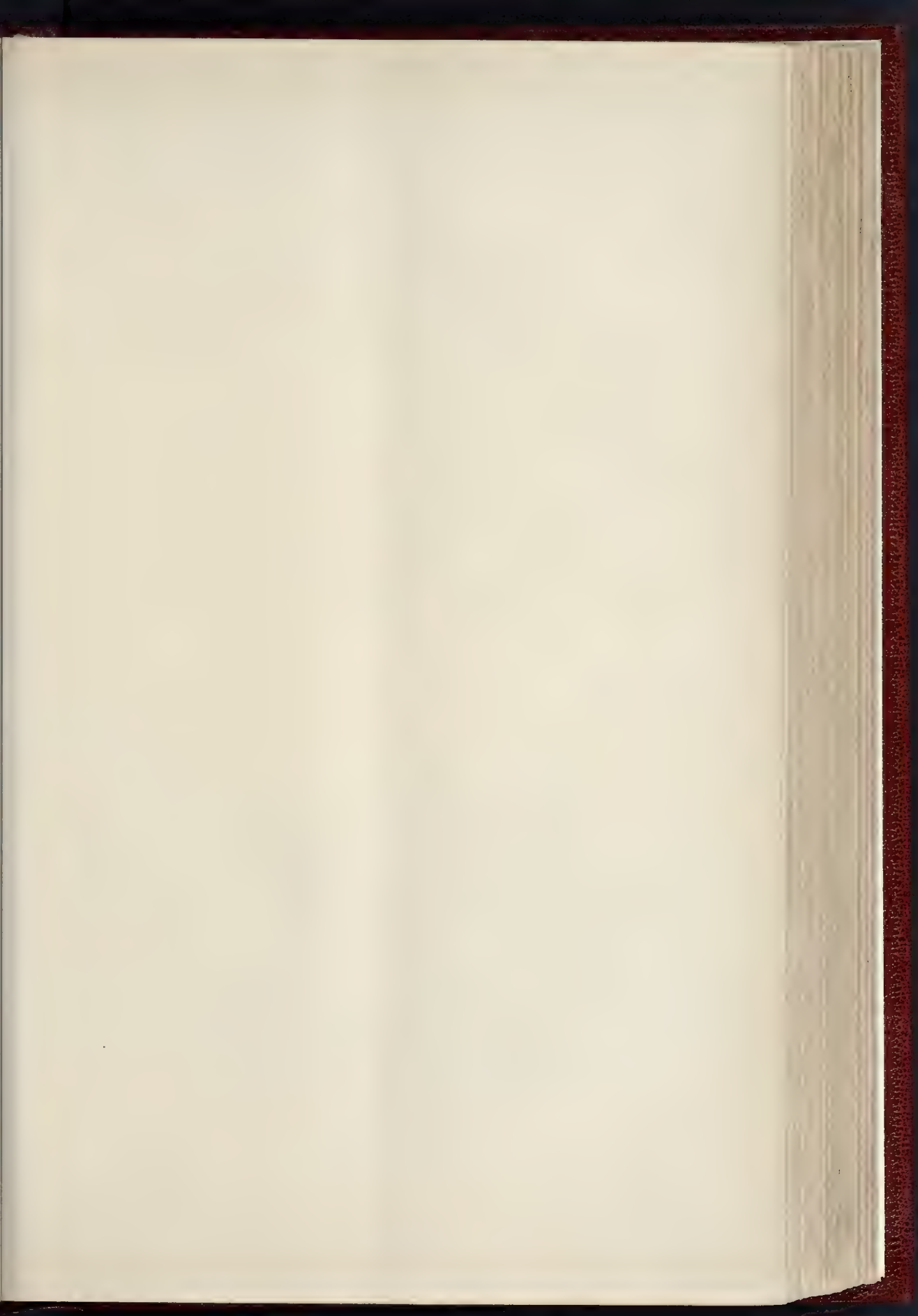
NW Angle of Eastern  
Transept

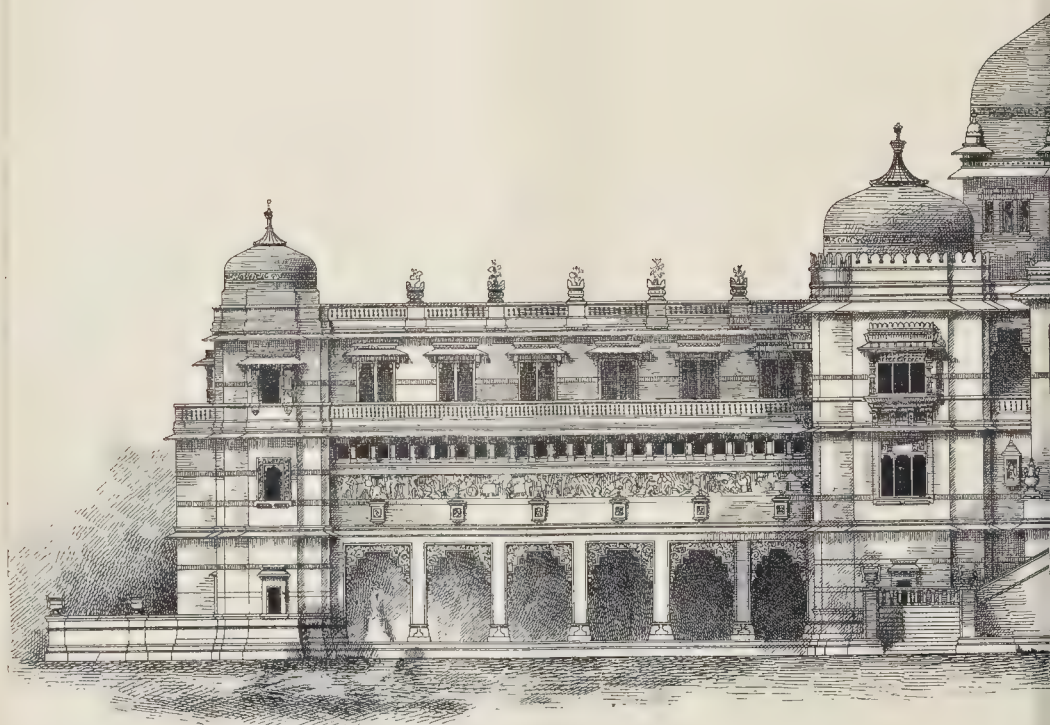
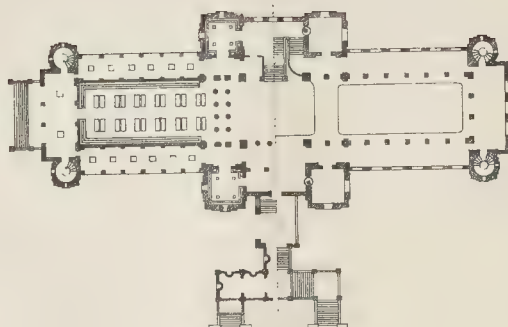
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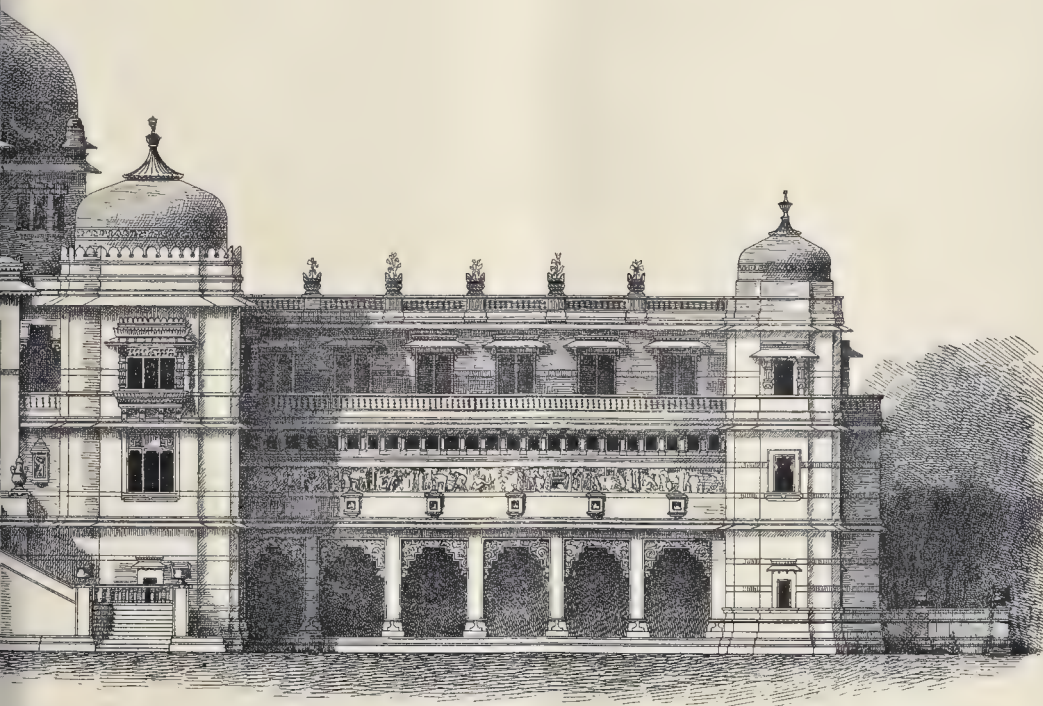






MUSEUM IN THE PUBLIC PARK,  
BARODA.

MR. R. F. CHISHOLM, F.R.I.B.A., ARCHITECT.







THE BRITISH ASSOCIATION AT  
NEWCASTLE-ON-TYNE.

THE British Association for the Advancement of Science has just concluded its annual week of congresses, lectures, exhibitions, and visits. From the reports which have been published in the daily press we culled two or three items that will be of interest to our readers, while one or two others are referred to under the head of "Notes."

Section G, Mechanical Science, was presided over by Mr. William Anderson, M.Inst.C.E., who, in his opening address, said he proposed to draw attention to a subject which appeared to be bearing with daily augmenting force on the practical manipulation of the materials used in construction. He alluded to the molecular structure of matter. This branch of science had, up to the present time, been left very much in the hands of the chemist and the physicist, and many engineers might think that it was by no means desirable to change the arrangement; but he was persuaded that the progress of engineering, the more exact methods of dealing with the properties of materials, the increased demands on their powers of endurance, rendered it imperatively necessary that mechanics should interest themselves more deeply in their internal structures and in the true meaning of the laws by which their properties were defined. After referring to the theories extant upon the subject, the President said that energy in the form of light operated changes in the surface of bodies, causing colours to fade, and giving to photography the marvellous power which it possessed; decomposing the carbonic acid of the atmosphere in the chlorophyll of green leaves, and determining chemical combinations, such as chlorine with hydrogen to form hydrochloric acid, or carbonic oxide with chlorine to form chlorocarbonic acid. It was inconceivable that these effects could be produced unless the undulations of light were competent to modify the molecular motions already existing in the solid, liquid, and gaseous bodies affected. Electricity exerted a similar influence. Generated by the molecular movements caused by chemical activity, whether directly, as in the primary battery, or in the dynamo, it was competent to increase the molecular movements in bodies so as to produce the effects of heat directly applied; it was capable of setting up motions of such intensity as to produce chemical changes and decompositions, to say nothing of the whole series of phenomena connected with magnetism, with induction, or the action through space and through non-conducting bodies, which, as in the case of radiant heat and light, seemed to imply the existence of an interatomic ether. Conversely, changes of molecular equilibrium, brought about by the action of external forces, produced corresponding changes in electrical currents; witness the effects of heat, for example, on conductivity and the wondrous revelations of molecular change obtained by the aid of Professor Hughes's induction balance. The behaviour of explosives illustrated also, and in a striking manner, the effects of disturbing molecular equilibrium. An explosive was a substance which contained in itself, in a solid or liquid form, all the elements necessary to produce a chemical change by which it was converted into the gaseous state. The application of heat, of pressure, or of impact, caused, as in Professor Spring's experiments, chemical union to take place, first at the spot where the equilibrium was disturbed by the application of external force, and afterwards, with greater rapidity, throughout the mass, the disturbance being propagated either by the air surrounding the particles or by the luminiferous ether, with all the rapidity of light; the chemical reaction was accelerated by the pressure which might arise, for example, if the explosive be confined in the chamber of a gun or in the bore-hole of a blast. It was a suggestive fact that the product of the atomic weight of certain groups of substances and their specific heats was a constant quantity which, for the greater number of the elements, did not differ much from 6.5. This implied that the quantity of heat necessary to raise the temperature of the atoms of any one of the groups to any given extent was the same. Hence these atoms would be endowed with the same amount of energy at any given temperature, and therefore would be competent to replace each other without disturbing the general dynamic equilibrium. When it was conceded that molecular motion pervaded matter in all

its forms, and that the solid passed, often insensibly, into the fluid, or even direct into the gaseous, it followed, almost of necessity, that there must be a borderland, the limits of which were determined by temperature and pressure, in which substances were constantly changing from one state to another. This was observable in fusion, but to a more marked degree in evaporation, where the particles were being incessantly launched into space as gas and return as constantly to the liquid state. If steel was looked upon as a solution of carbon and iron, then the hardening of steel was explained by the theory that dissociation had taken place at the temperature at which it was suddenly cooled, the sudden cooling fixing the molecular motion at such an amplitude or phase that it gave a characteristic structure, one of the properties of which was extreme hardness. In tempering, the gradual communication of heat caused dissociation again to take place, the molecular equilibrium was modified by the increased energy imparted to the particles, and when suddenly cooled at any point there remained again a distinct substance, composed of iron and carbon, partly in various degrees of solution and partly free, and again possessing special mechanical qualities. As far as he knew, no pure element was capable of being hardened or tempered, the reason being that no chemical change could take place when there was only one substance; the effect of heat or pressure, however suddenly applied, produced merely a change of form which did not appear to carry with it any corresponding alteration of mechanical properties. One of the most remarkable features of the last thirty years was the introduction of petroleum, and the wonderful development to which the trade in it had attained. Under the generic name of petroleum were embraced a vast variety of combinations of carbon and hydrogen, each of which was distinguished by some special property. At ordinary temperatures and pressures some were gaseous, some were liquid, and some solid, and most were capable of being modified by suitable treatment under various temperatures and pressures. The employment of petroleum in the arts was still extending rapidly. Used originally for illuminating purposes, it was now employed as fuel for heating furnaces and steam-boilers; as a working agent in heat-engines, valuable medicinal properties had been discovered; and as a lubricant it stood unrivalled. As an illuminant, even in this country, it was to a large extent superseding every other in private houses, and even in public lamps, because it gave a cheaper and more brilliant light than ordinary gas, and left the consumer free from the tyranny of great and privileged companies. As fuel it is especially convenient, cleanly, and economical. The President described the oil-bearing strata in Europe and America, and concluded by urging the want of a standard horse-power in marine engineering.

Sir William Thomson moved the vote of thanks to the President for his address, to which, he said, he had listened with thrilling interest. The necessities of the modern engineer led him to the very deepest questions of physics; and to those whose time and attention had been more devoted to the physical side of studies than to the practical it must be very pleasant indeed to find that the engineers were brought so thoroughly into harmony with the work of the physical engineer. The President had dwelt upon one of the most important subjects in physical and engineering practice—that was, the molecular construction of matter. The researches into force in modern artillery would contribute very largely indeed to the advancement of science. Might they not hope that the time would come when explosives in guns would be turned away from their present purpose, and that great guns would be used to demonstrate the effect of enormous pressures on the properties of matter in a purely scientific way? Concerning the durability of the petroleum supply, he had heard it said that petroleum was understood to be produced low down in the earth, and not taken from organic matter; but he could not hold that view with any certainty after he had heard Mendeleef's theory, so beautifully put before them by Mr. Anderson. They were very much indebted to their President for his address, especially upon a subject of such tremendous importance as the origin and possible durability of the petroleum supply.

Sir George B. Bruce seconded the motion, which was agreed to.

The President, in replying, said it had been stated in the newspapers that the petroleum supply of the Caucasus was becoming exhausted, and if this were true it would go far to upset his theory; but, by a strange coincidence, he had that morning received a letter from Professor Mendeleef, in which he desired him to say that it was absolutely untrue; that there was not the slightest falling off in the petroleum supply; and that the rumour which had got into the papers was a mere Stock Exchange scheme to make certain financial operations.

Mr. Killingworth Hedges, Mem. Inst. Civil Engineers, read the following paper on "Precautions to be Adopted where a Supply of Electricity is furnished by means of Transformers."—In a paper entitled the "Fire Risks of Electric Lighting," which was read at the meeting of the British Association held in Southport in 1883, I brought forward for the first time the necessity of electric light regulations and the use of safety appliances. The fire insurance companies have almost universally recognised that the electric light can only be considered a safe illuminant when the strictest attention is paid to the details of an installation; and the regulations which have been published by the principal companies and by the Institution of Electrical Engineers have so far proved successful, that no fire of magnitude can be traced to the electric light. The introduction of transformers has led to the increase of the electro-motive force in the primary mains, and there appears to be a tendency to decrease the pressure in the secondary, consequently there is an enormous difference of potential between the two systems, and a constant strain on the insulation of the transformer. A transformer may be compared to the reducing-valve which converts high-pressure steam into the safe pressure for working heating coils. There is, however, this difference,—a transformer never sticks like a valve, but it sometimes leaks, and the consequences are similar to those arising from a leaky reducing-valve. Supposing a small leak to take place between the primary and secondary coils; it is quite possible that a small current of dangerously high potential might be introduced into the secondary circuit, which would make very little difference to the light from the lamps, but might cause fatal results on any one inadvertently touching some unprotected portion of the wires or fittings with one hand and a gas-pipe with the other. To produce this effect it is necessary that some earth should occur on the primary main or mains. With the overhead wires which have almost universally been employed, with alternating currents of high E.M.F., any leakage to earth may be avoided; but with an underground system, and with the increased pressure which is about to be introduced, there is sure to be some earth connexion; in fact, with the Ferranti system, one of the conductors is to be earthed throughout. Allowing that a possible danger exists, the question is to find a safe preventive, and with this object it is proposed to briefly recapitulate what has been done. Mr. Kent inserts a metallic shield between the primary and secondary coils of the transformer; this sheet of metal is connected to earth. Now, if the insulation of the primary coil should fail, the leak before reaching the secondary coil must pass through the sheet of metal and thus to earth, causing the primary cut-out to melt, and thus cutting out the faulty transformer. The next plan is still simpler, and is to earth the secondary circuit, so that the effect of a contact in the transformer would be to establish connexion through the earth and to blow out the primary fuse as in the previous method. It has been stated by several high authorities that this arrangement is all that is wanted to secure perfect safety against shock; but the question of fire risks has also to be considered, and these would be greatly increased, also the insulation of the wires in houses would have to be of the most expensive character. Allowing that every care had been taken with the insulation, the proximity of gas and water pipes in a house to the wires, which are often laid under floors, might open a path for the deviation of a leakage current, say of 2,000 volts or over, and an arc once formed would result in a dangerous fire. The fire insurance offices have not sanctioned this plan, which does not even appear to be used in those go-ahead institutions, the electric light companies of the United States, who apparently



employ no safeguards, and trust to Providence with regard to the "burn-out" of a transformer, having a ready supply of duplicate parts to at once replace the faulty instrument. We now come to the intermittent earth device; that is, the automatic apparatus which only comes into play when the potential in the secondary has dangerously increased. Dr. Fleming has described an instrument which consists of a fine - wire safety catch holding down suitable contact pieces in mercury cups against the pressure of a spring. The safety-catch would be arranged to stand the normal difference of potential between the two secondary mains, but as soon as that rose beyond a certain amount the circuit would be automatically broken. This plan has the disadvantage of a certain amount of loss of current, which would be, however, checked by a resistance; but it avoids the necessity of using an earth. Dr. Bernstein advocates the contact-plug, which contains a substance, the resistance of which can be made enormous with the normal current, but the heating effect of an increasing current causes the mixture in the plug to be decomposed, and a metallic circuit established. I am unaware whether this has been tried in a circuit from a transformer or not, but am afraid it would not answer in practice. Major Cardew, whose improved apparatus I have the pleasure of showing you to-day, has, so far, produced the most successful device. It has been called the static mouse-trap, in that it goes off directly an unauthorised volt enters it. The arrangement which you see on the table takes the form of a box; in it there are two brass discs, separated one from the other by an insulating washer of ebonite. Between the two discs is placed a small strip of aluminium foil, which lies in ordinary on the lower disc, which is connected to earth. The other disc is in connexion with the secondary coil of the transformer, and should any leakage take place from the primary so as to raise the potential in the secondary say by 50 per cent., that part of the aluminium foil which is under a projection on the upper disc will be attracted to it, making an electrical connexion and starting an arc which short-circuits the secondary and causes the primary fuses of the transformer to be melted. Working quite distinctly from Major Cardew, I have also designed a safety appliance, which may be called a "vacuum cut-out." It is on the lines of those lightning protectors which are often used with telegraph cables, but the electrodes are fixed at each end, and cause the current on its way to earth, after leaping across the points, to energise an electro-magnet which releases a short-circuiting device connected with the primary poles of the transformer. There is one great advantage in my vacuum cut-out, in that it is not affected by dust or moisture, which might impede the static arrangement. In practice, I propose using old incandescent lamps, with their broken filaments sprung, as they often are, one-sixteenth apart. The perfect vacuum must, however, be destroyed, or only high potential will pass, and the current will preferably short-circuit across the terminals, instead of leaping across the broken filament. A lamp of this description would cost very little, and could be fixed in the same manner as the Cardew cut-out, without any relay. Numerous experiments were made to ascertain the distance which an alternating current would leap across points in tubes exhausted to a certain amount. The results differed considerably from the figures given by De la Rue in his experiments with continuous currents. In one experiment with glass cylinders having conductors hermetically sealed in opposite ends, and with a pressure of 5m/m., less than that equal to an ordinary vacuum, an alternating current of 1,000 volts invariably passed between the ends of the copper electrodes, which were 3 in. apart. The arc, however, did not remain steadily at the ends, but would first run down one electrode to the point where it was connected to the platinum wire, which came through the glass, with the result of fusing it away. The arc would at the same time extend almost to the glass, although the opposite electrode was left intact. The reason for this phenomenon with an alternating current may be perhaps explained in the discussion. In conclusion, I think that all those who intend using high tension alternating currents, for the supply of electric light and power, should be obliged to fix a safety device on the secondary circuit, near the transformer, with the object of not only protecting their own property, but also to do away with the possibility of an un-

authorised current being inadvertently led into a building so as to endanger the lives of the public.

Perhaps we may be able to find room for abstracts of one or two other papers next week.

#### COMPETITIONS.

*Proposed New Free Library, Aberdeen.*—Seven competitive designs for the New Free Library buildings were lodged by local architects, the accommodation required being as described in our issue of July 13 last, p. 30. One of the conditions of competition was to the following effect:—"The author of the design placed first in the order of merit by the Town Council, or assessor, will be employed as architect for the library, upon the usual terms of professional remuneration, and the author of the design placed second will receive a premium of 25 gs. If, when tenders are taken, it is found that the cost of the design placed first exceeds the sum of 7,500*l.* by more than 2*½* per cent., the design will be set aside without any compensation or allowance, and the Town Council will fall back on the other designs according to the order of merit." The Town Council has now fixed on a list of three in the following order of merit, viz.:—1. Design marked "Light B"; 2. "Light A"; 3. "Viaduct." The envelopes containing the names of competitors having been opened, these have been found to be respectively from (1) Mr. Alexander Brown, architect; (2) Messrs. Matthews & Mackenzie, architects; and (3) Mr. Pirie, of Messrs. Pirie & Clyde, architects: all of Aberdeen. The decision as to Nos. 1 and 2 having been unanimous, a reference to the professional arbiter was deemed unnecessary. Mr. Brown has adopted French Renaissance as the style of architecture, and the height of the front elevation from the level of the Viaduct to the parapet is 52 ft.

#### CONCRETE FLOORS.

SIR,—Mr. George L. Sutcliffe [see p. 178 ante] is entirely right in regarding as "the most important statement in the whole essay" that passage of my recent contribution wherein I remark that the strength of slabs is inverse to their breadth or diameter, and is as the square of their thickness.

You are aware, Sir, that, before Mr. Sutcliffe's letter appeared, it was my intention to contribute a further article dealing expressly with the theory of stress in slabs as distinguished from beams. So far as I am aware, this theory has never yet been published. Some years ago I was anxious to find some clear published statement of this theory. All I could find was Professor Unwin's two formulae for the greatest stress of square and rectangular plates; the very same formulae as Mr. Sutcliffe now quotes. A formula is the result of a theory; but it is not always sufficient in itself to explain the theory on which it rests. For some long time I continued to apply these formulae (which Professor Unwin published for iron plates) to concrete slabs, as well as to iron plates, knowing that (to use Mr. Sutcliffe's expression) "the rule will hold as good for one material as for another." I applied the formulae of Professor Unwin to floor slabs which I had constructed, and which I knew were more than safe; and, by means of this application, I settled a constant, of 2.3 lb. dead load per inch of slab surface-area, as the safe constant applicable to these formulae. If Mr. Sutcliffe will refer to page 524 of the *Builder* of April 3, 1886, he will there find a letter, in which I gave the particulars on which I based this constant. I was in doubt at that time whether these formulae were due to Unwin or to Grashof.

Subsequently, I arrived at the conclusion that Professor Unwin's formulae are misleading, because inducing calculators to greatly underestimate the real strength of slabs and plates. Professor Unwin himself, in a footnote to these formulae, makes the important admission that "some experiments by Mr. R. Wilson (*Engineering*, vol. xiv., p. 239) appear to show that the ultimate resistance of flat plates is considerably greater than that obtained by putting  $f =$  the breaking stress in the above formulae;" and he adds, by way of apology, "These formulae are strictly applicable within the elastic limit only, and Mr. Wilson's plates may have been dangerously strained long before giving way. They did take a large set."

Therefore, having concluded them probably at

fault, I ceased to rely on these formulae, and thought out the stress question for myself on the following lines. I invite Mr. Sutcliffe to test my theory for himself; and if he can find any flaw in it, I shall be glad to have it corrected, both for my own sake and for the sake of others.

The resultant of any number of parallel forces is the sum of those forces acting through their common centre of pressure.

The supports which contribute to sustain any total load divide that load amongst themselves according to their number and position.

Thus, a total load equally distributed along any beam, supported at the two ends only, becomes subdivided into two equal loads, one of which bears on one support, and the other on the other.

Thus, likewise, a total load equally distributed over any slab of square shape, resting on four edges, becomes subdivided into four equal loads, one resting on each edge. If the slab be rectangular then the total load becomes subdivided into two pairs of loads, whose relative magnitudes are as the relative lengths of each pair of edges.

For example, a 100-ton total distributed load becomes, in the case of a beam, 50 tons on each end; in the case of a square slab, 25 tons on each edge; or, if the slab be rectangular (say 30 ft. by 20 ft.), the 100-ton load becomes one pair of 30-ton loads (on 30-ft. edges) and one pair of 20-ton loads (on 20-ft. edges). In fact, just as the total top surface-area of a square or rectangular slab is subdivided into four triangular or trapezoidal areas by diagonals, &c. (as per diagram), so the total distributed load is likewise apportioned. We may similarly regard the rectangular top surface-area of a beam as expressing the load, divided, by a line across the middle, into a pair of loads.

While the upper surface-area of a slab or beam, thus subdivided, shows the subdivisions of equally distributed total load, the geometrical centre of each subdivision of area shows their true centre of vertical pressure of each section of total load, as indicated by the little crosses on annexed plans.

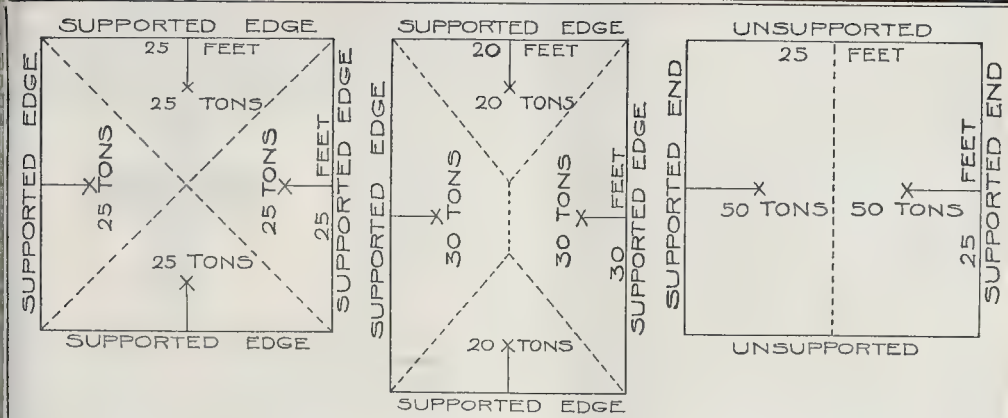
The resultant vertical downward force, acting through each cross on plans, is counterbalanced by the vertical upward pressures of the respective supporting edges of slabs, or ends of beams. And, just as the vertical downward pressures are equivalent to their sum acting through the crosses on plans; so the vertical upward pressures all along the edges of slabs, or ends of beams, result in each case in a central vertical upward force, equal to the sum of each set of vertical upward forces respectively.

The downward and upward resultants of each subdivision of total load perfectly counterbalance each other. But, as these two resultants do not act in the same vertical planes, they meet each other by means of horizontal forces acting through the slab or beam. Each edge of slab, or end of beam, is invested with a distinct set, so to speak, of these horizontal forces; and each set issues in a resultant horizontal force (equal to the sum of each respective set of horizontal forces) acting through the common centre of each respective set of horizontal forces, as indicated by the lines on the diagrams.

The horizontal force contributes leverage to the vertical force. That is to say, the horizontal force constitutes the "arm" of the "couple" of vertical forces; and, by means of the horizontal force, each subdivision of the slab or beam becomes a cantilever. The effective resultant length of the leverage is the horizontal distance between vertical downward and vertical upward resultants. With equally distributed load, the resultant leverage of a beam is equal to its quarter span—and of a square slab, is equal to its sixth span; because (as the crosses on plans show) the centres of vertical downward pressure occur at those distances respectively.

In the case of rectangular slabs, the middle lines which subdivide the load into its two pairs, are not at an angle of 45° with slab edges, but are at an angle such as makes the two triangular areas bear to the two trapezoidal areas the same ratio as the lengths of the ends bears to the lengths of the sides of rectangle. The centre of trapezoidal area occurs farther from the supporting edge than the centre of a triangular area of equal perpendicular; and thus the leverage, as well as the load, of trapezoidal area is greater, making the stress of the trapezoidal portion of rectangular slab more or less greater than that of the triangular area of same slab, as the rectangle departs more or less from square. Thus, when rectangular





gular slabs are of length far exceeding breadth, they are virtually beams; and thus the more nearly square the slabs, the stronger they are.

To compare the stress-causing forces of slab and of beam, take, for example, a beam and a slab, each having an area of surface between supports of, say, 625 square feet. Let the span of beam be 25 ft., then it will be 25 ft. broad. We need not, in this comparison, specify thickness, as that shall be the same in both cases. The slab is, say, 25 ft. square between supports. The distributed total load shall be, say, 100 tons in both cases. Then the attacking stress-causing force on the beam will be  $= \frac{100}{4} \text{ tons} \times \frac{1}{2} \text{ ft.} = 31\frac{1}{2} \text{ foot-tons}$ ; and on the slab will be  $= \frac{100}{4} \text{ tons} \times \frac{25}{4} \text{ ft.} = 104\frac{1}{4} \text{ foot-tons}$ .

Thus we see that, under similar conditions, a square slab is three times as strong as a beam to carry an equally distributed load; because it subdivides the total load into smaller sections than the beam does, while at same time it shortens the arm of leverage to less than that of the beam.

Now, let the same load of 100 tons be, in both cases, concentrated on middle of beam and of square slab. Then the stress-causing force of beam is  $= \frac{100 \text{ tons}}{2} \times \frac{25 \text{ ft.}}{2} = 625 \text{ foot-tons}$ ; and of square slab is  $= \frac{100 \text{ tons}}{4} \times \frac{25 \text{ ft.}}{2} = 312\frac{1}{2} \text{ foot-tons}$ .

So, a square slab is twice as strong as a beam to carry a central load. And the effect of a central load on the square slab is three times as severe as that of the same load distributed.

We must, however, not forget that, in practice, with concrete floors, the weight of the slab itself is always a very large proportion of the total load; and this fact powerfully contributes to the practical superiority of the square slab over the beam.

The above mode of reasoning applies likewise to slabs circular or oval on plan; and also to slabs with holes or openings.

It was my intention to deal in this letter not only with the stress-causing attacking forces of slabs, but also with the stress-causing resisting forces of same. The measure of the latter is the measure of counter-leverage due to slab's thickness. I also wished to deal with the encasement question. But I must leave these parts of the subject, at least for the present, as this letter has extended far beyond the limits I desired to observe. I trust I have said enough to satisfy Mr. Sutcliffe that I was not mistaken in stating that the strength of slabs is inverse to their span,—which was, as I understand him, the point he was in doubt about.

I ought not to leave this subject without saying a word as to the very greatly strengthening effect of a rim to each slab. In my own earlier practice I have adopted the expedient of casting the cornice-cove solid with the slab, and making the edges of the slab, where resting on walls, thicker by the depth of the cornice than the central or main portion of the slab. By this means I can safely employ much larger and thinner slabs than I could prudently use without rims.

If we would have a slab of equal strength throughout its entire area, we must give its soffit slightly domical curvature. But, though years ago I did many slabs that way, I eventually found it more convenient, less expensive, and otherwise preferable, in practice, to form the soffit of slabs level for ceilings of ordinary dimensions, giving more than equal strength to the centre, and employing rims as above stated.

The fact is, the curve of equal strength is so flat across the major portion of a span, and becomes quick and steep so close up to the bearings, that it really is not worth while, in ordinary-sized squares, to take any notice of the curvature, except by forming rims.

The rim of a tea-tray serves admirably to show what a rim can do for a flat thin slab.

FRANK CAWS.

SIR,—The rejoinder of Mr. Caws in yours of the 7th inst. to mine in the previous issue is quite a *non-sequitur*. The fault, however, is all my own. I took too much for granted, and left off with too little said; but I did not "miss the point."

Mr. Caws writes with too much perspicuity to leave any one in doubt as to his points. It shall be my aim now, in emulation of so good a model, to make my points equally sharp and equally incisive.

The original articles of Mr. Frank Caws on "Concrete Flooring" arrested my attention,—his ideal concrete beam-floor particularly, because beam-strength in concrete pure and simple is, to my mind, as much of a chimera as "perpetual motion." But now, and right here, let me explain. What I mean, by beam-strength, in the connexion I employ this term, is an equivoque of compressive and tensile forces in a structure or construction, with the tensile as a factor of safety decidedly in excess,—a condition that no prudent constructor will overlook, especially where human life is concerned. Until this factor of safety was made possible in cast-iron by the labours of Hodgkinson in 1827-30, architects and engineers stood as much in dread of cast-iron as an engineering and building material as they now do (and rightly, too, in my judgment) of concrete.

The ideal concrete beam-construction which Mr. Caws in his first articles so ingeniously pictured is an impossible construction with concrete, as he insists on using it. Concrete holds to-day the same relation to engineering and architectural constructions that cast-iron, its analogue, held prior to 1827-30; and so it must remain, and will remain, until some power, as yet to mortals unrevealed, shall succeed in packing away below the neutral axis of a concrete beam, six times (or the necessary equivalent) as much concrete as there is above it, and in a space no larger than that occupied by the compressional material.

In the light of this statement of my views on "concrete (without) iron as a building material," I may now say that my use of the term horizontal cleavage had reference, not to the "shelliness" of badly-mingled and badly-made concrete, but to that horizontal cleavage which arises where two determining forces are battling for the mastery in a structure or construction under bending stress, in which the dominant tensile power forces on the issue of

horizontal cleavage or absolute crush:—a state of things that never takes place in any concrete slab or floor made in the manner set forth by Mr. Caws, and to which he appears to be committed.

In this view of the case, and in conclusion, I may be allowed, I think, to say that in my humble judgment, the "cracks" that "are invariably clean, square-edged fractures" in the contractor's "miles of street-pavement and railway platforms" do not "fill the bill."—I am, very respectfully,  
THADDEUS HYATT.  
9, Farringdon-road.

P.S.—Forty years ago (when first struggling with problems in architecture, growing out of my Lights invention and its application as a new building material) I constructed for my own encouragement the motto, "Whatever ought to be done, can be done." Under this, I concede the possibility of a discovery, some day, of a compression-material (I don't think much ingenuity required to find it now) so weak in resistance to compression as to be the fit complement to Portland cement concrete in extension. But even then, the question of horizontal cleavage would still come up, and the tensile weakness of the work would still remain the measure of its maximum of strength, its capabilities, and its permanency.

SIR,—Mr. Caws, in his letter of last week [p. 194, ante], says that in mentioning half-a-crown a yard as the amount saved by omitting joists and one-coat ceiling, I leave out the cost of the remaining two coats of ceiling and of the flooring-boards themselves. Do I understand by this that Mr. Caws does not plaster his ceilings at all, or use any flooring-boards? I have not yet seen or heard of any concrete floors being left in this way, and I did not omit the two coats of plaster and the flooring-boards because I presumed they would be required. The tenants of the upper rooms of cottages and small houses like a plastered ceiling and boarded floor, and I think they would be very poor indeed if they occupied such houses as Mr. Caws describes.

My contention is that, in the ordinary way, a concrete floor would be finished with boarding, and that the ceiling would be plastered; therefore, the only saving would be in the joists, lathing, and one coat of plaster, i.e., about 2s. 6d. per yard; and, as the concrete and centering (without any iron) could not be done under 4s. 6d., it must necessarily be more expensive.

I have not at any time said that my floor was as cheap as simple slabs of concrete, but that it was (within very little) as cheap as a concrete and iron joist floor, and that the advantages of the permanent over the removable centering fully made up for the slight difference in cost.

Mr. Caws, perhaps, does not know that a few months ago I was "a mere architect" myself, and only became a specialist when I was quite sure that my studies and experiments had resulted in something being evolved.

MARE FAWCETT.

September 17, 1889.

#### ARTIFICIAL VERSUS NATURAL STONE.

SIR,—Sir Robert Rawlinson, in his letter in the *Builder*, page 194, rests upon a false premise.

He complains that Yorkshire flagged foot-pavements laid in London wear in flakes, alleging therefrom that artificial stone is preferable. All stones but granites and blints are laminated, but that is no reason why all build-



ings should be only of granite, flint, brick, or concrete.

Yorkshire, being a very large county, yields building and flag-stones of various degrees of hardness, closeness of lamination, or tendency to flakiness; it is very misleading to class all paving-stones from that county under the merely generic name of "Yorkshire flags." The flags used for public footways in towns are too often obtained by advertisement; and, according to the wretched custom of the present age, the lowest tender is generally accepted by the Urban Authority, provided only that it comes from Yorkshire and is cheap; thus, streets are paved with inferior stuff, that flakes while being squared; it is scarcely worth laying, and, of course, soon goes to pieces; but what matters this to the ordinary member of a Board who was elected to keep down the rates, and whose own shop is stocked with Brummagem goods? It is to be noted that the unfairly rough way in which flags are handled and moved during their passage from quarry to street, jars and separates the laminations of even the bottom and densest beds of good quarries.

If a careful examination were made as to how the hardest and toughest beds could be obtained from the best Yorkshire flag quarries, and a sufficient price paid for squaring and laying on a properly prepared bed, fully jointed with cement or hydraulic lime, we should not be told that a mixture of granite chips and Portland cement would produce street pavement superior to and more homogeneous than Nature's alchemy has provided.

It is important that the jointing of flag pavement should be perfectly water-tight throughout, so that rain may not filter in or freeze, and flake the slabs at their edges: but this simple condition is seldom attended to.

For more than thirty years the town in which I reside was paved with the best quality *blue hard* (Leeds) flags; those stones that were honestly squared "fall to the square," with chisels only, and not mutilated by pitching tools, are without a flake now; but for the last ten years a bastard economy has reigned supreme, the lowest tender has been accepted, and the bulk of the recently-laid flags belong to the contractor's favourite group, bearing the quarry name of "yellow soft," many being self-faced, not worth tooling. Of course they have flaked: what else could be expected? Now, the Urban Authority is using a concrete pavement of granite chips and cement. One specimen of this material, laid down as an experiment some years ago, is not now in flakes, but in a series of knobs, unpleasant to walk upon, because cement, being softer, wears away from the harder granite; the rough, uneven surface retains mud in wet weather, and is nasty.

The foregoing explains Sir Robert's paradox.

TOWNS SURVEYOR.  
September 16, 1889.

SIR,—In your issue of the 14th inst., there is a letter upon "Artificial versus Natural Stone," which I think is so worded as to rather mislead the reader, and evidently quite unintentionally on the part of the writer.

Thus, after eulogising thoroughly well-made artificial stone in lieu of a natural flag-stone (which few doubt) he says:—"As a trial and test for wear betwixt natural Portland stone and artificial Portland cement stone, at a bank in London there are two doors. At one there was a natural stone, at the other an artificial stone, and this wore out three of the real stone."

The writer having previously stated the suitability of artificial stone for "indeed all forms for which stone is used," the reader may think the two test portions were the jambs, &c., to the doorways (not the doors, of course, as the writer says!), but I take it he wishes to point out the test portions were the steps to the two entrances, and that the artificial stone wore out three of the natural. This, of course, one cannot disprove, but from many years' experience, I claim that there are as many grades of artificial stone as there are of natural stone; that there have been many more failures of artificial than natural stone, particularly when compared with Portland stone, than which a better or an equal has not yet been found, and which, by the bye, is not a "flag" stone as explained by the writer, but a homogeneous mass of oolite. In the particular instance alluded to, stated as being a test case, the maker of the artificial stone was no doubt most assiduous in seeing that nothing but the most suitable material was used, and that the manufacture and laying was of the first order, whereas no such knowledge was imparted to the stone merchants, the stone being evidently taken haphazard, and whilst doubtless being in every way suitable for ordinary building purposes, excepting steps, was

not specially selected, and hence quite unsuitable for the purpose named; but let the tests be again tried, and the stone merchants select and send the most suitable stone for the purpose, when I have no doubt the natural stone will hold its own against any artificial material, and that the same would have been the case if the artificial stone had been as badly selected as it is quite palpable the natural one was in the instance quoted.

As regards the earlier portion of the writer's letter, by which he would have us believe artificial stone for "all forms for which stone is used," is beyond all compare the cheapest and best, I can only say that Portland stone is too well known and too old established to need any "puffing," or to be knocked aside by such statements as these. When such stone as is used at St. Paul's Cathedral, the Monument, the Home and Foreign Offices, the Horse Guards, and innumerable other important, besides the countless unimportant, buildings, can be pointed to as instancing the durability of Portland stone; and whilst it can be had as cheaply as artificial stone, terra-cotta, or Bath stone, as has been proved in many instances by the tenders published in your estimable paper, and by facts which frequently come under my notice, architects need not fear, and will not hesitate or fail to specify Portland stone in their orders.

In conclusion, I should like to mention that not long since, one of the largest of artificial stone manufacturers was loud and continuous in his admiration of the Portland stone staircase in my office, stating that, in his opinion, there was nothing so nice.

F. J. BARNES,  
Portland stone dealer, owner,  
I. of Portland.

#### "THE PICTURESQUE OF COTTAGE ARCHITECTURE."

SIR,—I regret to find [see p. 166, *ante*] that offence has been given by the remark made in the Preface to my book on Old Cottages as to the limits of photo-lithography. It was certainly not intended to bear the meaning objected to, but was meant as an explanation that I found to be necessary to such of the general public and critics as might have wondered why this method was adopted instead of etching or one of the new processes.

Lithography is an excellent medium for architectural illustration, but there is a limit to the fineness of line of which it admits, and for artistic purposes it cannot, even in the best hands, compete with the delicacy and clearness of the small process blocks so often used in your own columns. This objection applies only to such very small drawings as mine, and I daresay might, as you suggest, have been evaded by an abler artist even if working under the limitations as to light and shade that I imposed on myself.

I am afraid I am but awkward in expressing myself, as I certainly intended the paragraph as an acknowledgment of my obligations to the *Builder*.

I hope I may be allowed to quote from my introduction, to show how cordially I agree with your remarks that some further quality than simplicity is necessary,—

"On the other hand, I do not wish to be taken as suggesting that any plain building will look well. On the contrary, well-thought out and planned proportion is, as in all architecture, of the greatest importance, and much is to be gained by the inclusion of some of the many features illustrated in my drawings, as long as the mistake is not made of crowding them all into one building."

RALPH NEVILL, F.S.A.

Sept. 10, 1889.

#### NORFOLK CIRCULAR TOWERS.

SIR,—As you have done me the honour to mention my name in the *Builder* of August 17, and have suggested in a "Note" (p. 119) that I am ignorant of the reason for making early church towers being built on a circular plan, I wish to say that I was perfectly aware that this was done to avoid stone quoins at the angles, owing to the scarcity of the material, and that I have repeatedly mentioned this in papers and addresses during forty years past. I was only briefly alluding to the fact of Norman remains in my lecture to the Section of Antiquaries at the Norwich meeting, and did not go out of my way to mention such an elementary fact to my cultivated audience.

C. R. MANNING, F.S.A.

Mr. Manning's was the second reference made to the Norfolk round towers in the course of the congress, on both occasions without any reference to the practical reason for it. It is the small ones only that are built in this form, where the object evidently was to provide a small church with the minimum of cost.

#### A QUESTION IN HERALDRY.

SIR,—I have read with great interest your article in the *Builder* of the 7th inst. on "The Heraldry of the Crusades," especially that portion relating to "escallop shells." Can I trouble you to give me any help as to the origin of the following, which is



intended to represent five escallop shells upon black cross, and which are my own arms!

ARTHUR STONHAM.  
57, Great Ormond-street, W.C.

As the coat-of-arms sent by our correspondent is evidently of Eastern origin, and was doubtless conferred either on a Crusader or a pilgrim to the Holy Land. The colour of the shield is not mentioned, but we subjoin particulars of three examples from Papworth, of which the first may be the one, viz., a black cross on a white shield charged with five white escallops. There are many families bearing this device, the colours being differentiated, with other details of minor importance.

1. Argent, on a cross sable, five escallops of the first. Borne by Stonham and Vastoye.
2. Argent, on a cross engrailed sable, five escallops of the first. Borne by Bygod or Bygot.
3. Argent, on a cross sable, five escallops or (gold). Borne by Beauvais, also by Stonham and Vastoye.

#### WEEDS ON CHALK ROADS.

SIR,—We are troubled with weeds growing on paths and roads of chalk bottoms, and composed of 8 in. chalk, 6 in. ballast, on loamy clay soil.

We are anxious to rid ourselves of this trouble, and should be glad if you will kindly insert this as a query in your next issue, as to the best means of doing so.

GEORGE NEWMAN & CO.

#### HOUSES AT SNARESBROOK.

SIR,—In the plan attached to the view of these houses, published in your last issue, a slight omission has been pointed out to me by a reader, viz., that the door between kitchen and scullery is not shown. Of course there is one in the building, and obviously the omission is but a draughtsman's slip.

A. HEMMINGS.

**Association of Municipal and Sanitary Engineers and Surveyors.**—A Home Counties' District meeting of this Association is to be held at Wimbledon, on Saturday next, September 28. The meeting will be held at the Local Board Offices, which are close to the station. Mr. Santo Crimp will read a short paper on "Wimbledon and its Public Works." Subsequently, the members will walk to the sewage farm, and inspect the pumping station, the settling tanks, the sludge pressing plant, and the farm. A demonstration, by the Amnes Syndicate, of the new Amnes Process for treating sewage (described and commented upon in another column of this week's *Builder*) will be given, and the process will, in the absence of Mr. Ellice-Clark, be described by Mr. Godfrey. The party will then proceed through the farm to the effluent outfall, which is near Earlsfield Station (London and South Western Railway). Members who have sufficient time at their disposal will visit the sewage farm and works at Merton, under the guidance of Mr. Chart, the Surveyor.

**Opening of the Dewsbury Town Hall.**—The new Town Hall at Dewsbury, which has cost between 40,000l. and 50,000l., and which is described as being as complete a building as any in the North of England, was opened on Tuesday last by the Mayor of the town. The new Town Hall is in the Italian Renaissance style, and is surmounted by a tower 135 ft. high. With regard to the interior, there is accommodation provided for all the offices of the Corporation, the School Board, and the Chamber of Commerce, a room for Council meetings, borough court, and offices for the police and magistrates' clerk. There is also a central hall intended for public meetings, concerts, &c., which has sitting accommodation for 1,500 people. Messrs. Holton & Fox are the architects. We are asked to say that all the doors are fitted with Kaye's patent locks and bolts.



## The Student's Column.

WATER-SUPPLY.—XII  
FILTRATION.

**F**ILTRATION is adopted to get rid of the suspended solids in water, both organic and inorganic, and in some measure also the impurities chemically dissolved in it. In cases where much suspended matter is present, as often happens when a river is the source of supply, the water to be purified is first admitted to settling ponds. The greater portion of the suspended matter is simply held up in water by the velocity of the current,—a fact abundantly testified by the accumulation of sediment in the bends and mouths of rivers. A river entering a large lake parts with nearly all its sediment,—a familiar example being furnished by the River Rhone, which runs into the Lake of Geneva laden with sediment, and issues from it quite clear, the muddy material having been deposited during its passage through the lake. In this way the lake is being gradually filled up. We cannot hope to so successfully imitate nature as to get rid of all the suspended matter, but by allowing river water to rest in properly-constructed settling ponds, a great deal is accomplished towards this end. If we could only afford to permit the water to remain long enough, no doubt it would part with practically all this foreign material; as it is, however, such enormous quantities of water are required per day, that the process must, as a rule, naturally be carried on too rapidly to effect purification altogether in this way.

Settling-ponds are usually assisted by filters, made in various ways, whilst the filtering media are of different kinds. Filters, however, are considered by some eminent engineers to be unnecessary under certain circumstances. The late Mr. J. F. Bateman was of opinion that where water is taken from rivers, sometimes turbid, and always containing more or less organic matters, and where it is taken from canals or reservoirs supplied by water flowing from gentle slopes of cultivated lands, it is necessary to filter it; and it is also occasionally requisite to filter water taken from shallow lakes. But in other cases he did not adopt filtration unless something special called for it, it is well known that in certain waterworks which were originally constructed with filter-beds, the latter have been done away with, because it was said that the quality of the water was not at all benefited thereby. In other words, it was found that by the system of decanting and drawing from the top of each reservoir, and straining through upper-wire gauze, the water was supplied as pure as if it had passed through the sand-filter. We are of opinion, however, that not very few sources available for large supplies exist in this country of sufficient purity to warrant us in saying that the improved systems of filtration would do the water no good; which opinion, we believe, is at the present time also shared by many water engineers. unquestionably filtration has, in the majority of instances, a very salutary effect upon waters at present supplied to the public, but considerable difference of opinion exists as to what is the best practicable material to pass the water through, and thoroughly effect its purification, if this latter be possible. Here, again, the "doctors disagree," so we may briefly describe the more prominent methods and substances adopted in filtering on a large scale, together with their comparative advantages. In doing so we must again divest ourselves of all bias, and, as far as possible, simply discuss the facts; but we may be profitable, firstly, to define the meaning of the word "filter," which in all discussions of this nature is necessarily of varying use. We take it that a fact in science appears only to a thing well established, or which has *prima facie* evidence on its face. Theories and hypotheses only recently brought forward, and which have not been subjected to the searching test of time and scientific criticism, though often interesting to the specialist, ought not to find a place in a brief outline or review of the principal known facts or well-established principles concerning a subject, although, from their familiarity to the reviewer, he may be sorely tempted to make allusion to them in his remarks. But let us now return to the immediate subject of the filter.

Filter-beds have this in common, that the water to be filtered is passed through porous

substances of sufficient fineness to prevent, as much as possible, the minute suspended particles in it from passing through. The material mostly used to effect this purpose is fine sand. The method of sand filtration on a large scale was first introduced into England in the year 1828, by the late Mr. James Simpson, who was engineer of the Chelsea Waterworks. A Royal Commission found that the water supplied to the metropolis from the Thames at that time was very objectionable, much suspended matter being clearly visible in it as it was delivered to the consumer, and Mr. Simpson, after numerous experiments, found that it could be cleansed by being made to pass slowly through sand held up by layers of grit and coarse gravel, the dirt being left behind on the surface of the sand. The accumulation of this dirty sediment was removed, at intervals, by scraping off a few inches of sand, thus exposing a new surface of clean sand to be next acted upon. The continual removal of the successive surfaces of the sand necessitated in time the re-making of the sand-bed by adding fresh layers of that material. This process is that adopted in all its essential particulars in the majority of our large waterworks at the present day.

In the case of a large supply, it is necessary to have at least four or five filters, because during the cleansing and replacement of the sand-bed, or through accident, it is requisite to empty a filter, and duplicates must at the same time be in working order to keep up a constant supply. They are often many acres in extent, for the purification, to be thorough, must admit of the water passing through the filters very slowly, and large areas are thus imperative when dealing with great volumes of water. The rate at which water passes through the filters depends on the grain of the sand, but principally, also, on the head of water. This rate is varied, at the will of the engineer, in different localities, depending on the class of water dealt with. In regard to the filtered water supplied to London, experience has shown that not more than 2½ gallons per hour should be allowed to pass through each square foot of area. Thus, each million gallons per diem requires about 16,700 square feet of filter at work.

In forming a filter-bed, care should be taken that the sand is not too fine, otherwise, as is often the case, the filter becomes speedily choked. Coarse, granular, and siliceous sand is the proper kind of material to be used. It extracts the particles of matter suspended in water quite as well as the finest sand, and is easy to clean, whilst fine sand is difficult to purify. After being thoroughly cleansed, the same sand may be used again and again for many years. At the same time, where it is readily procurable, fresh sand should be laid on as often as practicable. The section of an ordinary waterworks sand-filter, in descending order, exhibits sand of the above description, grit, small and then coarse gravel, large stones forming the foundation. It will thus be seen that the materials gradually get coarser from top to bottom, reasonable care being exercised to prevent mixture of the different strata. The thicknesses of the layers vary within narrow limits in different waterworks. The layer of washed sand forming the upper portion is often as much as 2 ft. 6 in. or more in thickness; whilst the total depth of the filter bed may be 6 ft. and upwards. After passing through this, the water runs off by means of drains to the pure-water tank or reservoir, and so into the mains.

The water may be passed either down, or up, or sideways through the filter. The first mentioned is the most common practice, the other two requiring some modification in the general arrangement of the filters. In the last mentioned method, the various kinds of filtering material are usually placed in compartments side by side.

From what has already been said, it will be apparent that sand filtration practically removes all suspended matter from water. In certain cases, however, it has not done this quite as efficiently as could be desired. For example, Mr. G. Higgin, M.Inst. C.E., referring\* to some experiments he carried out with the water of the River Plate, describes it as containing a large amount of very finely-divided matter, which was incapable of being removed by ordinary filtration. He had, therefore, to adopt another method, which will presently be described.

The suspended matter arrested by sand-filters

\* Min. Proc. Inst. C.E., vol. lvii, (1879), p. 272.

in the ordinary way, is formed of both organic and inorganic particles, so that a certain amount of organic contamination is thus got rid of. But the filtering action is something more than mechanical. Careful research has led to the belief that a part of the organic matter in solution is also removed; in other words, that the action is also chemical in its nature. It is highly probable that some kind of oxidising process is encouraged during the passage of the water through the sand, grit, and gravel of the filter. It is certain that by the expedient of intermitting the filtration, so as to allow of the aëration of the material composing the filter, this effect may be rendered much more active.\* The amount of organic matter in solution thus removed is very variable, depending on the quality of water dealt with, the construction of the filter, and the method and rate of filtration.

Many rivers have gravel beds of more or less thickness on their flanks, in the bottom of their valleys, or flats, which gravel contains a great quantity of water, in some cases derived from the adjacent river, and in others, water en route to the river. It may also belong to the gravel deposit in its character of a water-bearer simply, in which case it would not reach the river. In any case it has undergone a certain amount of natural filtration, and is frequently intercepted and made use of both by water companies and private individuals.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

12,258, Hinges for Folding Doors. T. Whittaker.

According to this invention, two semi-circular or U-shaped pieces of brass or iron are used; a slot is made on the circular part of each piece, and two halves of a cog-wheel are rivetted thereto. At each end is an iron or brass plate, which holds the two parts of the hinge in position, and bringing the circular parts together allows the cogs to gear, and the hinge to act both ways.

14,482, Wardrobe, Cupboard, and Door Fastenings. E. W. Taylor.

This invention relates to a fastening, automatic in its nature, which is obtained by an inclined plane in combination with the weight of the fastening itself. In the centre of a bevelled plate is made two parallel slots, which assume an angular position on the door-jamb when fixed, and when the door is shut it strikes on the bevelled surface, which, by reason of the inclined slots, is pushed angulose upward and away, allowing the door to pass, when the plate again slides down, the slots securing it.

12,251, Flushing Cisterns. S. Grossmith.

The object of this invention is to ensure that the syphon in an automatic flushing-cistern goes off when a mere dribble of water is taking place, and also to ensure greater certainty of the automatic action. A casing chamber fitted with an annular cover and a filling tank, and connected by a lever to the top of the chamber, is so adjusted as to act by the compression of air within the chamber, turn the tank, and periodically flush the cistern.

11,190, Sliding Window Sashes. T. P. Descout. The object of this invention is to provide means whereby window-sashes may be left open, to a certain extent, without the liability of their being opened from the outside. Stops or guards are used, which, after they have been moved to allow the sashes to be opened beyond the limit allowed by the stops, automatically resume their position and operation.

2,434, Mallets. H. Gribble.

A hollow cylinder is cast with taper openings, so that the shaft fits tight without the use of wedges. The hard wood head projects at each end of the cylinder, and forms a neat and efficient mallet.

## NEW APPLICATIONS FOR PATENTS.

Sept. 2.—13,791, J. Davies and W. Lloyd-Davies, Ridge Capping and Tiles, &c. 13,807, W. Cussans, Fasteners, Bolts, and Hinges for Windows, &c.

Sept. 3.—13,847, J. & H. Wilson, Ornamenting and Decorating Ceilings and Walls.—13,851, W. Greaves, Chimney Top or Cowl.—13,872, P. Parsons, Moistening, Heating, and Ventilating Factories.—13,880, M. Griswold and W. Atterbury, Sheet or Window Glass.

Sept. 4.—13,915, T. Kershaw, Door Knobs and Furniture.—13,942, L. Bühm and K. Rumpf, Tricarts.—13,953, C. Crabtree, Drain-pipes.—13,961, A. Brooke, Hunt Door Knobs.

Sept. 5.—13,972, J. Hatton, Chimney-pots.—13,976, W. Farr, Wood-Block Flooring.—13,980, B. Macdonald, Syphon Cisterns for Flushing Water-closets.—13,984, E. Hoyle, Double-threaded Screw for Wood.—13,997, A. Spencer, Metal Floors, Buildings, &c.—14,004, B. Nieuhaus and J. Gaetke, Controlling Apparatus for Doors, &c.—14,009, H. C.

\* See "Theory and Practice of Hydro-Mechanics," 1865, p. 30.



Jones, Chimney Cowl or Hood.—14,018, R. Brown, Portable Rain-water Pipes.  
Sept. 6.—14,042, D. Law and others, Automatic Flushing Cisterns.  
Sept. 7.—14,137, B. Malcolm and W. Pennington, Holding Sliding Windows in any required position.—14,145, P. Hoy and J. Jones, Drainage.—14,163, J. Kirk, Machine for Squaring, Beveling, Mitreing, or Trimming Wood.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

4,107, S. Cochrane, Shutter, Door, and Window Projectors.—7,337, W. Byatt, Latches or Bolts.—3,551, A. Sutherland, Flushing Apparatus.—9,331, F. and J. Rowson, Syphon Flushing Cistern.—10,663, C. Winton, Preventing Sewer-gas escaping into houses, &c.—11,449, J. Moreton, Imitation of Inlaying.—11,843, W. Wise, Extension Ladders.—11,901, E. Truman, Sanitary Arrangements of Buildings, &c.—11,904, E. Cubbon, Water-closets.—12,053, F. Abbey, Fire-ranges or Grates.—12,126, J. and A. Duckett, Water-closets.—12,147, C. Darrah, Pedestal Water-closets.—12,306, R. Swales, Flushing Apparatus for Water-closets.—12,333, E. Kerry, Heating Greenhouses or other Buildings.—12,453, R. Thompson, Flushing Cisterns for Water-closets.—12,829, B. Motham, Joiner's Clamp.—12,836, W. Gordon, Water Cisterns or Tanks.—12,889, T. Smith and R. Wager-Taylor, Cement or Artificial Stone.—12,890, T. Smith and R. Wager-Taylor, Cement or Artificial Stone.—13,004, T. Routledge, Sash-fastener.—13,007, H. Beaumont, Bolts for Doors, Gates, &c.—13,008, J. Wilson, Fire-resisting Flooring, &c.—13,009, J. Wilson and others, Fire-resisting Partitions and Walls.—13,050, T. Hyatt, Pavements and Paving Materials.—13,203, J. MacMahon, Composition for Arresting Decay in Wood.—13,333, H. Perry, Cornices for Rooms.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to Opposition for Two Months.

14,158, D. Clohesy, Under-cutting or Dovetailing Wood, Stone, &c.—14,963, E. Cox Walker and A. Swinton, Electric Bells and Signals.—15,136, E. Cain, Washer Strips of Doors for Excluding Draughts.—15,543, E. Newton, Horticultural Buildings.—16,131, A. McKechnie, Stone-dressing Tool.—16,923, A. Bouvier and J. Billord, Bricks, Tiles, &c.—16,408, J. Sharples, Flushing Pans of Water-closets.—9,726, F. Bolus, Sewer Gas Preventive Pipe.—12,457, W. Bunting, jun., Water-closets.—12,501, J. Darby, Joints for Pipes.

#### RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

SEPT. 9.—By DEBENHAM, TAYSON, & Co. (at Lowestoft).  
Lowestoft.—The Crown Meadows, containing 10a. 3c. 36p., t. r. £31. 10s. p.a. 250  
7 and 8, Crown-st., c. r. £31. 10s. p.a. 250  
SEPT. 10.—By WAGSTAFF & WARMAN.  
Chelsea.—22 and 23, Stanford-rd., u.t. 93 yrs., g.r. £2, r. £67. 15s. p.a. 390  
Battersea.—138, Battersea Bridge-rd., u.t. 48 yrs., g.r. £11, r. £32. 18s. p.a. 195  
Mildmay Park.—63, Queen Margaret's-grove, u.t. 60 yrs., g.r. £4. 15s., r. £41. 12s. p.a. 268  
SEPT. 12.—By NEWCOMB & HARDING.  
Holloway.—4, Tufnell Park-road, u.t. 33 yrs., g.r. £10. 10s., c. r. £80 p.a. 160  
Islington.—47, Orchard-st., u.t. 30 yrs., g.r. £2. 10s., r. £23. 5s. p.a. 500  
28, Ecclebourne-rd., u.t. 48 yrs., g.r. £5, r. £29 p.a. 270  
Stoke Newington.—11, Shakespeare-st., u.t. 68 yrs., g.r. £6, r. £46. 15s. p.a. 205  
Commercial-road East.—F.g.r. of £18. 10s. p.a., reversion in 21 yrs. 305  
By GHO, NEWMAN.  
Regent's Park.—29, Elworthy-rd., u.t. 75 yrs., g.r. £6, r. £109 p.a. 900

[Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; o.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

#### MEETINGS.

SATURDAY, SEPTEMBER 21.  
Glasgow Architectural Association.—Visit to Ferguslie Park, Woodside House, and Coats' Memorial Church, Paisley.  
TUESDAY, SEPTEMBER 24.  
Glasgow Architectural Association.—Mr. David Barclay, Hon. President, on "Perspective."  
WEDNESDAY, SEPTEMBER 25.  
Builders' Foremen and Clerks of Works' Institution.—Quarterly meeting of the Directors. 8.30 p.m.  
SATURDAY, SEPTEMBER 28.  
Association of Municipal and Sanitary Engineers and Surveyors.—Home Counties District Meeting at Wimbledon. Mr. Santo Crisp will read a short paper on "Wimbledon and its Public Works," after which a visit will be made to the Sewage Farm.

**The German National Monument to the late Emperor William.**—On Sept. 4, the day fixed for sending in competitive designs for the national monument of the Emperor William, 144 works, including forty-seven models, were received at Berlin. An exhibition of the designs will be held after the jury have made their awards.

#### Miscellaneous.

**School Board Contracts.**—Brief reports have appeared in some of the daily papers of one or two "meetings of Metropolitan builders" to protest against the action of the London School Board in merging the jobbing work at the Board schools, at present done by 143 small builders, into the hands of six large ones. According to the *Standard*, Mr. Barnes, one of the members of the London School Board, attended, and told the meeting that there were not more than ten members of the Board responsible for the change. It was done by a little side committee, sitting during the vacation; and when he was informed that one firm had been given the work of 150 schools he told the chairman of the Works Committee he had made a mistake. He believed in localisation in such matters rather than centralisation, and if the big firms did the work at what in some cases was bound to be a loss, depend upon it the value would be taken out in another way. So strongly did he feel the injustice of the matter, that he now offered to introduce a deputation from that meeting to the School Board. The Chairman (Mr. Lawrence Stevens, L.C.C.) said all the small builders were being paid what was due to them from the School Board, which, he supposed, meant dismissal; but if the contracts were signed with the large firms for the next twelve months, the small builders might agitate for the future. Mr. T. F. Stonekale, a late member of the Board, expressed the belief that the School Board had done that which was inimical to the interests of the ratepayers, because large builders at a distance could not do the work so cheaply as the men on the spot. It was finally resolved that the members of the meeting individually should wait upon their respective representatives at the School Board to lay the matter properly before them. Thanks to the speakers closed the proceedings, about which we should perhaps have been able to say more had we been asked to send a reporter to the meetings. For some reason best known to themselves, the promoters of the meetings did not extend this courtesy to us.

**Re-decoration of the Gaiety Theatre.**—From some particulars which have been sent to us, we learn that the proprietors of the Gaiety Theatre, feeling that the existing decoration and upholstery had become somewhat dull with the effect of time, called in Mr. Romaine-Walker, architect, to advise with them and suggest a new scheme of colour. It so happened that some two years or so ago the same architect had re-constructed a portion of the theatre, and adopted the Indian style. This has now been carried on throughout the whole auditorium. The present scheme of colour is white, turquoise-blue, and indigo. The greyish-white ground, with foliage and ornament in the two blues, are relieved at the lower part of the theatre with a little gold. The ceiling is a design of enclosing lines and pine ornament, the cove a series of upright Oriental ornament connected with a curved leaf, making a cusped fringing to ceiling. The spandrels of the arches are edged with a border to transform the effect of the Gothic arch as much as possible into the Indian, the spandrel being filled with a large Oriental ornament in the blue and white colouring. Feeling that the picture by Mr. H. S. Marks, R.A., which had become almost black with years, notwithstanding its many cleanings, did not fit in with this style of ornament or colouring, it has been carefully covered over with oiled paper and canvas, the latter being decorated, and can at any time be uncovered and the picture disclosed. The private boxes, &c., are papered with an Indian pattern paper in the same colouring, which is carried round the panels of circles and through the whole auditorium. The curtains, resters, seating and carpet are blues of the various shades, and being entirely new and so arranged as to come in with the general scheme of colour. The passages, staircases, corridors, &c., are treated in an entirely opposite key of colour. The walls are white, the dados and decoration in cerise, carpets, draperies, &c., all being in the same key. The vestibule lobby into stalls being some time back constructed in a light Louis Seize style, the decoration is carried out in the same style with salmon colour silk draperies, &c. The decorations, upholstery and carpets have been executed by Messrs. Campbell Smith & Co., under the superintendence of Messrs. Romaine-Walker & Tanner, architects. The whole work has been carried out in the remarkably short space of fourteen days.

**The Rating of Machinery.**—An important and largely attended meeting of manufacturers from all parts of England was held last week at the Grand Hotel, Bristol (Mr. W. F. Fox, of Nottingham, in the chair), to consider the attempts which have been made to assess all kinds of machinery to the local rates, and to consult as to the steps which should be taken to protect the interests of all those affected. It was unanimously resolved that a national society for the exemption of machinery from rating be formed among the machinery users of the kingdom, for the purpose of assisting manufacturers to resist illegal and excessive assessments. It was also resolved to prosecute an appeal to the superior courts against the recent decisions of the Somersetshire Quarter Sessions in respect of the machinery in the mills in the Chard Union, and to promote a Bill in Parliament which shall declare the law and render it free from any doubt on the subject. Mr. Humphreys Davies, F.S.I., of London, was appointed Secretary, and arrangements were made for a thorough organisation of the affected interests throughout the country. Subscriptions were paid or promised amounting to upwards of 2,000. The feeling of all those present was expressed strongly that the question was of great national importance, and that to rate machinery would be to place our manufacturers at a serious disadvantage in competing with foreign countries, as it would largely increase the cost of production here, while abroad no such imposts exist.

**Insanitary Areas in Clerkenwell.**—It is stated that Dr. Griffith, the Medical Officer of Health for Clerkenwell, has made representations to the London County Council of no fewer than fourteen localities which, in his opinion, are insanitary, and should be done away with. The newly-appointed authority are likely to have their hands full, and it will need some nice discrimination to distinguish between demolition which should be undertaken by the vestries and district boards, and for which, under *Torrens' Act*, no compensation is given, and the improvement of sanitary areas, which can only be effected by the London County Council under *Cross's Act*: at considerable public expense. We trust the ratepayers will not begrudge the cost of the removal of these plague-spots from London. It cannot be expected that the errors of the past can be undone without some burden being cast upon the present inhabitants of the metropolis, but it behoves the Council to see that we in our time are not guilty of mistakes that a future generation will have to redeem, for London must have spent in health improvements already not far short of two millions, in addition to the amounts which have been expended by private householders.—*Lancet*.

**The English Iron Trade.**—The English iron market continues exceedingly strong, and there is a very fair amount of activity. There is a revival in pig-iron all round, consumers coming forward more readily. The Glasgow warrant market has been firmer this week than last, with prices advancing, and Scotch makers have again advanced their quotations, some of the brands being as much as 3s. a ton dearer than last week. Middlesbrough pig has moved up 3d. a ton. Rates of Lancashire and Midland pigs are stiffer. It is only in north-west hematites that a relapse has taken place, the price of mixed numbers having dropped from 57s. 6d. to 55s. 3d. A considerable rise has taken place in old materials. Finished iron continues in active demand, and prices are very stiff. The previous activity of trade and hardness of values are maintained in steel. Shipbuilders are still very busy while booking fresh orders. Engineering establishments keep fully employed.—*Iron*.

**Proposed Forth and Clyde Canal.**—Some of the Scottish newspapers appear to be alive to the fact that this is a subject that it is worth while appearing to know something about. The *Scottish Leader* last week, after alluding gracefully to the fact that the *Builder* had some time ago drawn attention to the subject, proceeds to annex a considerable portion of one of our former articles, word for word, as its own: a proceeding complimentary to us, no doubt, but not very creditable to the *Scottish Leader*.

**The Sanitary Institute.**—Under the auspices of this Institute, a Health Exhibition and Congress are to be opened at Worcester on Tuesday next.



**Lady Jones.**—The widow of the late esteemed City Architect, Sir Horace Jones, died suddenly, a few days ago, at Dieppe, where with her little daughter she was spending the holidays. Lady Jones, who was fifty years of age, was (according to the *City Press*), the daughter of Mr. Patch, an eminent conveyancer of bygone days, and was an amiable, unostentatious lady, and her death will be deplored by many attached friends. We learn that the remains were interred in the family vault, by the side of the late Sir Horace, at Norwood Cemetery on the 11th inst. Amongst those present at the grave were Mr. Octavius Hansard, F.R.I.B.A., and Sir John B. Monckton, Town Clerk of London.

**Land Sale in Kent.**—We understand that "Meopham Court," the property of Mr. J. W. Crookes, has been sold by Messrs. Osborn & Mercer, of London, with about 436 acres of land, to Mr. Ralph Tweddell, who has for some time past been renting "Providence," near Faversham. The Meopham Court Estate comprises about 1,350 acres, and about 170 acres of building land adjoining or near to the station at Meopham, are going to be offered by auction at Gravesend, on October 9, in small lots of 2 acres and upwards. The remainder of the estate, we are informed, will be retained by Mr. Crookes.

**What Becomes of the Pins?**—As a suggestive indication of the number of pins brought in the ordinary course of trade into the City of London and there distributed throughout the world, we may mention that one wholesale house placed an order with a Strand firm this season for six tons weight of these useful little articles.—*Wholesalemen and Drapers' Trade Journal.*

**Clown and Barborough Sewerage.**—The Workop Rural Sanitary Authority have instructed Mr. W. H. Radford, C.E., of Nottingham, to prepare schemes for the sewerage and sewage disposal of Clown and Barborough.

#### PRICES CURRENT OF MATERIALS.

TIMBER.		£. s. d.	£. s. d.
Greenheart, B.G.	ton	7 0 0	7 15 0
Teak, B.L.	load	12 0 0	14 0 0
Sequoia, U.S.	foot cube	0 3 0	0 3 0
Asi. Canada.	load	3 10 0	5 0 0
Red "	"	3 10 0	6 0 0
Elm "	"	4 0 0	6 0 0
Fir, Dantio, &c.	"	2 0 0	3 10 0
Oak "	"	2 10 0	4 10 0
Canada "	"	5 10 0	7 10 0
Fine, Canada red "	"	3 0 0	4 0 0
" yellow "	"	3 10 0	5 5 0
Lath, Dantio "	fathom	4 10 0	5 10 0
St. Petersburg "	"	5 0 0	6 10 0
Waincoat, Riga, &c.	"	2 15 0	4 5 0
Deals, Finland, 2nd and 1st.	std. 100	9 0 0	11 0 0
" 4th and 3rd.	"	7 0 0	8 15 0
Hija "	"	7 0 0	9 0 0
St. Petersburg, 1st yellow "	"	11 0 0	15 0 0
" 2nd "	"	10 0 0	11 0 0
" white "	"	7 0 0	10 0 0
Sweden "	"	8 0 0	10 0 0
White Sea "	"	9 0 0	17 0 0
Canada, Pine, 1st "	"	16 0 0	20 0 0
" 2nd "	"	11 0 0	17 0 0
" 3rd "	"	8 0 0	10 10 0
" Spruce, 1st "	"	9 0 0	11 0 0
" 3rd and 2nd "	"	7 0 0	9 0 0
St. Petersburg, 1st "	"	10 10 0	18 0 0
Battens, all kinds "	"	6 0 0	18 0 0
Flooring Boards, sq. 1 in., prepared, First "	"	0 11 0	0 14 0
Second "	"	0 8 0	0 10 6
Other qualities "	"	0 5 6	0 7 9
Cedar, Cuba "	foot	0 0 4	0 0 5
Honduras, &c. "	"	0 0 4	0 0 4
Mahogany, Cuba "	"	0 0 4	0 0 4
St. Domingo, cargo average "	"	0 0 4	0 0 4
Mexican "	"	0 0 4	0 0 4
Tobacco "	"	0 0 4	0 0 4
Honduras, cargo average "	"	0 0 4	0 0 4
Rose, Turkey "	ton	4 0 0	13 0 0
Bora, Rio "	"	15 0 0	20 0 0
Bahia "	"	14 0 0	18 0 0
Satin, St. Domingo "	"	0 0 6	0 1 0
Porto Rico "	"	0 0 8	0 1 2
Walnut, Italian "	"	0 0 4	0 0 4

#### METALS.

IRON.		ton	0 0 0	0 0 0
Pig, in Scotland	"	6 0 0	6 5 0	
Bar, Welsh, in London	"	5 10 0	6 0 0	
" at works in Wales	"	7 0 0	7 10 0	
COAL.		ton	47 10 0	0 0 0
Best selected, in London	"	48 10 0	0 0 0	
Blackburn, in London	"	58 0 0	0 0 0	
Chili, bars	"	43 0 0	0 0 0	
YELLOW METAL.		lb.	0 0 5	0 0 5
LEAD.		ton	12 12 6	0 0 0
Pig, Spanish, in London	"	12 12 6	12 15 0	
English, coin, brands	"	14 0 0	0 0 0	
Sheet, English	"	14 0 0	0 0 0	
ZINC.		ton	93 0 0	0 0 0
Spelter, in London	"	93 0 0	0 0 0	
Strait, in London	"	90 5 0	0 0 0	
Australian	"	90 5 0	0 0 0	
English, in London	"	85 0 0	0 0 0	
Bars	"	98 0 0	0 0 0	
Refined	"	97 0 0	0 0 0	
Sheet—English sheet	"	24 0 0	24 10 0	

OILS.		£. s. d.	£. s. d.	£. s. d.
Linseed	ton	21 13 6	21 17 6	
Cocunut, Coddin	"	27 10 0	28 10 0	
Ceylon	"	24 10 0	0 0 0	
Palm, Lagos	"	28 0 0	0 0 0	
Rapeseed, English pale	"	32 0 0	0 0 0	
" brown	"	30 15 0	0 0 0	

#### COMPETITION, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

##### COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Board School	Burnley School Board	Not stated	Nov. 14th	ii.

##### CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Laying Water Mains	Epsom Local Board	Official	Sept. 23rd	xiv.
Roadmaking and Paving Works	Willenden Local Board	O. Claude Robson	Sept. 24th	xiv.
Widening Bridge, &c.	Stockport County Board	A. M. Fowler	Sept. 26th	ii.
Erection of Visitors' Room, Ashford School	West Lond. Sch. Dist.	Official	Sept. 27th	ii.
New Coastguard Station, Deal	Admiralty	do.	do.	ii.
Superstructure of Lunatic Asylum, Coulsdon	London County Council	G. T. Hine	Sept. 28th	xiv.
Completion of Passages on Estates	do.	H. Howell	Sept. 30th	xiv.
Heating Apparatus	Tortoth Park Loc. Bd.	John Price	do.	xiv.
Sewerage and Sewage Disposal Works	Chelsea Public Libraries Commissioners	Official	do.	xiv.
Storage Reservoir, &c.	Bingley Local Board	A. H. Preston	do.	ii.
Street-Making Works	Yeadon Water Co.	do.	do.	ii.
Engine and Deep Well Pump	Southend Local Board	P. Dodd	Oct. 1st	xiv.
Extension of Workhouse Laundry and Kitchen	Hackney Union	Official	do.	xiv.
Waterworks	Chelsea Guardians	do.	do.	xiv.
Erection of Baths, Plumbing Works, &c.	Market Harborough, &c. Local Board	J. B. Eversard	do.	ii.
Broken Blue Guernsey Granite	St. Helen's Corporation	G. J. C. Broom	Oct. 2nd	ii.
Stables	Remford Local Board	Official	Oct. 3rd	xiv.
Stables' Workroom, Harrow-rd. Workhouse	Southampton Corp.	W. B. G. Bennett	Oct. 8th	xiv.
Broken Guernsey Granite	Paddington Guardians	A. & C. Harston	do.	xiv.
Sewerage and Sewage Purification Works	Grays Thurnock L. B.	Official	do.	xiv.
School and Outbuildings, &c., Guildford	Kingston E. S. A.	W. H. Hope	Oct. 9th	xiv.
Sewage Disposal Works, Deighton	The Committee.	do.	Oct. 12th	xiv.
	Huddersfield County Board	R. S. Dugdale	Not stated	xiv.

##### PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of Works	Market Harborough, &c. Local Board	3l. per week	Sept. 24th	xix.
Clerk of Works	River Cam Bridges Committee	Not stated	do.	xix.
Assistant Clerk, Borough Engineer's Office.	Repsley Corporation	do.	Sept. 30th	xix.
Road Foreman	Handsworth Local Bd.	2l. per week	Not stated	xix.

##### TENDERS.

[Communications for insertion under this heading must reach us not later than 12 Noon on Thursdays.]

**BROMLEY (Kent).**—For additions to "The Dargle," Bromley, Kent, for Mr. B. G. Mullen. Mr. John Ladd, architect, 4, Chapel-street, Bedford-row, London, W.C. :—  
Caplen & Radgrave, Croydon.....£155 5 0  
Accepted.

**BROMLEY (Kent).**—For 900 ft. lineal of 9 in. stone-ware pipe sewer, with manholes, &c., in Magpie Hall-lane, for the Bromley Local Board. Mr. Hugh S. Craggen, surveyor:—  
W. & J. Woodhams.....£111 0 0  
E. Peill & Sons.....88 0 0  
T. Lansbury (accepted).....76 0 0

**CROYDON.**—For painting at the Union Infirmary, Mayday-road, Croydon, for the Guardians. Mr. F. West, architect, Coombe-road, Croydon. Quantities not supplied:—  
Cox & Woolard, Thornton-heath.....£1,270 0 0  
Joselyne & Yoring, Borough, S.E.....994 0 0  
D. W. Barker, Croydon.....850 0 0  
A. Bann, Sydenham.....548 0 0  
F. P. Marwood & Co., West Kensington.....790 0 0

Smith & Sons, South Norwood.....777 0 0  
E. Sease, Surbiton-hill.....720 0 0  
Hammond & Son, Greenwich.....680 0 0  
H. Fullager, Kingland-road.....614 0 0  
T. E. Dartnell, Croydon.....608 0 0  
G. E. Bryan, South Norwood.....597 0 0  
M. Batchelor, East Maidstone.....590 13 0  
F. J. Wicks, Willenden Park.....570 0 0  
W. F. Halliday, Dover.....567 5 0  
C. W. Fox, Anley-road.....567 0 0  
W. J. Penfold, Upper Sydenham.....559 17 0  
C. Shaw, Lavender-hill.....550 0 0  
W. F. Halliday, Dover.....548 0 0  
Gardner & Llewellyn, Croydon.....538 10 0  
Blackmore, Craker, & Co., Croydon.....522 14 0  
J. O. Hunt, Southsea.....508 0 0  
W. G. Lilly, Whitcombe-street, W.C. ....479 0 0  
Alkers & Co., South Norwood.....475 0 0  
W. Beadle, Penze.....448 0 0  
J. Hole, Sutton.....438 0 0  
Barber & Oliver, Hove, Sussex.....399 0 0  
W. & P. Hards, Croydon.....390 0 0  
Stewart & Co., Walsworth.....342 0 0  
J. C. Fuller, Lee-road.....334 0 0

**COLCHESTER.**—For building new billiard-room, for the Colchester Conservative Club. Mr. J. W. Start, architect, Colchester:—  
J. Grimes, Colchester.....£249 0 0  
A. Baker, Colchester.....231 0 0  
T. J. Ward, Colchester (accepted).....220 0 0

**EAST HAM (Essex).**—For the erection of fourteen cottages, for Mr. H. Howard:—  
Burgess & Algar, Bromley, E.....£2,100 0 0  
[No competition.]

**EGHAM.**—For two houses and shops, for Mr. J. Powell. W. Menzies, architect:—  
Dicks, Egham.....£547 0 0  
G. Beavell, Staines.....535 0 0  
W. Gray, Egham.....469 0 0

**LEYTON.**—For paving with Victoria stone the following roads, viz., Millais, Frith, Calderon, Ramsay, Trumpington, Thorpe, Malbourn, Broxbourne, Selby, Ranelagh, Chelmsford, Oakdale, Queen's, Cranbourne, Ectingham, Nutfield, Westdown, Alexandra, Wornley, and Cary roads, for the Leyton Local Board. Mr. Wm. Dawson, A.M.I.C.E., Surveyor:—  
Paving, Kerbing, &c.  
W. Farrar.....£3,407 9 9  
Nowell & Robson.....7,592 7 5  
Victoria Stone Company.....7,610 2 3  
Wm. Griffiths (accepted).....7,503 18 1  
J. Mowlem & Co.....7,752 2 3

**ROADMAKING.**  
J. S. Jackson (accepted).....1,780 0 0  
J. Reeves.....1,579 10 4  
Eli Wilson.....1,593 6 1  
Wm. Griffiths.....1,329 8 0  
W. G. Harris.....1,589 2 10

**LONDON.**—For alterations at the "Gauden Head," Bethnal Green-road. Mr. R. A. Lewcock, architect, 83, Bishopgate-street Within:—  
A. Hood (accepted).....£1,759 0 0

**LONDON.**—For alterations at "The George and Dragon," Cleveland-street, Fitzroy-square. Mr. R. A. Lewcock, architect, 83, Bishopgate-street Within:—  
Jackson & Todd.....£374 0 0  
Walker.....537 0 0  
Hayworth.....521 0 0  
Spencer & Co.....615 0 0  
Septimusson.....498 0 0  
Ivory.....495 0 0  
Davies (accepted).....460 0 0

*Gaffiter.*  
Winn (accepted).....£150 0 0

LONDON.—For the erection of new Mission Church of St. Fridericus, Follet-street, East India Dock-road, E., for the Christ Church Oxford Mission. Mr. R. Willey, architect, 68, Ludgate-hill, E.C. :—  
 Burnin & Sons ..... £4,209 0 0  
 Woodward & Co. .... 4,114 0 0  
 Smith ..... 3,975 0 0  
 Martin, Wells, & Co. .... 3,769 0 0  
 Holland (accepted) ..... 3,660 0 0

LONDON.—For hall, billiard-room, dressing-rooms, &c., for the Holborn Gledistonian Club, Devonshire-street, Theobald's-road, W.C. Messrs. Vinter & Holland, architects, 3, Little George-street, Westminster, S.W. :—  
 Kellaway ..... £1,330 0 0  
 Baults ..... 897 0 0  
 Lang & Son ..... 898 0 0  
 Wells & Sons ..... 885 0 0  
 Young & Lonsdale (amended) ..... 804 0 0

LONDON.—For alterations at the "Pitt's Head" public-house, Goswell-road, E.C., for Mr. M. Levy :—  
 Hawkins ..... £114 0 0  
 Wilson ..... 110 0 0  
 Kellaway ..... 107 0 0  
 Burgess & Algar, Bromley, E.\* ..... 91 10 0  
 \* Accepted.

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 Kirk & Rindell ..... 1,184 0 0  
 Lea ..... 1,041 0 0  
 J. & J. Greenwood ..... 974 0 0  
 A. White & Co. .... 839 0 0  
 Babey & Son, Islington ..... 803 0 0

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 Kevell & Co. .... 429 0 0  
 Trust ..... 410 0 0  
 Bowden (accepted) ..... 359 0 0

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 Ewe ..... 1,258 0 0  
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 Butler (accepted) ..... 607 0 0

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 W. J. Day, Clacton-on-Sea ..... 6,894 0 0

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# The Builder.

VOL. LVII. No. 2454.

SATURDAY, SEPTEMBER 23, 1899.

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### Excavations at Naukratis.\*



THE excavations at Naukratis, so ably begun by Mr. Flinders Petrie, have added very largely to our stock of knowledge with regard to the architecture and other arts of the early

Hellenic race. Hitherto we have mostly been able only to study the richer and more magnificent cities of the Greeks, but at Naukratis we have the novel advantage of being allowed to investigate the aspect and construction of those humbler types of buildings, in which stone and marble were completely absent, the smaller and less costly structures, which, during most periods, must have formed the bulk even of such wealthy cities as Athens or Corinth.

Naukratis was a purely commercial settlement, inhabited by Greek merchants and craftsmen, who, by an exceptional favour on the part of the Egyptians, were allowed to live and carry on their trade at one of the many mouths of the Nile in the thickly-populated Delta of Egypt.

With such a conservative race as the Egyptians, distrustful and scornful of foreigners, proud of their own antiquity of culture, this permission for the foundation of a Greek colony was a quite exceptional favour, the very rarity of which was the essence of its commercial value, and as such was evidently prized and made full use of by the many adventurous spirits of Ionian Greece.

Traces have been found of a Greek settlement at Naukratis, dating from as early as the beginning of the seventh century B.C.; and when, about a century later (c. 670 B.C.), the usurper Aahmes (or Amasis as Herodotus (II., 178-9) calls him) became master of Egypt, he renewed and extended the special privileges enjoyed by the Hellenic merchants of this valuable seaport.

With the exception of a period of invasion and destruction, probably due, as Mr. Gardner suggests, to the Persian conquest of Egypt, the prosperity of Naukratis appears to have been but little interrupted down to the second

century A.D., when one of its citizens, Athenaeus, wrote the famous book of table-talk, "The Deipnosophists," which, to the modern student of archaeology, is one of the most valuable treatises now extant.

This second volume on the remains of Naukratis gives us a very minute and carefully-described account of the excavations carried on by Mr. E. A. Gardner, now the Director of the British School of Archaeology at Athens. Mr. Gardner has been a worthy successor to Mr. Flinders Petrie, whose power of extracting the greatest amount of accurate information from even the most scanty remains, makes him one of the most productive explorers who has ever laboured in such fields of research as these.

With explorations of this kind, minute, and, above all, immediate, observation is especially needed. A stone or marble building will await the leisure of successive visitors; but the crude brick walls of Naukratis melt away into their native clay with the utmost rapidity, after they are exposed even to such a mild and almost rainless climate as that of Egypt. A visit to the site of Naukratis would now reveal little or nothing to the student, and, therefore, such a record as Mr. Gardner's becomes doubly valuable when the evidence it is based upon has passed away.

It is only within recent years that archaeologists have realised how very large and important a part was played by simple sun-dried bricks in the buildings, both secular and religious, of the ancient Greeks and Romans.

As Dr. Dörpfeld has pointed out, even the celebrated *Heraion* at Olympia was constructed with walls of crude brick resting on a low stone plinth; originally, the columns of its peristyle were of wood, but these decayed one by one, and were gradually replaced by stone columns, till at the time of Pausanias' visit in the second century A.D., only one of the original wooden pillars remained. See Paus. V., xvi., 1.

So, again, the circuit walls of Athens itself were mainly built of sun-dried bricks, and were of no stronger material even at the time when Sulla captured Athens, and levelled its fortification walls in 86 B.C.

The extraordinary preservation of the relief of Dexileus at the battle of Corinth, and other fine sepulchral *stelae* of the fourth century B.C., is mainly due to their having been buried in the fine smooth clay of the decomposed bricks of the walls of Athens. The pre-historic palace of the Kings of Tiryns is another and a very early example of the use

of wooden pillars and crude brick walls on stone footings, methods of construction which, especially for domestic purposes, seem to have survived throughout the whole period of the rise and fall of Greece. The real fact is that sun-dried bricks of Greek manufacture formed a very much stronger and more durable wall than one would naturally suppose. In the first place, very great care was expended on the making of these bricks, as is described by Vitruvius, II., cap. iii. The clay was dug long before it was wanted, and it was exposed to the frost and rains of several winters in order that all the particles might be thoroughly disintegrated, and a quite homogeneous paste made by beating and tempering. Pounded pottery, gravel, and chopped straw were kneaded up with the clay to increase its toughness; and, after it was moulded into shape, it was allowed a long time of probation, so that each brick might be thoroughly dry and sound. As Vitruvius records, a decree of the people of Utica ordained that none of these bricks should be used till they had been kept for five years and had been examined and passed by "the district surveyor." See Vitruvius, II., iii., §2.

It is, perhaps, worth noting that nearly all that Vitruvius writes about bricks, *lateres*, refers to sun-dried bricks. As a rule, in the very few places where he is speaking of kiln-fired bricks, he uses the word *testae*. The existing bricks used in the walls of ancient Rome are all triangular in shape; and these Vitruvius never mentions; the fact apparently being that till the Christian era unburnt bricks were almost exclusively used in Rome for walls, though for other purposes, such as paving or hypocaust pillars, kiln-fired bricks were in use long before the time of Augustus.

Another most vital point for the durability of buildings of crude brick was the extreme excellence of the stucco, which was always used to protect the walls from the weather. Examples of this stucco from Naukratis are harder and more weatherproof than most English freestone. It is a pure white in colour, made apparently only of lime and coarse sand, but is so hard that it is almost impossible to cut or even scratch it with a knife. We now think it sufficient to mix our stucco or mortar with plain water; but in ancient times, and even during the Mediæval period, down to the seventeenth century, a large amount of both labour and money was expended in making

\* "Naukratis," Part II. By E. A. Gardner, M.A., with an Appendix by F. L. Griffith, B.A. Sixth Memoir of the Egypt Exploration Fund. (London: Trübner & Co. 1898.)



really good mortar, and a great part of the extraordinary hardness of ancient examples probably depends on some substance, such as size, tree-sap, or white of egg, with which the sand and lime were tempered.

Among the expenses of building in Mediæval England we often find that eggs to mix with the mortar are an important item: or else malt to make a "wort" was bought and used in large quantities for the same purpose, not for the workmen to drink, which would now seem its more natural use.

In some parts of Britain, especially Cambridgeshire and South Wales, a good many cottages still exist which are built of mere blocks of sun-dried clay mixed with rushes or straw. The only protection to the walls from rain and frost is an annual coat of lime-white; and as long as this is renewed the cottages seem to last fairly well. We can easily imagine, therefore, how durable sun-dried brickwork would be in such a climate as that of Egypt, when protected by a coating of cement, as hard as one of the best magnesian limestones.

The crude brick buildings of Naukratis differ from those of towns in Greece or Italy in having no plinth or footings of stone,—stone not being obtainable in the Nile Delta. Again, timber for building purposes was very scarce in Egypt, the date palm, the acacia, and the tamarisk being the only trees which, now at least, grow to any size. Thus we find that most of the temples of Naukratis are built without pillars,—mere *cellæ*, with sometimes an inner chamber or *adytum*. One of these, the Temple of the Dioscuri, built, as Mr. Gardner judges, about the middle of the fifth century B.C., is peculiar in its plan, having no front wall to its *cella*, but an open end, with two free pillars in *antis*. These pillars were rectangular in section, and were built of the usual sun-dried bricks. No doubt an open screen of bronze or wood-lattice shut in the spaces between the pillars and the *antis*. In plan this little temple closely resembles the shrine of Nike Apteros, on the Acropolis of Athens, which was probably built about the same time as that at Naukratis. In both cases there is the same peculiar arrangement of free pillars or pilasters in place of the front wall, so that the statue of the deity would always be exposed to view. Another still smaller temple, dedicated to Aphrodite, as is shown by the many fragments of inscribed pottery which Mr. Gardner found within the *temenos*, is well illustrated with plans and sections. It consists simply of a *cella*, about 23 ft. by 18 ft., with an inner sanctuary about 8 ft. by 18 ft. In front of the doorway is a large rectangular altar, formed by low walls of unbaked brick, enclosing an inner core of ashes. A flight of four steps of the same brick-work leads up to the front of the altar from the temple door; and on each side is a projection on which, probably, the officiating priests stood. The whole of the altar and its steps are coated with the usual hard stucco.

At the north side of the temple, within the *temenos*, Mr. Gardner found two curious wells, about 20 feet deep, each lined with cylinders of baked clay, about 3 ft. 4 in. in diameter, in which were small openings to give foot-hold, and so allow a man to descend to clean out the well. These were, of course, choked with rubbish; but one of them, when cleared out, afforded a good supply of pure fresh water, which was of great use to the excavating workmen.

Exactly similar cylinders of pottery have been found in Phœnicia and in Italy, where they were often used to give access to subterranean tombs. The Capitoline Museum in Rome has some good examples of these, with foot-holes precisely like those of the Naukratis wells.

As Mr. Gardner has shown in his excellent illustrations, the Temple of Aphrodite was built and rebuilt at three different dates, the cement pavement each time being relaid at a higher level than in the preceding building. Curiously little care was taken to secure good foundations, and the walls of the two later temples stand partly on the remains of

the walls of the previous building, and partly on the made ground, in what seems a very reckless manner.

A large and very interesting collection of pottery, much of it inscribed with dedications to various favourite deities of the Ionian Greeks,—Aphrodite, Hera, Apollo, and the Dioscuri,—was discovered by Mr. Gardner, and is well described and illustrated in his book. One richly-decorated bowl is of very exceptional interest, as having probably been dedicated in honour of Aphrodite by one of the most famous of all early Greek architects and sculptors, the celebrated Rhœcus, the son of Phila of Samos, who is recorded to have been the architect of the great Temple of Hera in Samos, which Herodotus mentions as being the largest he had ever seen. Rhœcus is also famous for his skill as a sculptor in bronze, and is said to have been the inventor of bronze casting,—meaning probably that he was the first to make castings of great size.

Rhœcus worked mostly with a partner named Theodorus, who was no less famous as having been the architect of the great Temple of Artemis at Ephesus,—probably the second important temple on the site. The date of Theodorus and Rhœcus is usually supposed to have been towards the close of the seventh century B.C., and this date would very well suit the paleogeographical character of the dedicatory inscription, which runs thus, in the usual form:—*Ρῥαῖκος καὶ Θεόδωρος ῤ[ι] Ἀφροδίτῃ*, "Rhœcus dedicated me to Aphrodite." The general character of the pottery, which mostly seems to date from the seventh and sixth centuries B.C., has been described in the previous volume on Naukratis. A large proportion of it consists of the local fabrique, with elaborate patterns in red, brown, and yellow ochres painted on a ground of white "slip," which, under the action of the kiln has, in many cases, become slightly vitrified, and thus is of the nature of an enamel. Mr. Gardner unfortunately describes it as a "white glaze,"—a misleading term, as it is perfectly opaque, and therefore should rather be called an enamel than a glaze. It is, in fact, not unlike the early *mezzamaiolica* of Central Italy.

One of the most interesting pieces of pottery, which is happily in a very perfect state, is a flat dish or *pinax*, on which is a very decorative painting of a winged sphinx, in red, brown, and yellow on a white ground, of that special fabrique which is usually thought to have been made in the Cyrenaica, a wealthy Greek colony on the north coast of Africa. The sphinx is painted with much delicacy and minute detail, with a very limited use of incised lines for the inner markings of the figure. As Mr. Gardner suggests, this fine *pinax* probably gives a very fair notion of what the panel paintings of the early Greeks were like. Though this sphinx is painted on a dish, yet the holes in its rim for suspension show that it was treated like an easel picture, being hung on a wall purely for ornament, a method of wall decoration which survives in some of the Greek islands even at the present day. Twenty or thirty years ago, nearly every cottage in the island of Rhodes had suspended to its walls some of those fine dishes of Persian design which are now so much valued in England for their strongly decorative effect. Now, however, these Rhodian plates can be bought more easily in London or Paris than in their native island.

The fact is that this Cyrenaic and Naukratian class of pottery, with painted decoration on a delicate and rather soft creamy ground, is quite unfit for the wear-and-tear of actual use, and must therefore have been specially intended for ornament, either in private houses or as votive offerings in the temples of the gods. Indeed, it is rare to find a Greek painted vase of any kind which shows any signs of wear, though it is common enough to see ancient pottery which has been broken, and then carefully mended with rivets of bronze or lead.

Mr. Gardner's general plan of this important quarter of Naukratis shows the complicated lines of the narrow streets, and the outline of each block or *insula*. The

inner walls of the houses had perished too completely to be distinguishable. The houses appear to have been small, wholly built of crude brick, with coatings of similar stucco to that used in the temples, decorated in some very simple way with brilliant blue (*smalto*) and ochre pigments of different tints.

On the whole, this volume is a very interesting one, and in point of illustrations is superior to Part I. The plans and sections are ingeniously devised so as to show clearly a variety of different dates in the same building, and the photographic representations of the pottery are, in most cases, very successful.

#### "MASONIC REPRINTS."

BY WYATT PAPWORTH.



THE first volume of these has lately been published.\* It is of peculiar interest in connexion with the History of Freemasonry, and relatively so with Architecture, and as such is brought to the notice of the many readers, architects, and others, members or not of the Society. The Table of Contents shows that it is divided into three parts, with an Appendix. Part I. contains a facsimile and transcript of the great "Masonic Poem"; another of "Urbanitatis"; and portions from "Instructions for a Parish Priest"; the three originals being in the British Museum. Part II. contains a reprint of No. 51 of "The Plain Dealer," 1724; "An Ode to the Grand Khaibar," 1726 (both of much interest and value); "A Defence of Masonry," 1738; and "Brother Euclid's Letter to the Author," 1738. Part III. contains "A Commentary" on these two original poems, by Mr. R. F. Gould, the present Worshipful Master of the Lodge, and the author of the carefully-written "History of Freemasonry" reviewed in the *Builder* of 1883 and 1885 (xlv., 266; xlv., 37, 102; xlviii., 574, 608). The "Appendix" contains three maps showing the state of England in A.D. 627, 878, and in the tenth and eleventh centuries; and a glossary of the words used in the three facsimiles supplied by the editor, Mr. G. W. Speth, the secretary of the Lodge. Having briefly mentioned the contents of the volume, it will be well to proceed at once to the opening part of Mr. Gould's "Commentary on the Poem." He begins by observing that there are some points of analogy between the ancient Etruscans and the modern Freemasons; there is a mystery about both. The earliest Grand Lodge,—that of England,—was established in 1717, and the *oldest document* that can in any way be associated with the Masonic teachings which predicted the era of that body, and survives at this day, is the first one, above given in facsimile. It was printed by Mr. J. O. Halliwell, F.S.A., in 1840 and again in 1844. There is yet another MS. in the British Museum on the subject, "The History and Articles of Masonry," which was published fairly in facsimile by Mr. Matthew Cooke in 1861. Both these are now ascribed by Mr. E. A. Bond to the first half of the fifteenth century (there is still an inclination to place them in the fourteenth century), No. 1 being the older of the two. They are thus of high antiquity, and appear to be rather histories of, or disquisitions upon, Geometry (or Masonry), than as Constitutions of the craft. Besides these there are the "Constitutions," published in 1738, and many others in roll or scroll form, some of which have been printed of late years; these "Old Charges" are to appear in Volume 3. They were used in Lodges at the reception of new members, &c., and the earliest of these is "the Grand Lodge MS." which was written or copied in A.D. 1583. "We know absolutely nothing," writes Mr. Gould, "of either of the two MSS., except what can be gathered from their actual texts," and he then relates how these have been "very

\* By the Lodge Quatuor Coronati, No. 2,076, London. Small folio. Margate, 1889. Edited by G. W. Speth, P.M., Secretary.



factfully interpreted by historians of the Craft." He considers that English Masonry at the date of the poems was more of an operative than a speculative science. But here I cannot help objecting to the statement (p. 4) that there was a *Guild* of masons in 1355 mentioned in the valuable Fabric Rolls of York Cathedral. What is there mentioned is a *workshop* or *lodge* connected with the building works of the Minster, and should not, I submit, be referred to as a *Guild* of masons, for it consisted of only "the first and second masons who are called masters of the same" (the second was, I think); the warden, with craftsmen, apprentice and labourers, and the carpenters are connected with them, as in the Cologne records of 1396, mentioned hereafter. With all his researches, and they have extended over many years in quest of facts, Mr. Gould is still unable to say whether masonry always had its Speculative side in 1400 or earlier; if by "speculative" he means that the Guilds had lay members, is there now any doubt but that there were such members (even according to his own showing later on)? He gives a typical representation of the "Old Charges"; each family and each version of which is in its way unique,—but these are, as above stated, to be fully considered in a subsequent volume. Some singularities cannot be here considered, nor more than attention drawn to certain "Rules in the Old Charges," although they are interesting in a trade view, as they relate to the conduct, moral and workmanlike, of the Master, Fellow, and Mason, and are most of them as applicable at the present day as in 1390 or 1450. A complete list of the sixty-two Old Charges now known is given, whether Manuscript (45), Printed (6), or missing versions (11). Mr. Gould has further added for consideration the Table made by Dr. Bergmann, of Rostock, which place all these Constitutions into groups or families for the purpose of ascertaining their original, and their descent, a sort of genealogical table, in fact; treating them much after the custom of a Court of Law. The "Grand Lodge Family" of manuscripts has seven branches; the "Sloane Family" has four; the Roberts Family is a branch of the Sloane; and the Spencer Family a branch of the Grand Lodge.

Other subjects are here treated briefly by Mr. Gould, for they were fully discussed in his "History of Freemasonry." They are "The Statutes of Labourers," after 1348; the "Regulations for the Trades of Masons (London), A.D. 1356"; the "Statutes of Apprentices," 5th Elizabeth, c. iv., A.D. 1562; "Scottish Charters and Regulations," and "German Ordinances," ranging from 1396, 1459, 1462, 1563, down to 1800. Mr. Gould adds that "The manuscripts comprised in this last series relate exclusively to the steinmetzen (stonemasons) of Germany." But do not all the English ones to which he has referred equally relate to the working stonemasons of England? From my researches it appears to me that too much is assumed when ascribing the English charges to some Masonic body, irrespective of the Working, or Operative Lodges, for so little is known of either. He states that in the "Cologne Records," 1396 "the guild of stonemasons and carpenters, who are always referred to in connexion with one another—is repeatedly called the Fraternity of St. John the Baptist." And he lastly treats of "French Statutes," including the codes of 1260, regulations 1350, and statutes 1586, all minutely reviewed in his "History of Freemasonry." This opening portion is followed by the "Commentary on the Regius MS.," as he now terms this valuable early poem, which has been so well produced in facsimile in the work under review as almost to place the pages of the little volume in the possession of each subscriber to the work. The MS. has 794 lines; he shows how it can be separated into two great divisions, one terminating at line 496, and the other going on to the end of the poem; the compiler, he explains, has apparently transcribed from many sources, but without taking the trouble to attach any real thread or union to the transcripts. Mr. Gould carefully dissects the poem,

showing that down to line 577, it may consist of portions of five different legends, if that be a suitable word to use; and the last portion is in great part extracted from "Mirks' Instructions for Parish Priests;" and its continuation is almost word for word with the poem, "Urbanitatis," the second of the two facsimiles given in these reprints. As the learned compilers of this volume have so far been able to trace the originals of the later part, it may be hoped they will yet be able to trace the sources from whence the earlier part has been produced. He then elaborates sixty small folio pages of small type, which it is utterly impossible to condense, and requires some skill to follow, for he dives into origin, manners, and customs; gives elaborate histories of Kings Edwin and Athelstan (no later King of England is referred to in the legends); and the minstrel poets of the Anglo-Saxons and of later times, taking each reign *seriatim*. Then he takes his readers through Euclid and Geometry; refers to Athelard of Bath, 1110-20; the reported opinions of Sir C. Wren, and others, now exploded; the Jews and their familiar intercourse with the Moor and the Persian in the cultivation of learning, and philosophy, arts, and sciences—they not being persecuted by them, as was the practice of the Gothic priests to do. Then he briefly reverts to the invention of printing and its consequences. He points out that both the Regius and Cooke MS. Constitutions divide the *Regulations* into "Articles and Points," affecting the conduct of the members of the Lodge or Guild, which is not followed in any of the Old Charges, the former giving fifteen of each, and the latter eight. He again shows that a very great part of the Regius MS. was transcribed from other documents, and asks were "the Masonic fragments also derived from a like source, or from recitals,—were copied (or written down) in prose or rhyme, by the penman of the poem?" And still later (p. 17), he adds, "each compiler (of the Regius and Cooke MSS.) must have had certain sources of information to rely on,—the one an oral and rhythmic, and the other a written and prose channel." He had previously noticed (p. 14) that an "old book" and other writings are referred to in the poem; and (p. 15, and compare p. 10) considers the writer honestly copied from manuscripts, or took down the verses from actual recitation. Then Mr. Gould enters elaborately upon "the York Legend" (p. 18-47, claiming for it a thread of fact in the skein of fable), through which we cannot follow him, for he includes Alfred, Athelstan, Edwin, the Guilds of Craft, the Danish invasion, Scotland, and its early lodges at Kilwinning and Edinburgh, and (p. 42) quotes the historian of Scottish Masonry as observing on the Kilwinning version of the "Old Charges" that "it was a production of the sister kingdom," evidently so from the context. He then reverts to "the first digression" (on p. 17), as to the nature of the guilds, showing that as early as A.D. 1400 persons with occupations other than those (of Merchant Taylors) were admitted into the Guild, for of thirty-five persons entered as *confreres*, not one is a taylor. There are references in the poem to a "syster" and to "wommon." Hence Mr. Gould (p. 50) considerably suggests that by "some readers the passages may be held to point rather to the absorption of the Craft Legend by a social guild, than to a gradual transition from operative to speculative or symbolical Masonry, by a craft or fraternity composed, in the first instance, of members of the Building Art." Many, if not all, of the Trade Guilds of London, and at least some of the Lodges in Scotland admitted "sisters." The interesting "Articles and Points" are then printed and discussed in detail, and he concludes, "if the existence of any form of Speculative Masonry can be carried earlier than the fourteenth century, the evidence to support it must be looked for among the Records and Fabric Rolls of the past."

It has long been my opinion that many facts connected with the history of architecture (or Masonry) are yet to be gathered from these Fabric Rolls, important documents

in the possession of each Dean and Chapter, but which will probably never see the light in print unless a society can be instituted for their publication, entailing great labour, but not more than has been carried out by societies for the similar object of printing or reprinting ancient records. The "Surtees Society" set the example by again printing the most useful "Fabric Rolls of York Cathedral" in 1859, although Mr. J. Browne of York had first printed them in 1838-47.

The whole seventy pages of Mr. Gould's Commentary and remarks are so replete with information, elucidation, and speculation, with, moreover, most faithful references to authorities, that little appears to be left for others to do, even if another Mr. Gould could be found to undertake such great labour. The Masonic view of the interest attached to this first volume of "Masonic Reprints" has been well given by Mr. J. Hughan in the *Freemason* for June, 1889. I fully concur with that gentleman, that the learned "Commentary" should be rewritten to do the subject full justice, though I would not vote for the author being banished from all society for the twelvemonth it might take him.

## NOTES.



SCHEME for a bridge across the Channel is exactly the kind of thing to attract the notice of newspaper correspondents, and accordingly the *Times*' correspondent furnished a long account of the paper read on the subject at the meeting of the Iron and Steel Institute at Paris. Of course if there were any chance of the matter taking a practical form it would be of the highest interest, both for those who liked and those who disliked the scheme, but the practical statistics of MM. Schneider and Hersent do not in our view suffice to remove it from the region of ideal speculation. The engineers propose spans of a maximum of 500 metres and a minimum of 100 metres, with cylindrical vertical steel columns erected on platforms, we presume of concrete, some of which will have to be built up in a depth of about 170 ft. of water. The statement is that the road would be carried by horizontal girders, which will preserve the headway height for the whole distance between the piers, a result, it is naively remarked, "which has not been attained in the bridge over the Forth"; as if the cantilever form had only been employed at the Forth Bridge as a kind of amusement or for picturesque effect, and might as well be dispensed with. The fact is, that the girders proposed are, in reality, cantilevers with a curved tension member above instead of a curved compression member below; a form often used as a beam girder, but in this case proposed to be used as a cantilever on a central support. They look workmanlike enough in the illustration, but they have not the security of base of the Forth Bridge form of cantilever. If the report of the discussion given by the *Times* correspondent is correct, there seems to be an extraordinary inaccuracy of ideas among English as well as French engineers about the design of the Forth Bridge; for Mr. Adamson is reported as saying that he approved the deviations from the Forth Bridge, as "nothing could be more harassing than curved elliptical girders"—in construction, we presume. Quite true; and the Forth Bridge compression tubes are not elliptical curves, for that very reason. They appear so to the eye on a distant view; but they are really built in a series of straight sections forming tangents to an elliptical curve, in order to facilitate fitting and erection. Sir John Fowler and Mr. Baker are named as consulting engineers to the Channel Bridge scheme, but we should very much doubt whether those exceedingly practical engineers have done more than accept *pro forma* a nominal official position offered to them. Granting however that the construction of the bridge is possible within any reasonable or useful limit of time and cost, what is to be said as to the proposal to



establish, in such a highway of shipping as the Channel, what would practically be a line of reefs, at distances varying from 500 to 100 yards? We are convinced that from a sailor's point of view it would be regarded as perfect madness. The engineers inform us that the piers would be no hindrance to the navigation of steam vessels, "as the current" (we presume they mean the tide), "which would become a little faster in the centre of the open spans, would carry floating bodies, even disabled vessels, towards that part and prevent their ever touching the bridge." Would it? If MM. Schneider & Hersent will adopt the simple practical experiment of getting into a rowing boat on the Thames tideway, and rowing, with the tide, at one of the piers of a bridge, that will be sufficient to convince them that "currents" are not so obliging as they suppose. And we are told it will be no danger to sailing ships, because there is plenty of room between the piers! We have no authority to speak for seamen, but we can fancy pretty well what would be the feelings and opinions of the captain of a sailing ship caught in a gale in the Channel on a dark night, with his ship only half under control and with the knowledge that a row of concrete reefs, extending all across the Channel, were to leeward of him. He would wish at all events for the "melancholy satisfaction" of having the engineers who built them on board with him.

**SIR MICHAEL HICKS-BEACH**, in the course of his speech before the Chambers of Commerce at Hull last week, referred at some length to the Railway and Canal Traffic Act. Earlier in the week the Associated Chambers had passed the following resolution:—"The new classification to be agreed upon under the Railway and Canal Traffic Act, 1888, can and should be a working classification as well as a Parliamentary classification." The President of the Board of Trade considers that this resolution was arrived at under a misapprehension, and that it is undesirable that it should be pressed. His view of the matter is that the lowering of the rates applicable to any class of goods would practically amount to the removal of such goods out of one class into a lower. But alterations in rates would but seldom take this form. They would, as a rule, be effected by raising or lowering the rates applicable to the particular class in which the goods were placed, the Parliamentary maximum being the limit in the upward direction. The *Times*, in commenting upon the resolution just quoted, remarks that it appears to mean that the classifications and schedules should specify not merely the maximum charges, but the actual charge to be made for each particular class. It appears to us that the position taken up by the traders is by no means clearly understood. They do not want the scale of charges to be fixed,—as it would be with an unalterable classification and schedule,—it being the classification only that they desire to see definitely fixed and used in practice, with a reasonable maximum applicable to each respective class. This would allow for contingencies, without rendering the rates liable to such sweeping alterations as would be possible if both class and mileage rate were uncertain and variable. At the hearing of objections before the Board of Trade next month, the position will doubtless be clearly explained. We understand that Lord Balfour of Burleigh (the Parliamentary Secretary of the Board) will preside at the sittings, and that the two assessors appointed by the Board will probably be Mr. W. A. Hunter, M.P., and Mr. Henry Oakley. As the former gentleman is the standing counsel of the Railway and Canal Traders' Association, and Mr. Oakley a railway manager (Great Northern Railway) and secretary of the Railway Companies' Association, a better selection could hardly have been made. Sir Michael Hicks-Beach expressed some surprise at the fact that Clause 24,—dealing with rates,—should engross public attention to the exclusion of other equally important sections of

the Act. But it must be remembered that the Act is incomplete until the provisions of Clause 24 are carried out, and the maximum rates and charges legalised; and this fact is quite sufficient to account for the interest of both the public and the railway companies being concentrated upon this particular clause for the present.

THE larger portion of the last issue of the *Εφημερίς Αρχαιολογική*,—an important double number (1888, 3 and 4),—is taken up by the long-promised report of the most recently discovered tombs at Mycenæ. The report is by M. Tsountas, and is fully illustrated by five plates, reproducing the most important objects discovered. It is too detailed to be even summarised here, but will well repay a careful reading. In the same number, Dr. Wolters publishes a remarkable terra-cotta, which for some years back has excited the attention of all professional visitors to the Museum of the Archaeological Society at Athens. It is in the form of a plaque, but of such solid proportions that Dr. Wolters holds it may safely be assigned to the class of terra-cotta of which we have so far but few and scattered specimens, i.e., those which were employed, not as tablets to be suspended or nailed to a wall, but as actual members of an architectural structure. Since Dr. Dörpfeld's paper on the "Verwendung von Terrakotten am Geison und Dache Griechischen Bauwerke," archaeologists have been on the look out for analogous instances. In the present case there is happily no doubt what sort of building the terra-cotta belonged to. It formed a part of a frieze running round some sort of tomb. A procession of mourners is represented, eight men uplifting their hands in token of salutation; above, in archaic letters, *σῖμα ῥδ' ἔστι Ἀρείου*—this is the monument of Areios, —no doubt part of a metrical line. The design is of fine archaic black-figured style of the latter part of the sixth century.

AT a recent meeting of the *Académie des Inscriptions*, Paris, Mr. Karapanos announced an important discovery at Corfu. Upwards of a thousand terra-cottas have been discovered, and what makes the find the more important is that they all, without exception, represent one and the same subject,—they are statuettes of the goddess Artemis, represented with a bow in her hand and a fawn by her side. In the brief report of Mr. Karapanos' address (in the *Berliner Philologische Wochenschrift*, Sept. 20), nothing further is said respecting the type, but it is impossible, from the description, to repress the hope that we may have in these terra-cottas further material for the reconstruction of the Artemis *Laphria* which Dr. Studniczka has recently, with so much ingenuity, recognised in the Pompeii statuette, and which we hold to be, though remotely, echoed in the Artemis of Versailles. It is reasonable to suppose that where a thousand terra-cottas repeat one type we have votive offerings reproducing a great cultus statue.

THE *Bullettino della Commissione Archeologica Comunale* at Rome (July and August, 1889) publishes in coloured fac-simile a very curious and interesting wall painting, the colours of which are most vividly preserved. Specimens of wall-painting preserved at Rome, whether Greek or Roman, are still sufficiently rare to make this acquisition of considerable importance. The subject deserves special attention. It is not—as is usual with mural decorations—mythological, nor yet *genre*, but distinctly, and from the inscriptions, unmistakably historical. The design is arrayed in three tiers: on the lowest a battle is raging; in the two upper ones are represented meetings between the generals of the hostile armies. Against the head of one of these is inscribed, in archaic Latin letters, Q. Fabio, i.e., Quintus Fabius. The custom that prevailed among the Romans of commemorating a successful campaign by a picture is well known, and there is little doubt that we have here a case in point.

Such pictures were sometimes carried in triumphal procession, as, for example, when Marcus Marcellus carried in triumph, as Livy relates (Hist. xxv., 20) a *tabula cum simulacro captivum Syracusarum*. Others formed permanent mural decorations.

THE death of Lady Holland separates the name of Holland from the historic house at Kensington. The property now passes to Lord Ilchester, and it may be,—for such rumours are abroad,—that it will in no long time be in the hands of builders. If such an event became likely, it would behove the inhabitants of Kensington to make strenuous efforts to preserve the grounds of Holland House as an open space. There is need for such a space, and Holland House itself might be kept intact. It is to be hoped, however, that, for some time to come, such an effort will not have to be made; but care should be taken that this open space be not covered with buildings through any want of foresight on the part of the inhabitants of Kensington.

IT appears that the Minister of Agriculture and his staff will not, as was first reported, be housed in the Paymaster-General's offices at Whitehall, since the latter are still required for some of their former purposes; the new department is to be accommodated at No. 3, eastern side of St. James's-square, which for some years past has served for the Land, and the Copyhold, Inclosure and Tithe Commission Offices. This is the house that once was inhabited by the Duke of Leeds, who is commemorated in certain absurd lines, written by a servant of the Duke, which Dr. Johnson used to repeat:—

When the Duke of Leeds shall married be  
To a fine young lady of high quality.

She shall have all that's fine and fair,  
And have a house in St. James's-square.

THE foundation-stone of a new pavilion for the Marylebone Cricket Club was laid at Lord's ground a few days ago. This building will be erected from the designs of Mr. Verity, and is to be completed in readiness for next season. Thomas Lord established his original cricket-ground in 1780, where Dorset-square now stands, and that square is said to be named after the Duke of Dorset, an early patron of the game. The ground at St. John's Wood was at first about nine acres in extent. Having since been enlarged from time to time, it is now, we believe, the property of the M.C.C., who, in May last year, purchased for 18,500*l.* the freehold of what had been Henderson's nursery-gardens, abutting against Wellington-road, from the authorities of the Clergy Orphan Asylum, whose girls' school is close by.

WE subjoin two illustrations of a very cleverly-designed apparatus for automatically distributing a disinfecting fluid into the cistern or pan of a water-closet at every discharge of the contents of the cistern or pan. The inventor is Mr. A. C. Flanders, but the patent-owners are the Jeyes' Sanitary Compounds Company. The apparatus consists of a rectangular metal box A, which is filled with the disinfecting fluid through an opening at B, the box being held horizontally for that purpose with the opening upwards, and B is then stopped with an air-tight screw stopper. The apparatus is then fixed upright against the side of the supply cistern (if it is intended to be so applied), so that when the cistern is full to its usual height the ball is held up as in fig. 2. As the supply cistern is emptied for the flush, the ball descends, and in so doing raises the hinged block C out of the little pan D, which it had previously filled up (fig. 1). Beneath the hinge of C is a small round hole opening into the main container (not seen in the illustration), and as C rises the disinfecting fluid flows down into the pan, but as the main container is air-tight, the external pressure of the atmosphere prevents the fluid rising higher



than the rim of D. There seems a little theoretic flaw here, for one does not quite see how the level of the fluid is to be correspondingly lowered at A without leaving a vacuum; but practically we presume sufficient air works its way up through the fluid. At any rate the action takes place as described, as we have tested it by repeated working. When the supply-cistern fills, and the ball is raised, the block C descends again and fills D, forcing over its rim one charge of the fluid, which disinfects the water in

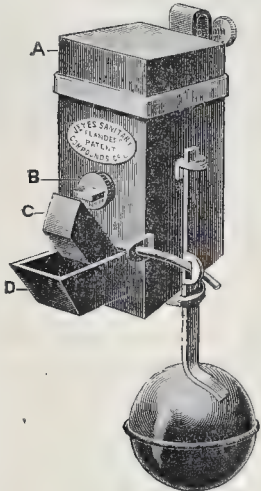


Fig. 1.

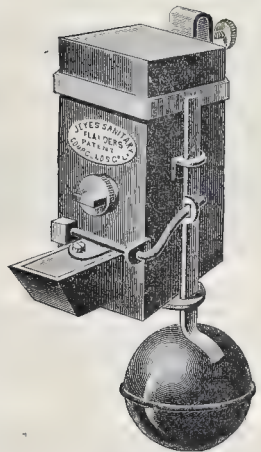


Fig. 2.

the cistern ready for the next use of the closet. The action seems perfectly certain, and there is absolutely nothing that is liable to get out of order. If it is preferred to have the fluid discharged direct into the pan of the closet after the flush, the apparatus can be connected with the service-pipe a little way above the closet, and the discharge actuated from a ball in the cistern by means of a lever and rod geared so as to act the reverse way of the previously-described method, so that C falls as the ball sinks and the water is discharged into the closet. Considering how often, even where it is intended to disinfect the pan of a closet at each use, this is forgotten when the fluid has to be poured by hand from a bottle each time, such a simple, clever, and cheap apparatus ought to prove very useful.

WE have received specimens of a T-square and set-square made according to a plan invented and patented by Mr. Mark J.

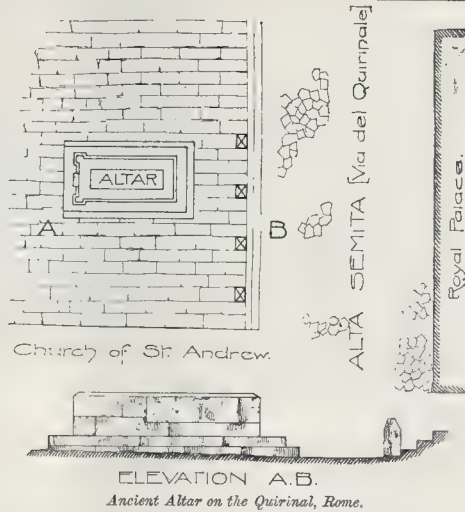
Lansell, architect, the object being to prevent the rubbing of the surface of the instruments on the paper when in use. As every one in the habit of using drawing instruments knows, the large flat under surfaces of a set-square and of the blade of a T-square tend to deface the paper more or less in use, especially when used on a drawing in the "pencil stage" of its production; they take up a good deal of the dust and pencil particles from one portion of the paper and distribute it over other portions. A frequent and careful wiping of the implements themselves will prevent a good deal of this, but will not entirely do away with it. Mr. Lansell's patent consists in hollowing the under side of the T-square so as to leave only the two outer rims resting on the paper; and he has attained the same object in a set-square by forming the outer edges of a vulcanite frame slightly relieved above the main surface of the square. The device is practical and simple, and is worth the attention of draughtsmen.

#### ANCIENT ALTAR ON THE QUIRINAL, ROME.

DURING the erection of a new edifice built near the Church of St. Andrew on the Quirinal, by order of the Royal house, an area has been discovered, paved with large travertine blocks. In the middle of this area is an altar (*ara*) also of travertine, raised upon two steps that go all round it (see sketch). The altar was originally covered with slabs of marble, as we can see by the holes of the nails. Access was gained to this area from the old Roman road called *Alta Semita*, which still exists under the modern *via del Quirinale*, by means of three steps, 0.30 metres high and 0.50 wide. Near the third and last step are some pilasters also of travertine stone, which originally supported iron or bronze bars. The altar that has been discovered measures 3 metres in front and 6.30 on one side, and is 1.20 metres high. We learn the nature and destination of this monument by two inscriptions, discovered in this same spot, one in the fifteenth the other in the sixteenth century. The inscriptions say, that terrified by the fearful conflagration, which took place under Nero, the inhabitants solemnly vowed to offer sacrifices in order to keep away fires. These sacrifices were apparently celebrated upon altars especially raised for that purpose, in various parts of the city. One of these altars is the one which has been recently discovered, and which (in accordance with the above mentioned inscriptions) was again erected by Domitianus, about twenty years after Nero's conflagration.

The monument, by express order of H.M. the King, will be preserved, and will be visible in the subterranean portion of the new building.

L. B.



#### HEALTH EXHIBITION AT WORCESTER.

THE Health Exhibition which was opened on Tuesday at Worcester, in connexion with the Autumnal Congress of the Sanitary Institute, while it is a very good representative display of sanitary apparatus, materials, and appliances, and "articles of domestic use and economy" (to quote the title-page of the catalogue), hardly comes up to the standard which we had anticipated, seeing that it is two years since the Sanitary Institute held a similar exhibition at Bolton.\* The Worcester Exhibition is neither so large nor so varied as some others held under the auspices of the Institute, and it does not contain much that will be novel to sanitarians. Several of the leading firms are absent from the list of exhibitors, although one or two of them are partially represented on the stands of local exhibitors. Nevertheless, the Exhibition is a good typical show, and the study of its contents by the citizens of Worcester will reveal much that will be new and important to them. Regarded in their educational aspect, such peripatetic exhibitions as this cannot fail to be of great service if diligently and intelligently studied in conjunction with the various papers, lectures, and discussions of the Congress. The Exhibition,—thanks partly to the excellent management of the Curator (Mr. R. L. Box), and partly to the fact that, as the judges' awards are announced at the opening ceremony, the exhibits must necessarily be in place before the opening,—presented the too-rare phenomenon of being ready by the time announced, and even earlier, for the opening proceedings commenced three-quarters of an hour late.

The exhibits are divided into five classes, viz., I., Building Materials, Construction, and Machinery; II., Water Supply and Sewerage; III., Heating, Lighting, and Ventilating; IV., Personal Hygiene, Foods, Filters, and Disinfectants; V., Miscellaneous. Of some of the exhibits under these heads we will now proceed to speak briefly.

In Class I. Messrs. Joseph Robinson & Co. (Limited), Carlisle, occupy Stand No. 1 with samples of "Robinson's fireproof cement" and specimens of work executed in it, very hard, clean, and sharp in line. Stand No. 3 is tenanted by Messrs. Holloway Bros., builders, Queen's-road, Battersea, who show their patent system for constructing fireproof floors with blocks or slabs of concrete, locked or keyed together by an ingenious combination of plays on the edges of the blocks, without the aid of ties or fastenings of any kind. The same system of jointing, with certain modifications, is employed for walls, ceilings, and wood-block and parquet floors. It is worth the attention of visitors.

\* The present exhibition at Worcester is described on the title-page of the catalogue as the "eleventh annual Health Exhibition in connexion with the Sanitary Institute, but this is hardly correct. The Institute held neither congress nor exhibition last year, in consequence of its energies being concentrated on the work required to be done in connexion with its amalgamation with the Parkes Museum and the incorporation of the Institute.



At Stand No. 4 Mr. James Gregson, of Bolton, exhibits some improved forms of his "Perfection" rain-water down-pipes, which we described two years ago on the occasion of the exhibition at Bolton. By the use of these down-pipes, with their special sockets, hangers, and clips, it is possible to at once remove or renew any length of a down-pipe without disturbing the contiguous lengths. Mr. Gregson has also introduced a new bracket, to which the ears or lugs cast on the ordinary makes of down-pipes can be bolted. Specially adapted for use in cottage property is Gregson's "Short Socket" down-pipe, which possesses many advantages as compared with the common stack-pipes, at a very slight increase in first cost. At Stand No. 6 Messrs. Davis & Crouch, of Hardington, Evesham, exhibit what appears to be a very effective and durable draught-excluder for doors or windows. As applied to the bottom of a door, it consists of a number of pieces of very stout india-rubber tubing, forming rollers mounted on bearings so arranged that any inequalities in the surface of the floor will neither cause the door to drag nor admit a draught. This is managed by means of self-adjusting spring bearings placed at the ends and intermediately.

Mr. George Beck, architect and civil engineer, Worcester, exhibits at Stand 7 a large model of his newly-patented "safety adjustable portable scaffolding" for builders and decorators, which appears to possess all the essential qualities of a good scaffolding. It is strong, rigid, adaptable to all uses, external and internal, while at the same time it is light and portable. Mr. Beck uses squared timber for his "standards" and "ledgers," and scaffold-cord and wedges are not required. The scaffold is specially adapted for the erection of stone-faced buildings, as no "putting"-holes are required. All the parts are interchangeable, and altogether Mr. Beck's system of scaffolding well merits the attention of the building trade. We see that Mr. Beck is announced to read a paper on the subject of his invention before one of the sections of the Congress. The substance of this paper we hope to print next week. The "New Wire-Wove Roofing Company, of London, show, at Stand 15, their material called "Duro-line," which is a light, flexible, and unbreakable substitute for glass for roofing purposes, very well adapted for use in temporary buildings.

At Stand No. 16 Mr. John Fottrell, of Dublin, exhibits specimens of what he calls his "patent hygienic or sanitary cement concrete," as laid down to form a foot-pavement in front of the Holborn Town-hall, in Clerkenwell-road, in 1885. It is apparently a very durable material, for after three years of use in so busy a thoroughfare, a piece of it was taken up for examination, and Mr. Lewis H. Isaacs, M.P., the Surveyor to the Holborn District Board of Works, testifies that it shows no perceptible diminution in thickness. It has worn evenly all over the surface, and altogether it seems to afford corroboration of Sir Robert Rawlinson's views as to the very great durability of good artificial stone for street paving.\* Of the "hygienic or sanitary" property of Mr. Fottrell's concrete we must speak with some reserve. It is claimed that inasmuch as carbolic acid or some other powerful disinfectant is incorporated with the material, it is especially valuable for the flooring and wall-linings of basements where there is reason to suspect the existence or possibility of contaminated soil. Of course concrete, being more or less porous, will permit, to some extent, the passage of air through it, and the theory of the patentee appears to be that any ground-air which may find its way through the concrete will be filtered through, and rendered innocuous by the disinfectant which is contained in the concrete. Granting that this might be so at first, is there any well-founded reason for supposing that the concrete will not sooner or later (and, perhaps, sooner rather than later) lose its virtue as a disinfecting medium or filter? Until well assured on this head it will be well not to place too much reliance on the material in this particular phase of its use. The sanitary advantages of a good layer of well-made concrete in the basements of houses are beyond question, and the incorporation of a disinfectant with the concrete may do no harm, provided that the thickness of the layer be not diminished on the mere assumption that a comparatively thin layer of concrete containing a disinfecting material will be as permanently efficacious as a thicker layer without it. On this

question, however, we hope to learn more from a paper which is to be read on the subject by Professor Charles R. C. Tichborne, F.R.C., on Friday, and to which we shall look forward with much interest.

Millar's patent reversible window, shown at Stand 18, by the company which has been formed to work the invention, possesses many advantages. It is readily adaptable to sash windows; the upper and lower sashes being pivoted and self-balanced, they can be turned outside-in for cleaning, painting, &c., and they can both be opened louvre-fashion, at any desired angle, for ventilation. There are no complicated parts or fastenings to get out of order, and the window is one which deserves to be extensively used.

Owing to want of space we must defer our remarks upon many other exhibits which deserve notice until next week. In the meantime, we give hereafter the award of the judges, and we may also add that the Exhibition will remain open until Saturday evening, October 19.

The following are among the awards made by the judges:—

#### Medals.

Joseph Cliff & Sons, Leeds, for "Cecil" Slop-sink.  
Henry Dean, London, for Nicholl's "Eclipse" Soot and Soot Closet.  
Guest & Chimes, Rotherham, for Excellence in Manufacture of Water-fittings.  
Maplove, Allott, & Co., Limited, Nottingham, for Washington Lyon's Steam Disinfectant; another medal to the same exhibitors for Fryer's Destructor with Jones's Cremator.  
J. Ward & Sons, Worcester, for "Grabtrix" Fan-light Opener.  
Webb's Worcester Tiles Company, Worcester, for exhibit of Flooring and Wall Tiles.  
The Worcester Royal Porcelain Company, Limited, Worcester, for their exhibit of Art Porcelain.

#### Certificates.

A. T. Angell, London, for Improved Air-tight Manhole Cover.  
William Bennett & Co., Worcester, for Airtight Soil Pail; another certificate to the same exhibitor for Thomasson's Inlet Ventilator.  
Joseph Cliff & Sons, Leeds, for Enamelled Fire-clay Hospital Sink; another certificate for the Beaulieu Disconnecting Trap; another for the Beaulieu Urinal Base; another for Yorkshire Salt Glazed Sink.  
Henry Dean, London, for Dean's Silt Trap; another certificate for a Hygienic Dust Bin.  
James Gregson, Bolton, for Removable Rain-water Pipes, Heads, Clips, and Hangers.  
Guest & Chimes, Rotherham, for Self-acting Air Valves.  
Hermann Heim, London, for Enamelled Iron Plates for Decorative Purposes.  
Holloway Bros., London, for Solid Wood-block Floor-Paving.  
McNaught & Co., Worcester, for Arrangement for Releasing Horses from Vehicles in Cases of Accident.  
Millar's Patent Reversible Window Company, London, for Reversible Windows.  
Joseph Robinson & Co., Limited, Carlisle, for Robinson's Cement for the Erection of Chimneys.  
The Sanitary and Economic Association, Gloucester, for Trew's Manhole Cover.  
R. W. Tomlinson, Worcester, for Black's Signalling Speaking-Tube; another certificate for the "Burton" Water-closet; another for the Household Water-closet; another for Shanks' Tubal Wash-out Closet; another for the "Tornado" Water-waste Preventer.  
H. Trott, London, for Removable Valves for Hot and Cold Water Cocks.  
D. W. Wall, London, for Sanitary Hat Linings.  
J. Ward & Sons, Worcester, for "Herald" Kitchen Range; another certificate for the "Marlbrough" Grate; another for Shanks' Reliable Water-waste Preventer.  
Winsor & Co., London, for Air-tight Manhole Cover; another certificate for Enamelled Drain-Channels; another for Stokes' Gully-trap; another for "Winsor" After-dash Cistern.  
Worcester Sanitary and Ventilating Company, Worcester, for Budget Kitchen; another certificate for Lloyd's "Winchester" Grate.  
Three silver cups are offered by the Worcester Gas Company for the best Gas Stoves exhibited under the following classes:—1. For the best Gas Stove or Gas Apparatus for cooking purposes for families, including a sufficient supply of hot-water. 2. For the best Gas Cooking Stove for an artisan's family. 3. For the best and most economical Open Gas Fire. The following exhibitors competed for these Special Awards:—William Bennett & Co., Worcester; H. & C. Davis & Co., London; Freeman, Emery, & Co., Birmingham; Geoffrey Harrison, Worcester; Siddaway & Sons, West Bromwich; William Unsworth, Warrington; J. Ward & Sons, Worcester; Charles Wilson & Son, Leeds;

and John Wright & Co., Birmingham. In reference to these exhibits, it was announced that inasmuch as the determination of the awards would necessarily involve a considerable number of tests, the result of the competition could not yet be announced.

With regard to certain other exhibits, the judges reported that they were unable to arrive at a decision without a more elaborate trial than can be given at the Exhibition, and the following amongst others have been selected for further practical trial in London:—

Bland, Sinclair, Tweedie, & Co., London, Chemical Fire Extinguisher.  
Clemons Abell & Co., Worcester: Horse-Power Squeegee; Improved Scavenger's Cart; Improved Street Watering Van; Reversible Squeegee; or Footpath Cleaner; Road Scrapers for Horse-Power and Snow Plough Combined; Street Sweeping Machine; and Watling's Tip Wagon.  
Joseph Cliff & Sons, Leeds: Nursery Bath, Enamelled inside and outside; and Roman Bath.  
Henry Dean, London, Durran's Metallic Jointed Air-tight Cover.  
John Fottrell, Dublin, Hygienic Cement Concrete.  
Guest & Chimes, Rotherham: Caluk's Automatic Gas Governor; and Pressure Reducing Valve.  
The Haslam Fire Extinguisher Company, Bolton, Chemical Fire Extinguisher.  
Hermann Heim, London: "Helios" Stove; and "Hestia" Stove.  
C. Kite & Co., London: New under-roof Ventilator; and Simplex Water-jet Air Propeller.  
Maplove, Allott, & Co., Limited, Nottingham: Allott & Paton's Filter Press, with pneumatic attachment for opening and closing; Firmans' Dryer; Fryer's Carboniser; and Johnstone's Dryer.  
New Wire Wove Roofing Company, London, Wire Wove Roofing.  
Peters, Bartsch, & Co., Derby: Antioxide; and Carburettum Antioxide.  
The Sanitary and Economic Association, Limited, Gloucester: Bond's Euthermic Ventilating Stove; and Bond's Regulating Filter.  
Scott & Company, London, Archer Pipe Joint.  
Stott & Co., London, Stott-Thorp Reflex Sunlight.  
James Stott, Manchester and London, Stott's Gas Governor.  
R. W. Tomlinson, Worcester, Rufford's Porcelain Bath.  
J. Ward & Sons, Worcester: Cheavin's Filter; Fletcher's Gas Instantaneous Water Heater; Fourness Regenerative Gas Lamp; and Rufford's Porcelain Bath.  
The "Dececo" Water-closet, being an adaptation of an invention of one of the judges, has been excluded from competition.  
The report of the judges is signed by Messrs. Rogers Field, B.A., M.Inst.C.E., Chairman; Wynter Blyth, M.R.C.S., L.S.A.; W. H. Corfield, M.A., M.D.; Baldwin Latham, M.Inst.C.E.; Henry Law, M.Inst.C.E., F.G.S., F.S.S.; Louis Parkes, M.D., D.P.H.; J. Wallace Peggs, A.M.Inst.C.E.; J. C. Steele, M.D.; and Ernest Turner, F.R.I.B.A.

#### OLD DOORWAY, BOSTON, U.S.

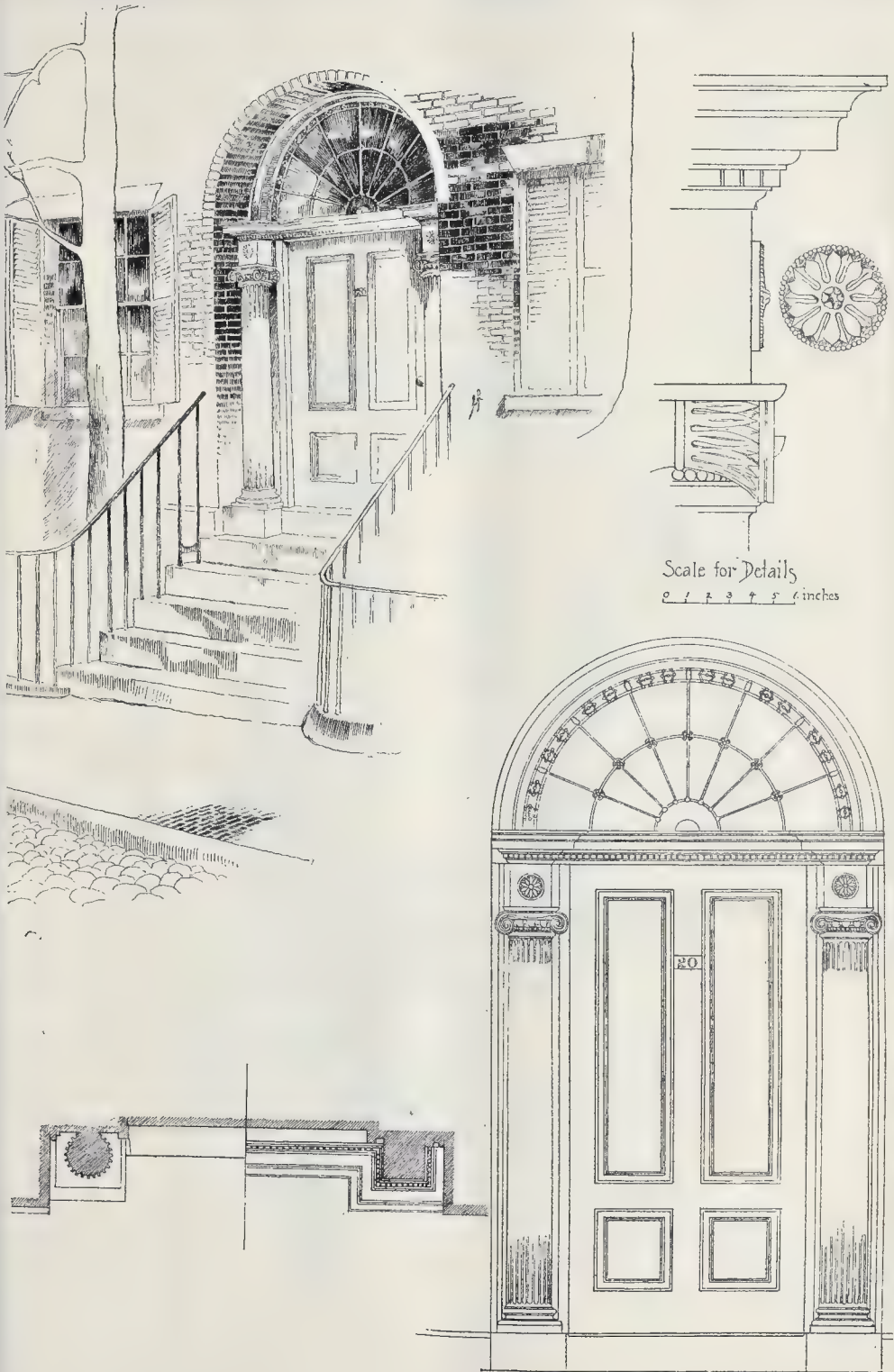
This is one of the examples of old Queen architecture transplanted to the United States "in good old colony times" (to quote Motley's favourite song), of which we have given some other illustrations already. The doorway is that of a house in Bulfinch-street, Boston.

**The City and Guilds' Technical College, Finsbury.**—The evening classes of the City and Guilds' Technical College, Finsbury, will re-open on Monday, Sept. 30. Instruction is given in the Applied Art Department in technical painting, modelling, and designing, art metal work, furniture design, and cabinet-making. Special courses are given for carpenters, plumbers, bricklayers, metal-plate-workers, and the building trades generally. Classes are also held for those engaged in electrical, mechanical, and chemical industries. In connexion with all the courses of lectures there is a corresponding course of practical instruction in laboratory, workshop, or drawing-office. The main object of the College is to impart sound instruction to prepare students more for industrial purposes than for examinations. Apprentices under twenty are admitted at half-fees.

**The Leicester Borough Surveyorship.**—The Standard reports that at a meeting of the Leicester Town Council, held on Tuesday last, the Highway Committee recommended the appointment of Mr. E. G. Mawbey, of York, to the vacant Borough Surveyorship. The salary to commence with is 700*l.* a year.

\* See his letter in the *Builder* for Sept. 14, p. 194.

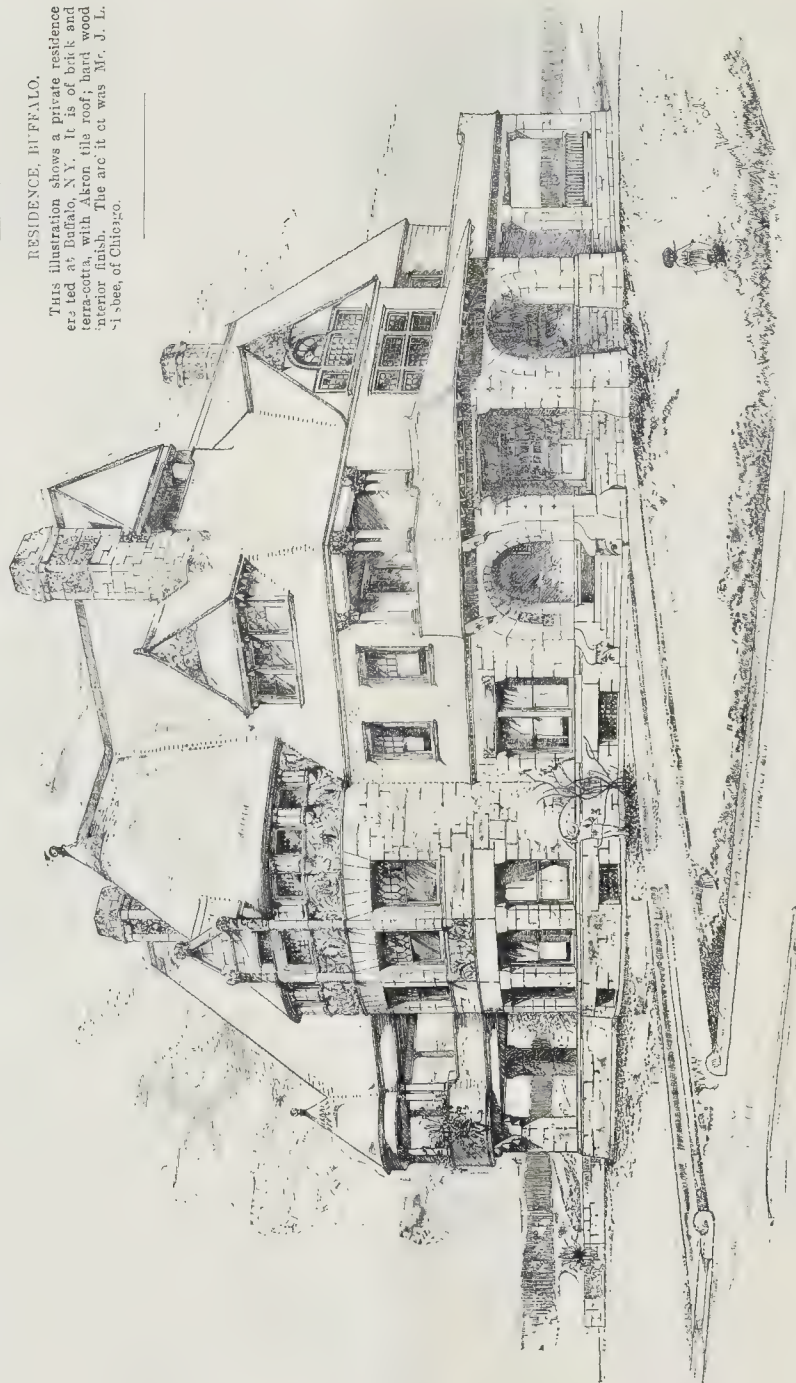




Old Doorway in Bulfinch-street, Boston, Mass.

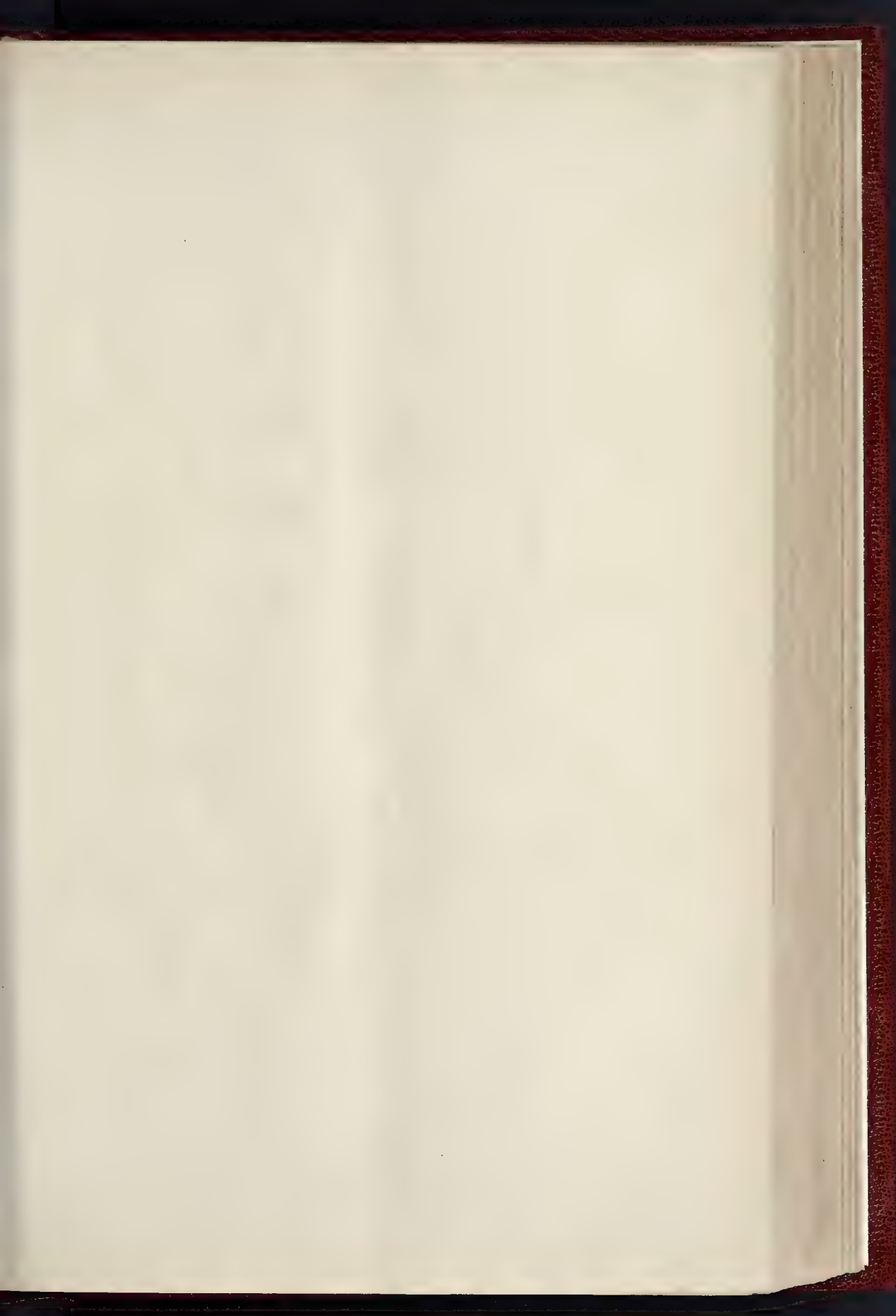
## RESIDENCE, BUFFALO.

This illustration shows a private residence erected at Buffalo, N.Y. It is of brick and terra-cotta, with Akron tile roof, hard wood interior finish. The architect was Mr. J. L. Slade, of Chicago.



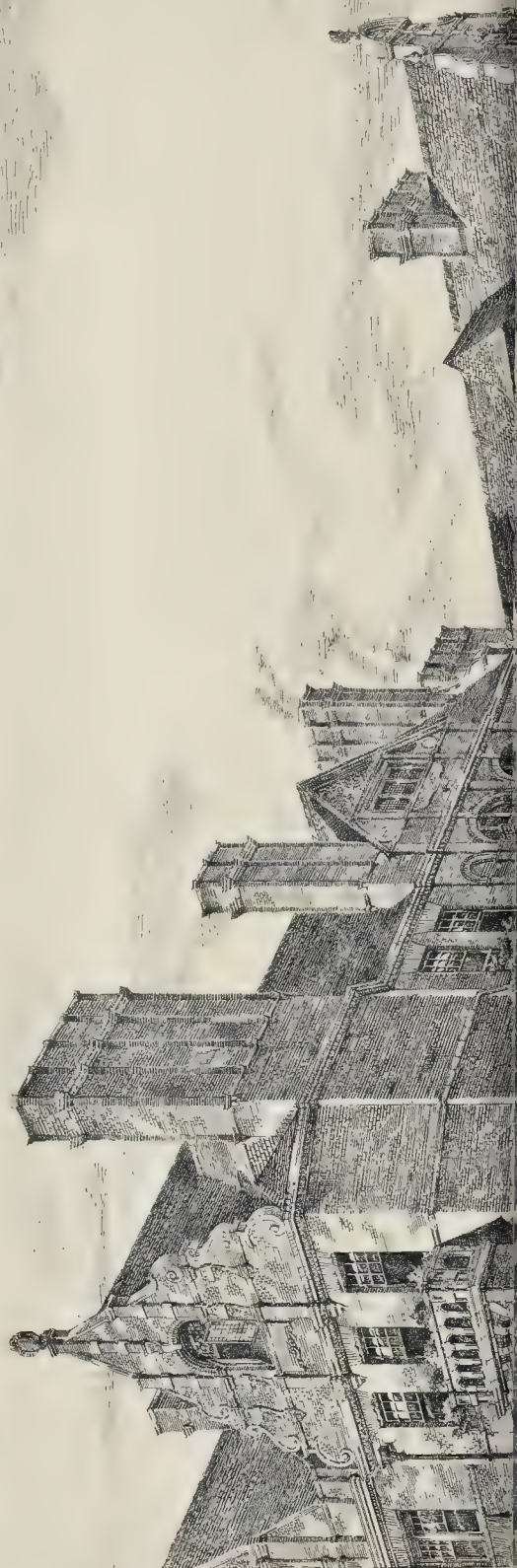
*Residence, Buffalo—Mr. J. L. Slade, Architect.*





THE BUILDER, SEPTEMBER 28, 1889.

# Two houses in Cadogan Gardens, *Westminster, W.C.*

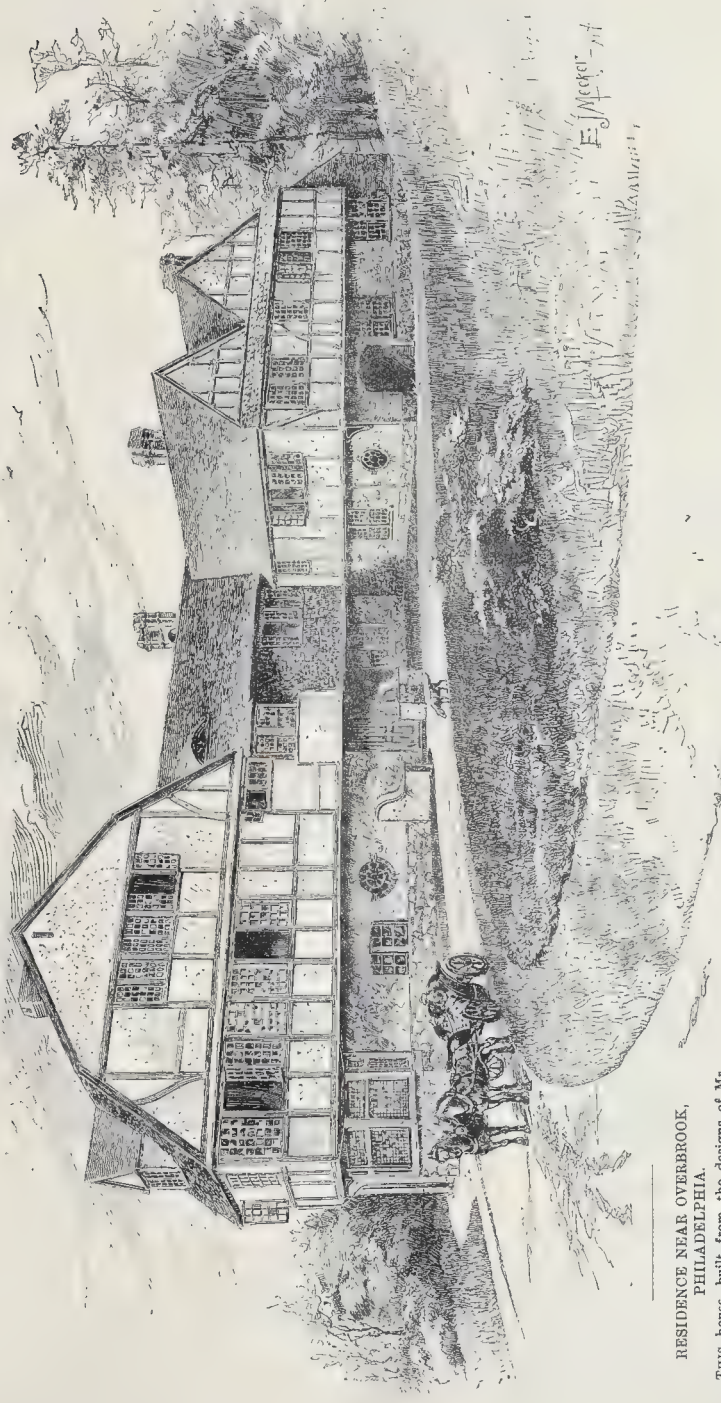












RESIDENCE NEAR OVERBROOK,  
PHILADELPHIA.

This house, built from the designs of Mr. Wilson Eyre, Junr., architect, of Philadelphia, is constructed in the lower story of local stone quarried on the spot. The second story is of half-timber work filled in with rough-cast.

*Residence near Overbrook, Philadelphia.—Mr. Wilson Eyre, jun., Architect.*



### ARCHITECTURAL ASSOCIATION VACATION VISITS.

THE last of this year's series of Vacation Visits was made on Saturday last by the members of the Architectural Association to the old Elizabethan manor houses of Maple Durham and Hardwick, which lie on the north bank of the Thames between Reading and Pangbourne. Maple Durham, the first house visited, was built in 1583 by Sir Richard Blount, and has remained ever since in the possession of the Blount family. In the Civil Wars it was fortified by Sir Charles Blount, Governor of Reading, on behalf of King Charles, but was taken by the Parliamentarians.

The house, on plan, consists of a long, narrow block, one room deep, with projecting wings at the ends. The entrance front faces a magnificent avenue of elms nearly a mile long, has a projecting porch at present of much later date than the house, and two bay windows forming a fairly regular façade. Several of the windows have been "improved" by the substitution of single-transomed lights instead of the older double-transomed arrangement. The width of the lights in each instance being similar, the contrast in the proportions is striking, and the "improvement" met with little sympathy from the visitors. The rear windows have in many cases been blocked up, thus depriving the rooms of their distinctive, if somewhat uncomfortable, feature of windows on both sides.

The exterior owes much of its present charm to the play of colour resulting from the mellowed tints of the old red brick and black diapers. Internally there is a wealth of interesting detail in woodwork, stone chimney-pieces, and plaster ceilings. The principal staircase is especially noteworthy for its soundness and thoroughness of construction, as well as for its beauty of design, both in general treatment and in detail. There are many pictures of interest and value in the house, though it is curious to note the preponderance of representations of Judith and of the daughter of Herodias. There is a domestic chapel, dedicated to St. Michael, attached to the rear wall of the house, but having been erected in the year 1800, it is of slight interest, and is, we hear, shortly to be replaced by a more modern structure.

The older manor house, a half-timbered building, still stands in close proximity to the Elizabethan house, and was inspected by the members.

A visit was paid to the parish church of St. Margaret, a late Perpendicular building, restored in 1863 under Mr. Butterfield. The south aisle is divided from the church, and forms the private chapel of the Blounts, many of whose memorials are here, as well as a fine brass of Sir Robert Bardolf, date 1385.

The picturesque almshouses, or Lyster's hospital, were also visited, after which the members proceeded to Hardwick House.

Hardwick House was erected in the reign of Richard II. by the Hardwicks, and part of the existing cellars are supposed to have belonged to the original house.

The property was subsequently sold to the Lybbs, who held it till 1730, when it passed by marriage to the family of the present owner. Like their neighbours at Maple Durham, the Lybbs were staunch adherents of the Royalist cause, and the house, consequently, suffered from the attacks of the Parliamentary forces. After the restoration of Charles II. it was repaired, and has subsequently been more or less modernised, but still contains much that is interesting, some of the ceilings and mantelpieces being exceptionally good.

**Architecture at University College, London.**—The classes for the study of Architecture, Construction, and Modern Practice, at University College, London, will commence for the session in the second week in October. Professor Roger Smith announces the usual public opening lecture for Thursday evening next, October 3, at 7.30 p.m. The subject selected is "Sir Christopher Wren and his Architecture." In the course of the lecture some reference will be made to Wren as an architectural draughtsman, and Professor Smith will give an account of the collection of Wren's drawings preserved at All Souls' College, Oxford, which he has recently visited for the purpose of preparing this lecture.

### Illustrations.

#### TWO HOUSES, CADOGAN-GARDENS, S.W.

THESE houses, which form a part of the Cadogan improvements, are in course of erection, the material being of red brick, with Cornham Down dressings. They are being built by Mr. H. J. Wright, from the designs of Mr. Fred G. Knight. The original drawing from which the illustration was taken was in the last Royal Academy Exhibition.

#### ST. PAUL'S, BEDFORD.

THE interior of the chancel of St. Paul, Bedford, is being now completed from designs by Messrs. Carpenter & Ingelow, having for some years remained unfinished after partial reconstruction from Mr. Gilbert Scott's plans. It was formerly the chancel of the monastic and parochial church, founded in Anglo-Saxon times, "without the old city walls"; and it then had a large cemetery attached, in which the body of King Offa was laid [796] in "royal fashion." There is no part of the present church earlier than the time of Edward I., for the Norman church had been destroyed by King John's sons. The side windows of the sacrum are, however, of this date, but the modern work is planned in harmony with the alterations made during the fifteenth century in the body of the church. The roof of the chancel is of this period, and it was raised to its present height under Mr. Scott's directions, as it cut across the heightened arches of the tower.

There still exist the ancient stalls and desks of this fifteenth-century period belonging to the prebendal college, which succeeded the earlier foundation some years after its reconstitution at Newenham by Simon de Beauchamp and his mother. These stalls are to be added to and replaced, with their return stalls and desks, against new parclose screens and a new rood-screen, in place of the ancient one; this ancient screen was removed some years ago when the central tower was rebuilt with wider and loftier arches, as advised by Mr. Street, and carried out under Mr. Palgrave. It does not, therefore, fit the modern arch, and it has, therefore, been carefully repaired and erected in the arch between the south transept and southern chapel. The designs for the new rood-screen are not yet carried out, but estimates have been prepared.

The levels have been raised and arranged in accordance with the relative ancient levels of the sedilia and sacristy doorway, and new steps are fixed of Derbyshire marble, while the floor is of Minton's tiles, designed by the architects, including in their arrangement some ancient ledgers, and others of modern times. Careful search has been made, without success, for the seat of Simon de Beauchamp, which Leland describes as being in front of the high altar, while a much worn slab, with the matrix J. A. Cross and two shields, has been laid within the sacrum; and a large one of the fourteenth century, supposed to be of "Muriel Calt," will be laid in its former position between the stalls.

The altar is of oak and walnut, painted by Messrs. Clayton & Bell; the re-table is of alabaster and marble, and on it will be placed the reredos of painted wood, the central subject of which is the Transfiguration. The modern window-cill is on the level of the ancient one of the chancel, of lesser height, but, in carrying out the new window, Mr. Scott's original and greatly superior design for a window of five lights was not adopted, much to the injury of the whole internal effect of the church. The proposed reredos will, however, rectify this defect.

R. H. C.

#### FLIXTON HALL, SUFFOLK.

FLIXTON HALL, Suffolk (near Bungay on the Waveney), was built by Sir John Tasburgh in the reign of Henry VIII. It was completely gutted by fire in 1847, the main walls only being left, and was soon afterwards restored by the elder Salvin, externally for the most part in the Tudor style, and internally in a kind of Elizabethan peculiar to himself.

Old engravings show pediments over the windows, but these were probably added later, and were composed of stucco. They were removed by Salvin, who restored the Tudor labels.

The present owner, Sir Hugh Adair, Bart., who succeeded his brother, Lord Waveney, has

undertaken extensive alterations and additions. The whole wing added by Salvin, containing the servants' offices, &c., has been pulled down and rebuilt on a larger scale, more in keeping with the style of the main building. The accompanying plan will explain other additions. The two new grand staircases at either end of the great hall are of oak, with elaborate balustrades. Various other internal works have been undertaken or are contemplated. The clock-tower is entirely new, and takes the place of a smaller one by Salvin of somewhat debased Elizabethan style, and the same may be said with regard to the north entrance porch. As executed, the tower is some 10 ft. higher than it is shown on the drawing.

Mr. John Thompson, of Peterborough, is the contractor. FAIRFAX B. WADE.

\* \* We may add to Mr. Wade's notes that the drawings were exhibited at the Royal Academy Exhibition this year, being among the few geometrical drawings in the architectural collection.

#### CONVALESCENT HOME FOR LADIES.

THIS convalescent home was designed for one of the South Coast watering-places, and would accommodate about fifty patients. Most of the patients would have separate bedrooms, and there are detached rooms for the use of those who have been suffering from any infectious disease, though this class of patient is not usually admitted into a home of this description. The main idea of the design is to make the premises look as homelike as possible, and unlike the usual institution. A large dining and drawing-room are provided, and a separate department for the matron. The cost of the buildings would be about £8,000. The drawing was in this year's exhibition at the Royal Academy.

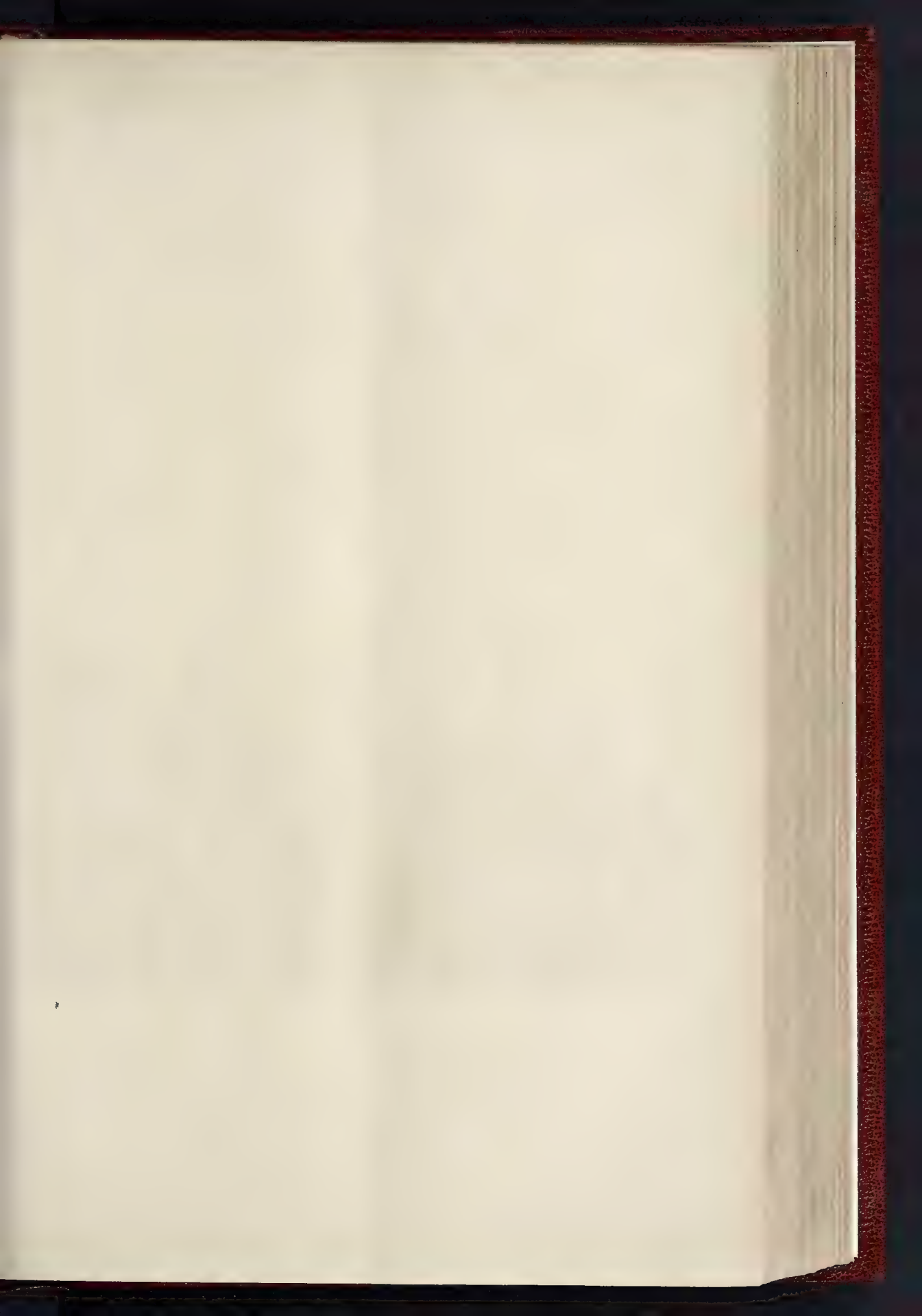
#### SANITARY CONGRESS AT WORCESTER.

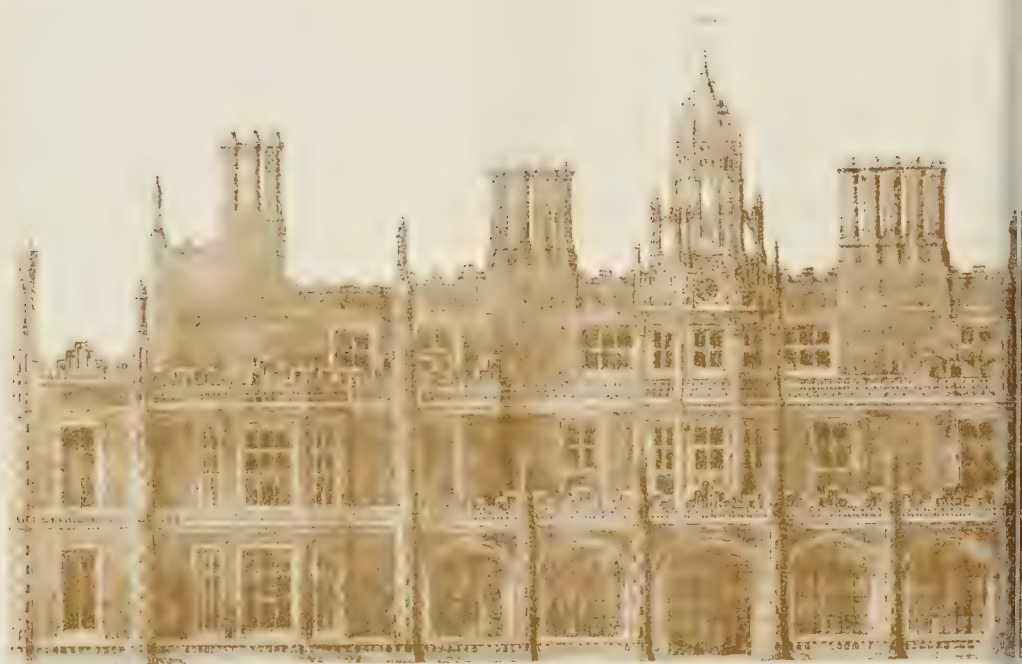
THE Sanitary Institute, having last year absorbed the Parkes Museum and obtained a charter of incorporation, has now resumed its autumnal Health Congresses and Exhibitions, and the Congress opened on Tuesday, at Worcester, under the able presidency of Mr. G. W. Hastings, M.P., bids fair to be a very successful one, both in point of the number of Members, Associates, and visitors attending it, and from the interesting papers read in the various sections. There are three sections, viz.:—I., "Sanitary Science and Preventive Medicine," presided over by Dr. George Wilson; II., "Engineering and Architecture," presided over by Mr. Henry J. Marten, M.Inst.C.E.; and III., "Chemistry, Meteorology, and Geology," presided over by Dr. J. W. Tripe, F.R.S., F.R.Met.Soc.

After the opening of the Exhibition (which is noticed in another column) on Tuesday afternoon a large number of ladies and gentlemen attending the Congress visited the famous Worcester Porcelain Works, of whose history and achievements the President of the Congress, Mr. Hastings, who is the chairman of the directors, gave (in the unavoidable absence of Mr. R. W. Binns, F.S.A., the Art Director) a succinct account. The specimens, chronologically arranged in the cases of the Museum attached to the works, and showing the whole progress of Worcester porcelain since the establishment of the works in 1751, were examined with much interest. Curiously enough, the works were established with a political object by Dr. Wall, a notable Worcester physician, who was a staunch Whig, and who sought, by the establishment of some local industry, to attach the people of Worcester to Whig principles. While this object was in his mind, he happened to be travelling in Cornwall, where he saw some kaolin or china clay, and this he determined to import into Worcester. Such was the commencement of these world-famous works. Mr. Hastings referred with pardonable pride to what he asserted to be a fact, viz., that French or other foreign artists have never been employed at Worcester, the productions of whose kilns are exclusively the result of native taste and technical skill.

The President, Mr. G. W. Hastings, M.P., delivered the opening address of the Congress on Tuesday evening, in the Guildhall. Sir Douglas Galton, K.C.B., as Chairman of the Council, took the chair at the commencement of the proceedings (in the unavoidable absence of the retiring President, Lord Basing), and installed the new President, remarking that it gave him the greatest pleasure to do so, on a



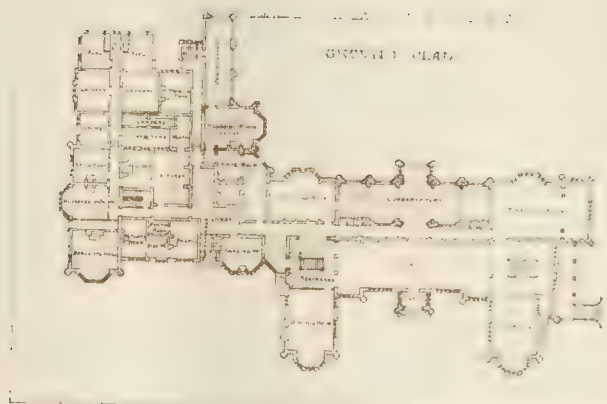


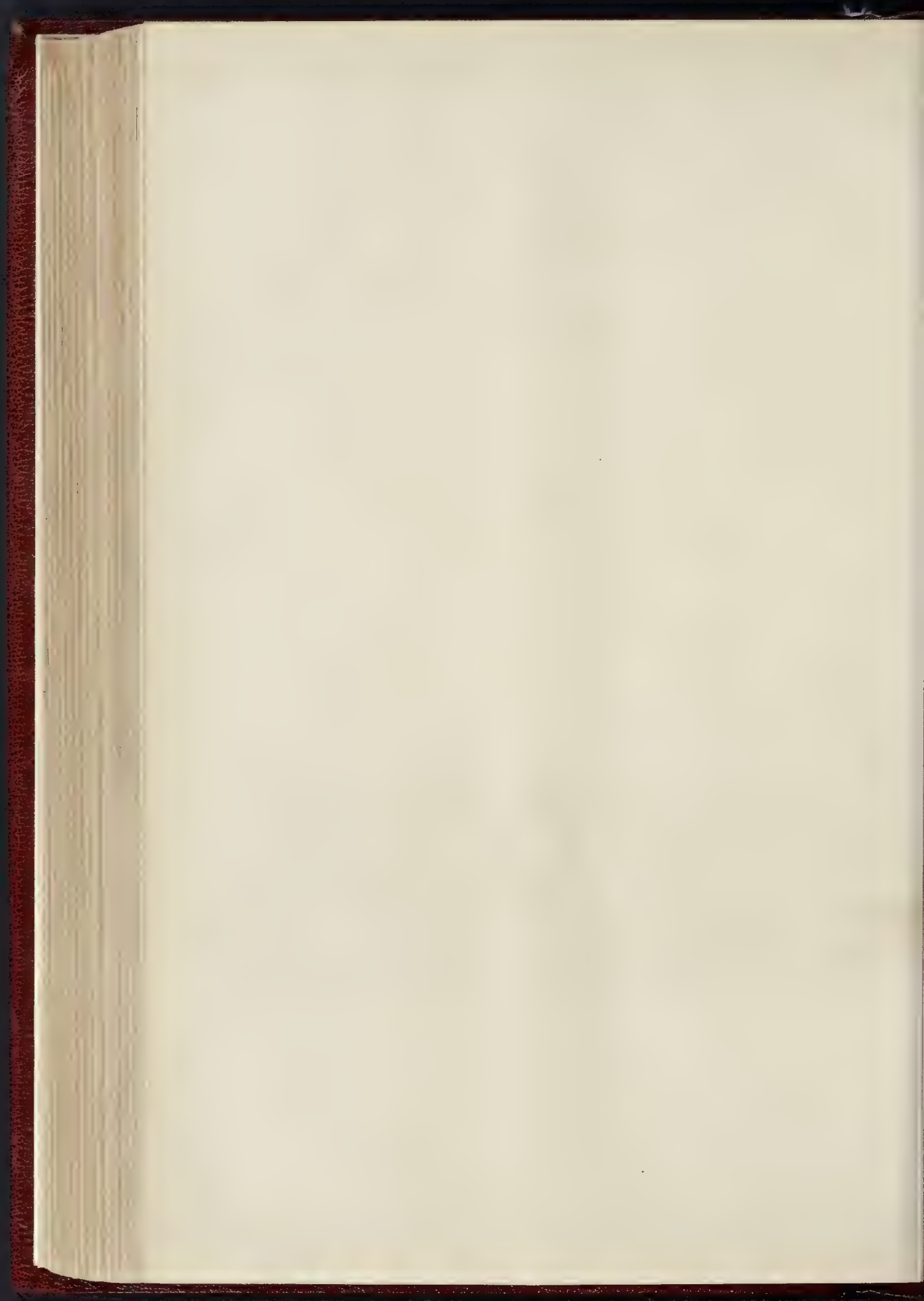


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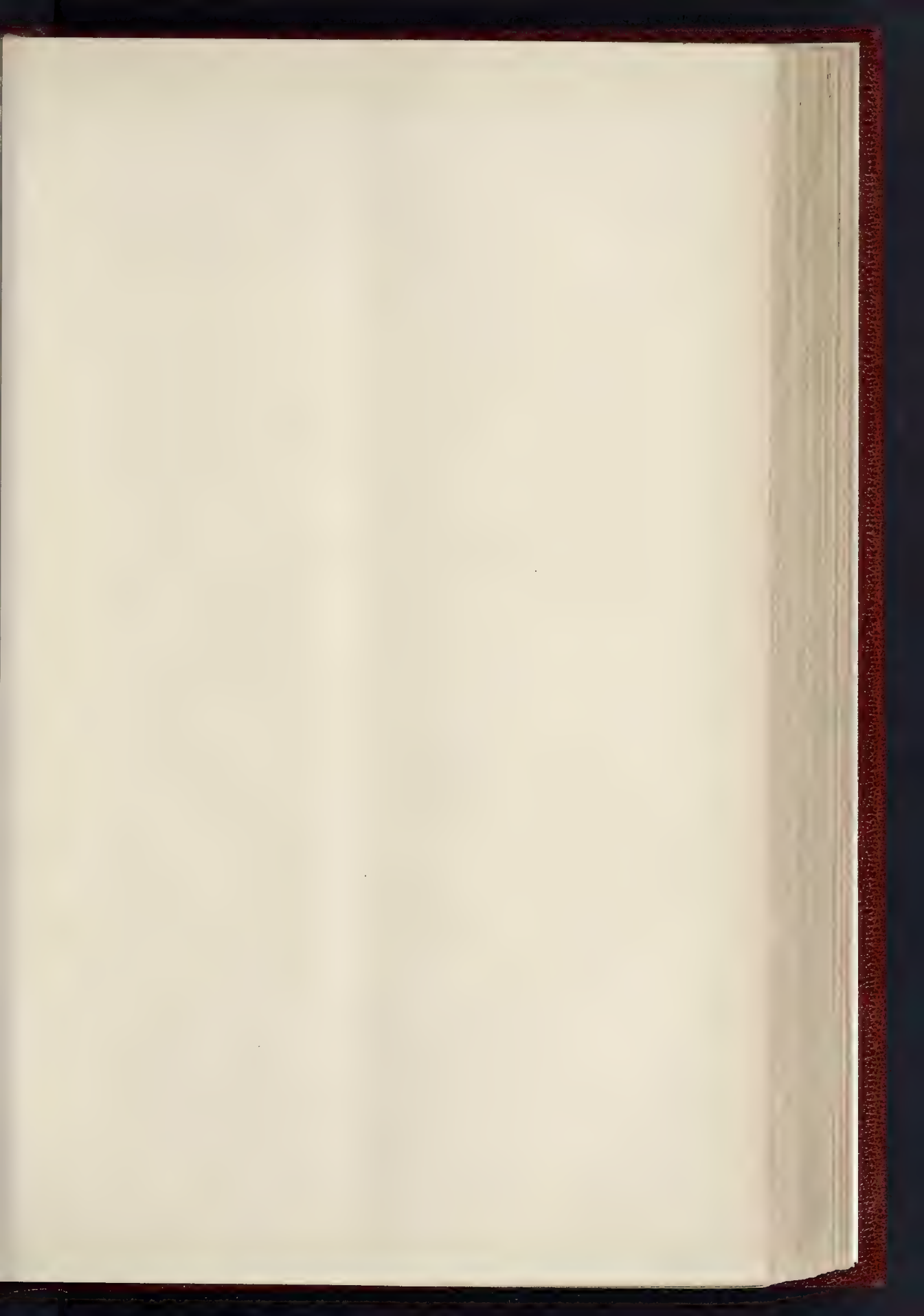
FLINTON HALL, SUFFOLK











THE BUILDER, SEPTEMBER 28, 1889.

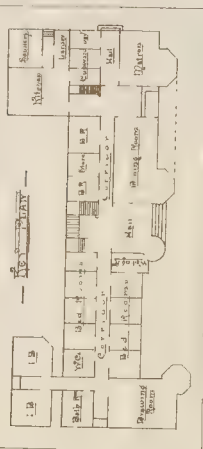


WEST ELEVATION

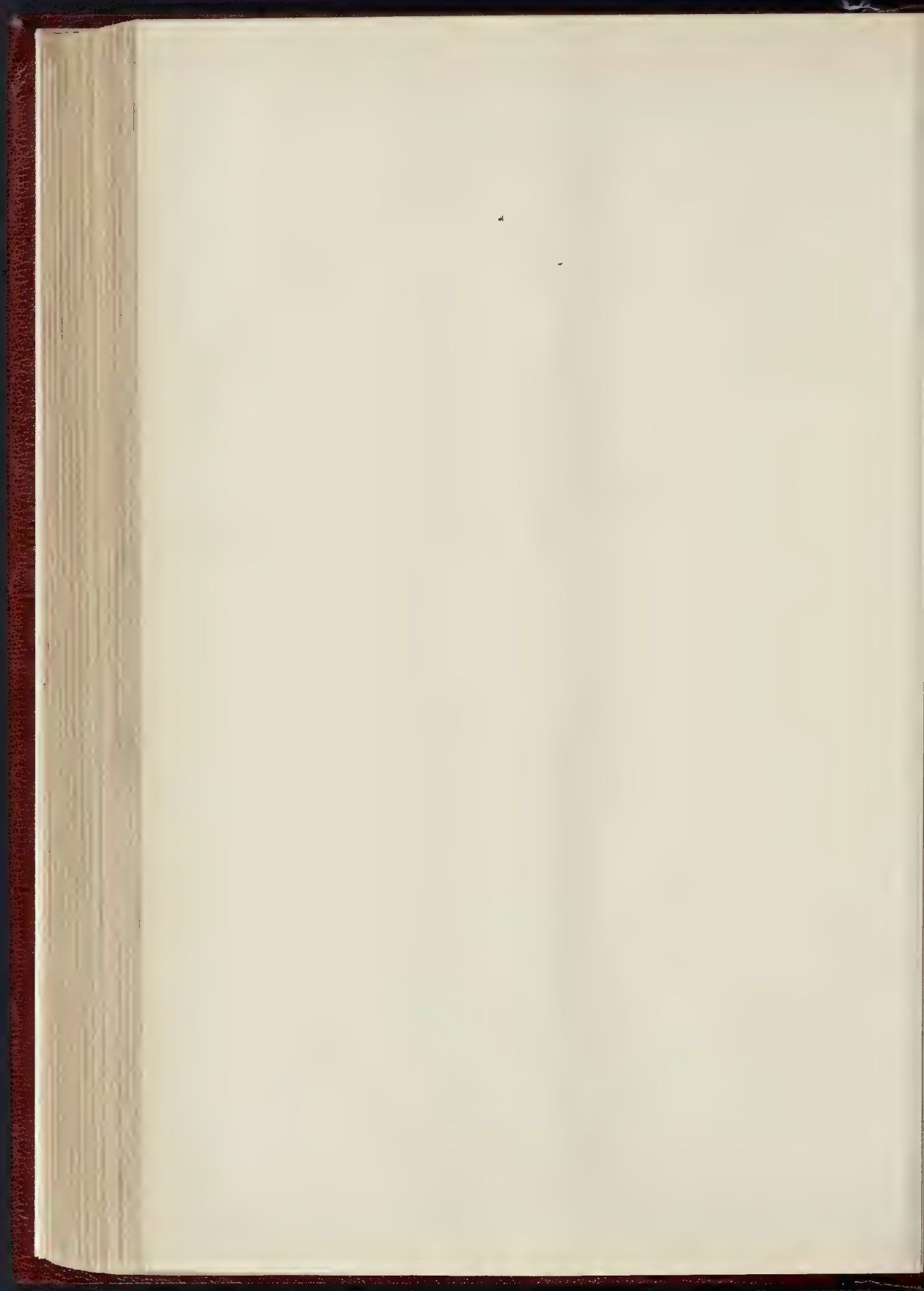


# Design for a Convalescent Home for Ladies.

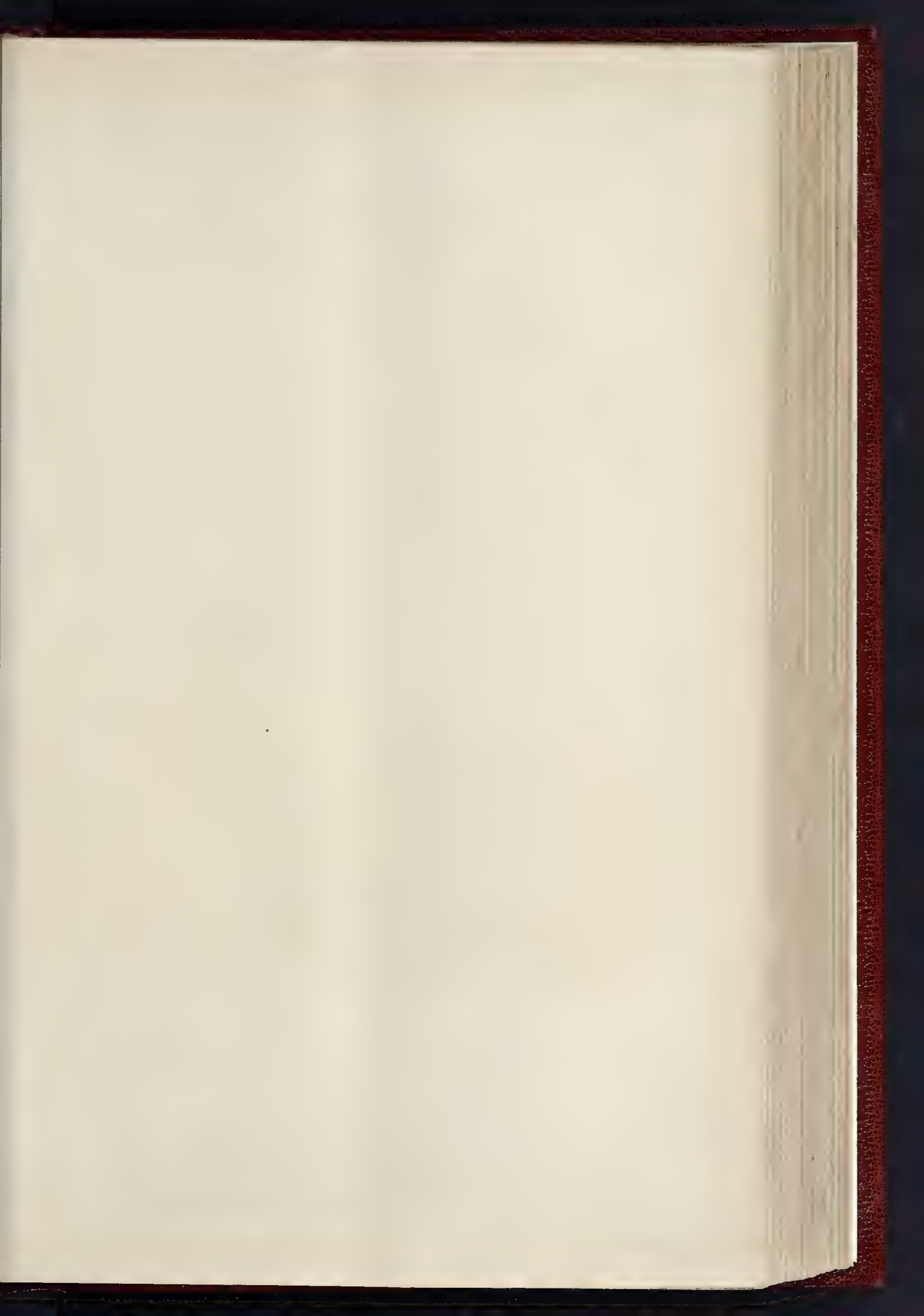
M<sup>r</sup> W. Hilton Nash, R.R. 134, Greenwich

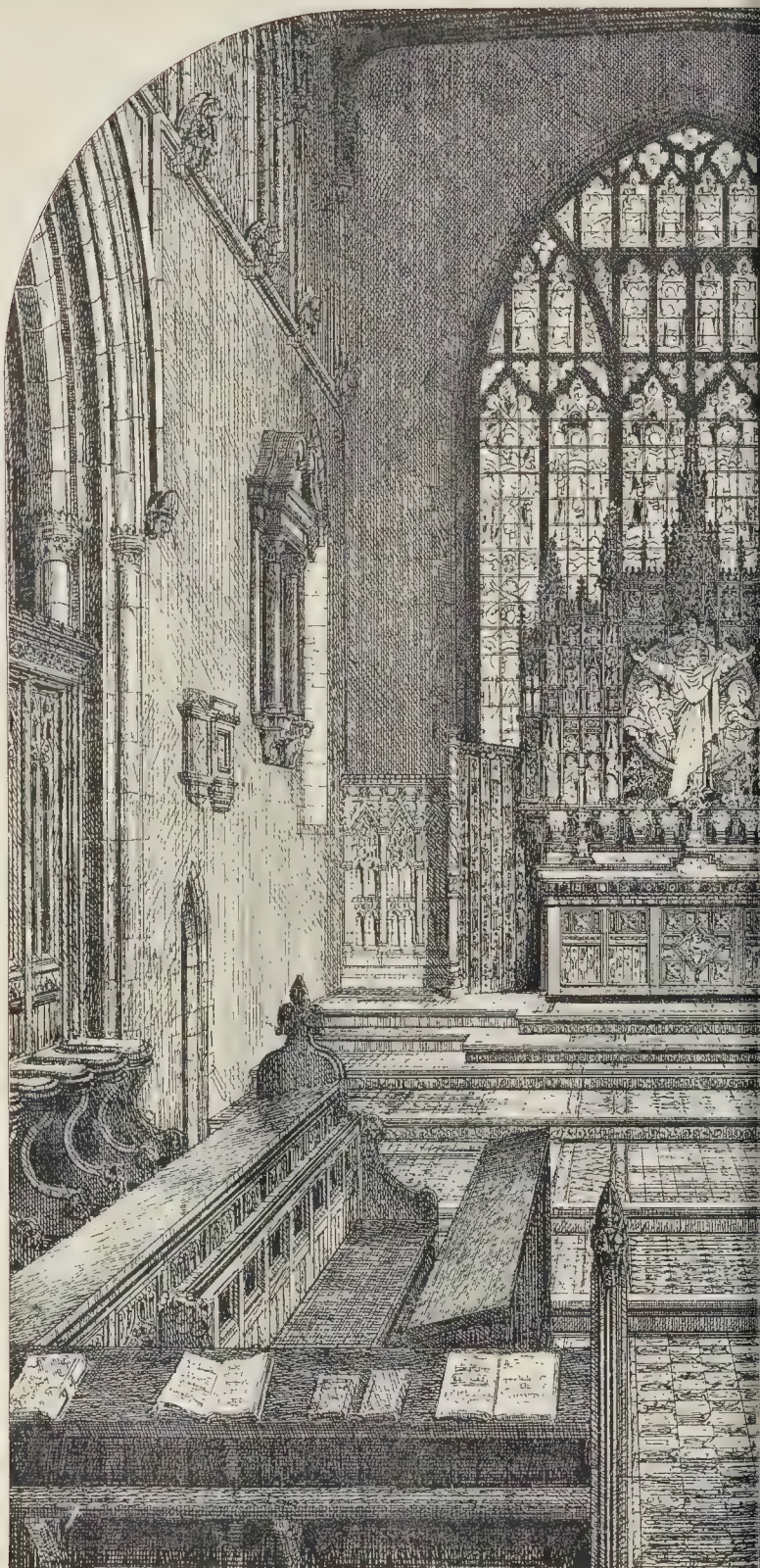


Elevation









ST. PAUL'S, BEDFORD · THE COMPLETION









account of the great service which Mr. Hastings had rendered, not only in connexion with the Social Science Association, but also in his capacity as a member of Parliament, to the cause they all had at heart. Mr. Hastings, in commencing his address, said that though he felt that he was better fitted to be a learner than a teacher at a gathering of that kind, yet he had two qualifications to speak on sanitary subjects. He had for some years served on the Police and Sanitary Committee of the House of Commons, and he had taken a great deal of interest in the work of the Social Science Association, a practically defunct body, upon whose ruins the Sanitary Institute had been largely built, and whose "Proceedings" were a veritable storehouse of valuable papers on sanitary subjects. He regretted that the father of sanitary science in this country, Sir Edwin Chadwick, was unable to attend. Sir Edwin's patriarchal age—bordering on ninety,—which made him unable to bear the fatigue of the journey to Worcester, was the only reason for his absence. In reviewing sanitary questions, it struck him that we had yet a great deal to learn before we could know all that was to be known as to the causes of public health. They would have to go more fully, for instance, into geological questions. He had been told that day that in Salisbury the effect of subsoil drainage had been to reduce the mortality from tuberculosis by one-half. But when one talked about drainage the question arose, Where was the product, the sewage, to be discharged? At first, the nearest stream was considered the best and the proper means for carrying it off; but they had learned better things than that, and were beginning to understand that the very last place into which they should turn their sewage was that which was intended by Providence to provide one of the first necessities of life to the population, and to afford delight to those who looked upon it. The Local Government Act had given greater facilities for preventing the pollution of rivers and streams, by placing in the hands of the County Councils extensive powers, and it depended upon those councils to decide in what way those powers were to be used. If those powers were used firmly and efficiently he could not doubt that a considerable improvement would take place throughout the country. In Worcestershire they had two fine rivers, which Providence intended for the supply of pure water and for purposes of healthful recreation. But neither the Severn nor the Teme in its present state was likely to be useful for these purposes. Having quoted the lines in which Milton speaks of the Severn as the nymph Sabrina, Mr. Hastings remarked that if John Milton were alive now, and able to look at some spots on the river where an outfall sewer was discharging the sewage of a neighbouring town, he would begin to think that if the tresses of Sabrina dropped anything at all, it was anything but amber. What he said of the Severn applied to a very large extent to the rivers throughout the land, and it would rest with the County Councils to use the powers Parliament had given them, powers the enforcement of which he was convinced public opinion would support if they were rightly exercised, and if it were determined that this pollution should go on no longer. The Worcestershire Council had already taken the important step of addressing the Councils of Herefordshire, Salop, Montgomeryshire, and other counties, asking them to unite with Worcestershire in forming a joint board for preserving the streams of the Severn and the Teme through their whole length from pollution. But he regretted to say that up to that moment their negotiations had been altogether fruitless. He hoped that wiser thoughts would yet prevail; for it was useless, or next to useless, for one county to take steps to prevent the pollution of a stream within its own borders if that stream were to suffer contamination in its course through the counties above. As a general thing, and wherever it was practicable, undoubtedly the best way of disposing of sewage was to allow it to flow in liquid form on the land, through which, its natural purifier, it could return to a neighbouring stream, without detriment thereto. They had a remarkable example of the success of such a system at Reading. In connexion with the matter of drainage, too, he would dwell upon the absolute necessity of employing skilled labour in the making of all internal fittings, otherwise an excellent system

of drainage might exist without being of service to a particular building. In this respect most excellent work was being done by the Plumbers' Company of London, in taking care that an efficient body of men should be available. Then it was important that all sanitary authorities should have good by-laws. The general law could only lay down principles; it was only through good by-laws that all the details of sanitary administration could be properly carried out. Then, in the matter of the occupations of the people, we were all apt to overlook the effects upon health of different callings. In the Royal Porcelain Works, which some of the members had visited that afternoon, the directors had endeavoured, by providing sufficient cubical space and good ventilation, and in other ways, to diminish the causes of ill-health; but still they were obliged to confess that the pottery trade was an unhealthy one, and this was the case with many other occupations. He saw at Newcastle the other day an invention for blowing glass bottles which was likely to vastly diminish the unhealthiness of that trade; and the inventor told him that under the old conditions of working very few bottle-blowers lived to the age of thirty-two, the average age attained being much lower. Very often, however, appliances intended to diminish mortality in unhealthy trades were disliked, and were not availed of by the men. It should be the business of sanitary reformers, therefore, not only to induce employers to adopt various means of removing the causes which hasten death, but to so educate the people in the knowledge of sanitary laws that they would be glad to avail themselves of these means. Then there was the question of food and drink. He would not dwell upon the subject of adulteration, but would speak of two matters on which they ought to exert themselves. It should be the constant endeavour of every sanitary authority to secure and maintain a water-supply which should not only appear clear, but should be absolutely pure and also of good quality. Then the importance of a pure milk-supply was very great. Several municipalities had applied to the Parliamentary Committee of which he had spoken for powers over the places whence milk was supplied to their populations, whether those places were within the boroughs or not, and he thought a general act ought to be passed conferring similar powers upon all municipalities. He was happy to say that last session an Act was passed which did confer on all sanitary authorities powers which had been exceptionally possessed by some of them. He referred to the measure providing for the notification of infectious diseases. A large number of applications for such powers had been passed by his committee during the last few years, and in no single instance had there been any instance of the misuse of those powers, or of any evil arising out of them. This, he thought, was a considerable proof that the possession of those powers had been solely beneficial, and he was convinced that in a great number of cases the system had been the means of stopping the spread of infectious disease at its outbreak. Infectious disease was very like a fire. A bucket of water might put out a fire at the beginning; a fire-engine might be impotent to stop it if it had half-an-hour's start. Just so with zymotic disease: deal with it at the moment of the outbreak, isolate the first case promptly, and the deadly foe might be stifled; leave it unchecked for a few days, and the result might be such an outbreak of scarlet-fever as at that moment was raging in Birmingham, where the very nurses had been stricken down, and the disease had the whole population at its mercy. He could not help remembering, and he hoped the people of Birmingham would remember, that a few years ago, when a Bill was passed enlarging their municipal powers, they had the opportunity of securing the power of making the notification of infectious diseases compulsory. The proposal was made and was recommended to them by those who knew the subject well, that they should have in their Bill the ordinary clauses for the notification of infectious disease, but in an evil hour they refused to adopt the system. He ventured to say that the present outbreak would have been impossible if their Medical Officer of Health had had the opportunity of knowing when the scarlet-fever first originated in the city, so that he might have taken steps to prevent the further spread of the malady. The measure of which he had spoken, and which was to come into force on October 1, would be compulsory in the

metropolis, but it would be permissive in the rest of the kingdom. He had had an amendment on the paper to make the Act compulsory everywhere, but it was found that the patriotic zeal of the Irish members, who had nothing whatever to do with the Bill, was likely to result in defeating it, and it was therefore thought advisable to drop all amendments, lest the chance of getting the Bill through should be lost. He trusted, however, that the good sense and patriotism of sanitary authorities all over the country would lead them to bring the Act into operation in their localities. By a system such as that, thousands of lives would be saved that otherwise unquestionably would be sacrificed. To those who, like the members of that Institute, had felt the pressing importance of all those great subjects, the whole question resolved itself into this: "Is it well to do good or to do evil, to save life or to kill it?" It was recorded of those to whom these words were first spoken that they held their peace. They were struck dumb by the Divine scorn of their hard-heartedness, and of their want of apprehension of the great truth before them. He was sure that none present that evening would require to have those words said to them. The very existence of that Institute showed that they desired to save life, and not to kill it. But there were, he was sorry to say, many in this land who, through ignorance—and he knew through ignorance only—were willing rather to kill life than to save it; that was to say, they were willing to indulge their own appetites, their prejudices, their opposition to change and improvement, rather than to take the plain truths that were laid before them, and to follow the path that was clearly pointed out to them. But the members of that Institute would still strive on, trusting that somehow "good will be the final goal of ill."

On the motion of the Mayor of Worcester (Mr. Ernest Day, F.R.I.B.A., who, as an architect, naturally takes a very great interest in sanitary matters, and has done very much to promote the success of the Congress), seconded by Mr. Michael, Q.C., a vote of thanks was passed to Mr. Hastings for his address.

On Wednesday morning the opening meeting of Section I, Sanitary Science and Preventive Medicine, was held in the Council Chamber of the Guildhall, when the President of the Section, Mr. George Wilson, M.A., M.D., F.R.S., &c., delivered his opening address. Turning to the sanitary aspect of his subject, as illustrated in the domain of Public Hygiene or State Medicine, Dr. Wilson said that it was in this direction that the policy of prevention had been attended by the most gratifying results, and year by year became fuller of hope and promise. The policy of prevention in its sanitary aspects might be said to owe all its success to the long series of skilled inquiries into the distribution of disease throughout England, and the circumstances by which it was regulated, which in the first instance were more intimately associated with the labours of Sir Edwin Chadwick, and later on with the distinguished public services of Sir John Simon. "The statistical returns of the Registrar-General furnish the fullest proof that the lowering of the general death-rate has been steady and continuous ever since the passing of the Public Health Act, 1872, when it may be said the administrative machinery of sanitation was first set in motion throughout the country by the establishment of urban and rural sanitary authorities, and the appointment of sanitary officials. Thus the average death-rate of the country during the five years ending 1870 was 22.4 per 1,000 of the population; during the five years ending 1875 it was 20.9; during the five years ending 1880 it was 20.0; during the five years ending 1885 it was 19.3; while the average during the last three years has been still further reduced to 18.7 per 1,000. This reduction from the average of 22.4 per 1,000 during the five years ending 1870 to the average of 18.7 during the past three years represents an annual saving of 95,000 lives. Or again, if we compare the average death-rate from the seven principal zymotic diseases for the same periods, I find that the reduction in round numbers represents an annual saving of 30,000 lives. All this is very gratifying, but it is when comparison is made between the death-audits of districts in which the Sanitary Acts are intelligently and conscientiously carried out, and those of districts in which they are still practically ignored, that we can appreciate still more fully the enormous saving of life and prevention of human suffer-



ing which yet await improved sanitation. Even in the healthiest rural districts, the abominations of foul privy cess-pits or deep midden ashpits polluting the air and endangering wells are still far too plentiful, while leaky drains are a constantly-recurring source of nuisance. And these dangers to health are, unfortunately, perpetuated in respect to rural dwellings, because the great majority of rural districts possess no urban powers, and have therefore no control over the structural details of the dwellings themselves or of drains and closet-accommodation. It is true that the Public Health (Water) Act insists upon a proper water-supply, but so long as there are no by-laws to regulate those other important details, risk of nuisance and well-pollution will continue. These are questions which sooner or later must force themselves on the attention of the newly-constituted County Councils, but there are others of perhaps greater moment. For though I am very pleased to be able to say, from my own experience and what I know of other districts, that in spite of legal defects and local shortcomings, sound sanitary progress has been made in many parts of the country, there is no disguising the fact that in the great majority of small urban and rural districts a do-nothing policy is still tolerated, if not encouraged. And this is mainly due to the fact that the unfair incidence in rating naturally enlists the opposition of farmers and others to any village schemes of drainage or water-supply from which they themselves derive no direct benefit. Then, too, there is another great stumbling-block to sanitary progress in small urban and rural districts to which I would allude with all due deference. Sanitary officials are plentiful enough; indeed, there can be no question that the country is over-officed, but they are not always well trained, and when well trained they are not sufficiently protected for the full and fair discharge of their duties. The great majority of the Sanitary Inspectors are elected from year to year, or for short terms, while, with comparatively few exceptions, the Medical Officers of Health are still further hampered by the conditions involved in carrying on general medical practice. I know I am trenching on somewhat delicate ground in once more alluding to the relations of the medical profession to the policy of prevention, but I cannot help asserting that in small urban or rural districts Medical Officers of Health who are in active general practice are heavily handicapped in the discharge of their duties. If, as in some cases, they endeavour to discharge them efficiently and without fear or favour, they run the risk of coming into collision with some of their best patients, and in any case they cannot expect the cordial co-operation and support of their rivals in practice. They are generally paid to do little, and as a rule they do not feel bound to exceed the limits laid down by their salaries. This was abundantly proved by the reports of the special inspectors who were sent by the Local Government Board throughout the greater part of the country some two or three years ago to inquire into the state of preparation of various Sanitary Authorities against an invasion of cholera. I am proud to say there are many exceptions, but the exceptions prove the rule; and a zealous and conscientious officer always runs the risk, when the period of re-election comes round, of being relegated back to the sole charge of his patients. On the Medical Officer of Health depends in very large degree the motive power of sanitation, and for this purpose he should not only be well-trained, but he should be appointed over an area large enough to occupy his whole time, and be debarred from private practice. As to the question of cost, nothing is more certain than that the system under which the medical service of the country generally has been hitherto carried out exhibits an unnecessary waste of resources, and that a much smaller number of officials properly organised would do much larger and more effective work, and, in all probability, at considerably less cost to the ratepayers. I have been induced to refer more particularly to these obstacles and difficulties connected with rural sanitation, because public health progress in the larger towns, considering the enormous difficulties which had to be faced, has made much more rapid strides than in smaller towns and scattered country villages. But in towns and villages alike, though in villages far more than in towns, the policy of prevention must always depend in great measure upon the sanitary condition of the home and its surround-

ings; and this applies as much to the mansion as it does to the humble dwelling, and often more so. When people move into other houses they are generally assured in the most explicit terms that the sanitary condition is in every respect most satisfactory, but how often does it happen that in a comparatively short time the doctor has to be called in for indefinite ailments, bad throats, or something worse? Cases of this description are so notoriously frequent that it should be laid down as a rule that every tenant in search of a house should have the sanitary condition carefully inquired into by some competent official, and any defects removed before he takes possession. In London, Edinburgh, and several other large towns, there are Sanitary Protection Associations, which undertake to make such inspections; but it would, I think, be a wise economy on the part of Sanitary Authorities generally if they themselves should undertake this most necessary work by appointing their surveyors, or other properly-trained officials, at fixed salaries, and charging fees on a fixed scale, which could be regulated according to rateable value.—the fees, of course, to be handed over to the Sanitary Authorities. Such inspection should also be made to apply to all schools, whether public or private, to hotels, boarding houses, and lodging houses." In conclusion, Dr. Wilson discussed the question of the notification of infectious diseases.

Dr. W. Strange, Medical Officer of Health, Worcester, next read a paper entitled "Results of Fifteen Years' Sanitation in the City of Worcester." He said that Worcester, like most other towns in England, did not appoint a Medical Officer of Health until the Act of 1872 rendered such appointment imperative. The person the Authority appointed was himself, consequently he had had the work of sanitary amelioration in his own hands from that time to the present. He had had the support, during the whole tenure of his office, of an active and intelligent Health Committee, and they had now, since the enlargement of the city boundary, two Nuisance Inspectors, one of whom devoted his time to a regular house-to-house inspection, whilst the other, the senior, supervised the general work of the office, attending to every case as it arose, and acting as the Executive Officer of the Health Committee. The population in 1881 was 33,201, and was now, with the enlarged area, about 43,000. "Worcester is an old city, dating from the time of the Romans, if not earlier. It was a walled town, and, therefore, was compressed within narrow limits. Its poorer population was crowded in narrow courts and alleys, behind the dwellings of the more opulent classes, with little light and fresh air, and plenty of dirt and filth of all descriptions. Although, of course, some amelioration was made during the centuries before this, the sanitary condition of large parts of the city, twenty years ago, was about as bad as it could be. I fortunately possess a record of its condition at the time of the passing of the Act of 1866. We were, at that time, threatened with an epidemic of the cholera, not the first by any means which had attacked this city. A Vigilance Committee was appointed to examine into the real state of the city, and in a report written by myself and presented by that Committee to the Town Council, I find the following items:—'The visitors, who made a house-to-house inspection, discovered and reported over one thousand nuisances; comprising dwellings overcrowded by two or even three families living in them; overflowing privies and cess-pits of enormous size, never properly emptied; houses unconnected with any sewer, supplied with water from surface wells, in most cases polluted with sewage and drainage; courts unpaved, unlighted, and unventilated; windows not made to open, and the interior of the dwellings filthy with the absorbed matters of years. Epidemics of zymotic disease are frequent; in one quarter alone scarlet fever was said to have carried off 300 persons; and the report goes on to say that epidemics which are intensified, if not caused, by accumulations of filth and the use of polluted water, strike hard when they visit this city. That typhoid fever is endemic in Worcester, and is clearly caused by foul drains and privies, and the use of polluted well-water.' The death-rate at that time ranged from 26 to 27 per 1,000, or thereabouts. At the time of my taking office, in 1873, it was 25.6. The first proceeding to be taken was naturally that of obtaining information. A house-to-house survey was made, by which notice was taken of the numbers living in each house; the numbers living in courts and alleys; the con-

dition of the dwellings as regards cleanliness and waterproofing; of the drainage and water supply; of the soil, paving, &c., of streets and courts; and other similar facts, such as privies, water-closets, and cess-pits. As a short summary of the condition of the population discovered by this survey, I may state that the number living in courts was 3,145, occupying only 1,656 sleeping rooms, many of them containing more than one family,—911 families living in 441 houses. The inmates of 466 houses used water from superficial wells situate on these premises. 1,847 common privies, with their immense and foul pits, supplied the wants of the courts, alleys, and other crowded parts of the city. Many of these privies did duty for the inmates of three houses, or from twenty to thirty individuals each. There was no regular removal of the contents of these pits, which were emptied only when they became unbearable, and when the farmers could find time to send their carts for their contents. The streets were badly paved, and the soil in the lower and closer parts of the town was almost always damp and polluted with foul organic matters. To the credit side of the account must be placed the recent supply, complete and constant, of good water from the River Severn—a new system of sewers, which has since been extended to every part of the city, and the connexion of the house-drains with the sewers was being rapidly carried forward. There was also one Inspector of Nuisances. The recommendations which I made to the Sanitary Authority as the outcome of this inquiry, were nine in number, namely:—1. The improvement of the courts and alleys (where these could not be abandoned), and other crowded places by every practicable means. 2. The closing of such houses as were unfit for habitation, and the compulsory repair of others. 3. The compulsory drainage of every house into the City sewers. 4. The provision of tap (or Severn) water to every house at present supplied by well, and the closing of that well, in case it can be shown that the water in it is impure, and likely to continue so. 5. The regular and efficient supply and care of gullies and ventilators in the sewers, and the connexion of all house-drains with them. 6. The enforcement of the law against overcrowding. 7. The improvement and alteration of the system of privy accommodation, both as to structure and number. 8. The institution of a system of cleansing all privies and cess-pits, so as to insure the rapid and frequent removal of their contents by the Sanitary Authority itself, and the encouragement, especially in new buildings, of the erection of water-closets. 9. The erection of a mortuary and post-mortem room. This report was dated Aug. 19, 1874. 10. The providing a suitable hospital for infectious cases, by fitting up a large house which had been previously used as a small-pox hospital, and which has proved admirably suited to the purpose, was recommended by me, and agreed to immediately after the adoption of the above report. If I have wearied my audience with these preliminary details, my excuse must be that I have wished to show how easily all the worst sanitary evils may be remedied, and an unwholesome and dirty town made clean, healthy, and pleasant to live in, by the enforcement of the law, steadily, incessantly, with tact, and in some cases, forbearance, by the authorities, and by vigilant and active sanitary officers. The first necessity for health in a population is a plentiful supply of good water. Our earlier fathers knew this fact well, and never built a house without first securing good water. It was the reckless and rapid building in all manner of places, careless of any other condition, so that the dwellings were placed near enough to the places of work, which culminated about the middle of this century in large towns, or parts of towns, where this and almost every other sanitary necessity were totally neglected and passed over. The next necessity is proper and sufficient drainage. With these two prime requisites to hand, the problem of converting Worcester from a malodorous, dirty, and unhealthy city, to one sweet, clean, and salubrious, was one to be solved *ambulando*.

With regard to our water supply, it is and has been for many years constant and abundant in quantity. It is filtered, and every house is, or may be, supplied with it at the very moderate cost of 5d. per 1,000 gallons. Nevertheless, being drawn from the river Severn, it is open to the charge of being more or less polluted by the drainage of many towns, fields, and farmyards. With regard to the possibility of re-



moving or neutralising these noxious matters, opinions, as you are aware, differ. Pending the adjustment of scientific opinion on this point, we have lately cast about to see if a purer water could not be obtained that that derived from the Severn. Amongst the Lickey Hills, between here and Birmingham, water is obtained from artesian wells of the very purest quality, and we have discussed the question of substituting this water, in whole or in part, for that of the Severn. . . . Our main drainage, begun thirty-five years ago, is now carried into every street; and every house-drain, with a very few exceptions, is connected with a sewer. In some places, owing to the almost dead level on which parts of the city are built, there is not sufficient fall. This evil, however, time and experience have taught us to remedy by extra flushing. Flushing-tanks have been placed at the head of nearly every sewer, and at many junctions; and others are added at any spot which seems to require them. . . . The present condition of our city, then, you will well believe, offers a striking contrast to what it did in the year 1866, or even in 1872. We have cleansed and dried the soil by paving the courts and back yards, and the abolition of cess-pits; by good house and privy drainage; by the substitution, almost universal now, of water-closets for the old-fashioned privies; and by the paving of most of the streets with granolithic pavement. . . . I am aware that I have now exhausted the time allotted to me. I am anxious, however, with your kind indulgence, in a very few words, to tell you what effect our sanitation has had upon the health, comfort, and lives of the inhabitants. At the beginning, in the year 1872, the death-rate was 25.5. Last year it was 18.74, or a reduction of nearly seven per 1,000, on a population of 43,000, a saving of three hundred lives per annum. This year, up to date, the rate is only 14, and every year holds out a prospect of still further reduction. But of more consequence than the death-rate, which is still kept too high by the abnormal deaths of infants, is the improvement in the general health of the population.

Further proceedings of the Congress shall have attention in our columns next week.

#### CONCRETE FLOORS.

SIR.—Mr. Mark Fawcett [p. 211 ante] errs in regarding simple slabs of concrete as fit only for the floors of houses of the very poor.

For at least six years I have employed them in my own practice, not only for warehouses, but for counting-houses, offices, restaurants and dwelling-rooms, in buildings of decidedly superior class. With good linoleum or carpet, they are as comfortable or as luxurious as wood floors, and have the inestimable advantage of being not only fire and water proof, but also vermin-proof.

As to ceilings, any ceiling of mere plaster-film is as inferior to a homogeneous ceiling done by the waterproof-centering method described in my papers, as vincer is inferior to solid mahogany.

Mr. Hyatt, in his kindly way, speaks of my "ideal concrete floors" as being "as much of a chimera as perpetual motion." How am I to reconcile Mr. Hyatt's view with the fact that I myself, and other architects to my knowledge, have constructed considerable areas of such flooring; and that has gone on for years bearing exceptionally heavy work in some cases, and in all cases enduring the work required of it?

I content myself at present with this reminder to Mr. Hyatt, that I am not an idle propounder of new theories; but a practical architect, simply telling what I have learnt and seen in my actual work.

I should much like to deal with the theory of the neutral axis to which Mr. Hyatt refers, and to point out where (in this very theory) he misses the mark; but I feel afraid of further extending this correspondence by discussing abstractions at the risk of wearying your readers.

Has Mr. Hyatt, while insisting on excess of tension, forgotten that when we cover spans with a material strong compressively but weak in tension,—as, for example, brick or stone,—we keep that material, as in arches, vaults, or domes, clean above the neutral axis, with the compressive force so "decidedly in excess" as to leave the tensile force nowhere? But when, on the other hand, we have to deal with material,—as, for example, wire,—strong against tension, and weak compressively, we stretch it across spans, as between telegraph

pole and pole, clean below the neutral axis, so leaving the whole wire in tension. A concrete floor-slab, with slightly-curved soffit, is in the same condition of stress, not as a telegraph wire, but as the crown of a vast dome or vault.

Certainly, horizontal cleavage does occur, as described by Mr. Hyatt, when vertical structures, such as columns, pillars, or walls collapse by bending rather than by direct crushing. But when horizontal structures, such as beams, break by bending, their cleavage is vertical. And this is true, not only of concrete, but also of all building materials. Cleavage is always, necessarily, transverse to the stress which causes it.

FRANK CAWS.

\*\*\* We have received a long letter from Mr. Sutcliffe in reference to this subject, which we are obliged to defer till next week.—ED.

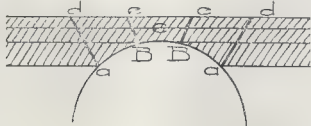
SIR,—In your issue of August 10 I see a letter on concrete flooring. I agree with Mr. Thaddens Hyatt that concrete beams should always be made in one operation of a simple mass of the plastic material. It is frequently specified that the material is to be put in layers of not less than 6 in. or 9 in., and thoroughly rammed; the surface to be picked up before the next layer is put in. I was at one time of opinion that this was the proper course to follow. But experience has proved to my satisfaction that this is a mistake.

I have found in many instances that, no matter what care has been taken in breaking up the surface of the completed layer, the second one will not form with it a homogeneous mass.

I have had a considerable experience in the construction of the Imperial offices at Simla, which were constructed of iron and concrete. I had to break down some of the walls owing to their surface having been injured by frost before the material had sufficiently set to resist its action; and I found that each layer could be removed from the one below it, leaving a distinct surface corresponding with the finished surface of the lower layer, though each layer would break off in a solid mass.

It is impossible to avoid building walls in layers or courses, but all arches or beams over openings should be made in one operation. It is far more important to do this than to secure solidly by ramming over ramming; for ramming continued for too great a length of time is injurious to the material, as it disturbs it in the process of setting.

In forming arches over openings (which by the way are not arches in reality, but corbelled beams), it is preferable to put in the whole of the required material at one operation, as if laid in layers. Horizontal joints will be the result, weakening the corbel (at A and B, see sketch), and it is evident that the upper portion



of the arch, which is really a beam, must be weakened if in two layers as at C.

If it is impossible to put in all the material at once the joints should be made to radiate as at A and B, which can be done by taking a little trouble, thus forming an arch proper,—but at best this is only a make-shift. I have found this plan answer, however.

As little water as will suffice to mix the material thoroughly should only be used, as its bulk when dried up leaves vacancies, also excess of water tends to separate the lime and other materials, particularly at the surface of walls and on the underside of flooring, as well as at the springing of arches. In working with hydraulic mortar it is necessary to keep the work damp for a considerable period after completion.

HENRY IRWIN, C.I.E., M.I.C.E.,

Late Superintendent of Works,  
Imperial Circle, Simla.

Mount Abu, Rajputana,  
September 1, 1889.

The Architectural Association's opening Conversation for Session 1889-90 will be held on Friday evening next, at the Westminster Town-hall.

#### ARTIFICIAL VERSUS NATURAL STONE.

SIR,—May I supplement my letter in the *Builder*, p. 211?

Really good, sound, hard, flag-stones, forming foot-pavements in town streets, when required to be cut for closers to break bond, at either end of a course, or for radiating joints in circular work, should be sawn with sand and water, sufficiently deep to enable the stones to be readily snapped; this, and every precaution should be taken to avoid damaging the material; good stone is worth taking care of, and many years are added to its life in consequence. We do not shoot a load of facing-bricks out of a cart, as though they were macadam. But in the case of flagstones, a constant custom is to mark a line across a stone, to score and indent the line with punch and chisel, then to pound away at the back of the stone with a heavy hammer until the stone fall in two; it will be found upon examination that all the laminations have started in their beds, and the stone is permanently injured, and made ready for destruction by frost.

At the principal Yorkshire towns the Town Surveyor goes to the quarries and selects only those stones that have been lifted from the hardest beds, and are sound: he sees with surprise hundreds of tons of inferior and damaged stones, such as every Yorkshire architect would reject, leaving the quarry for London and southern towns, because, in quarry language, "they are good enough to send away."

As a building material, Portland stone for a variety of purposes is unsurpassed. But it is not the best stone in Great Britain for steps subject to the incessant traffic of London, even if the hardest beds be selected, which they seldom are. I require, in my work, a quarry-owner or stone merchant to send me a precise copy of the order for stone that he receives from the contractor; I often find some inferior stone substituted for that specified, such as Robin Hood (a soft stone) for blue hard Idle, the colour being similar; or the contractor's order has written in the corner, "Let it be soft."

If steps be made from carefully-selected stone of a kind most suitable for the purpose, such as Craigleith, the hardest Yorkshire, Ancaster rag, Weldon rag (both these rags will polish), or the bottom beds of Pennant, they will be preferred to artificial stone. For steps, Doulton's hard terra-cotta is superior to cement concrete.

TOWN SURVEYOR.

September 23, 1889.

\*\*\* We have found what is called "Eureka concrete" very durable for steps which are in constant use.—ED.

SIR,—Mr. Barnes, in his letter in your last issue, September 21, 1889, says that Portland stone can be had as cheap as Bath stone. This assertion on the part of a quarry-owner will have a damaging effect on the already too low prices of masonry. Portland stonework should command 20 per cent. more than the ordinary Corsham Bath stone, if it is honestly executed. Many architects specify "hard, brown Portland," not the soft, white stone that is often put in by some unprincipled traders. That is not the stone used in St. Paul's Cathedral and other old buildings. If the buildings of the present day are to stand the test with these, architects must insist upon having the hard, brown Portland stone, and make themselves thoroughly acquainted with it when they see it. Then I will defy any man to say Portland stone can be wrought at the same cheap rate as Bath stone.

I have challenged Mr. Barnes's remarks as I think it may mislead several of your readers.

J. WORNELL,

Foreman mason.

\*\*\* The remark escaped our notice in the original letter, or we should hardly have printed it without comment.—ED.

#### PORTLAND AND BATH STONE.

SIR,—In Mr. Barnes's letter, published in your issue of the 21st inst., he states that Portland stone "can be had as cheaply as artificial stone, terra cotta, or Bath stone." Most people will regard this statement as extraordinary, so far, at least, as Bath stone is concerned,—a slip of the pen, probably. The price of Bath stone delivered on rail is 11d. per cubic foot, while Portland is 1s. 4d., being 45 per cent. more. Besides this, every practical man knows that the cost of labour on Portland stone is very much more than on Bath stone.

What sort of Portland it is that can be had as cheap as Bath stone I do not know,—certainly not Portland stone similar to that used in the buildings named in Mr. Barnes's letter.

GEORGE HANCOCK,

Manager of the Bath Stone Firms.



## AN APPEAL.

SIR,—Will any of your readers give a little help towards a building now in progress that is being erected in the very remote parish of Coombe, Oxon; population 641; all agricultural labourers and no one near to help. When finished it will be a reading-room and coffee-house, from the designs of Mr. Wilkinson Moore, architect, of Oxford. To carry out the plans in their entirety money is wanted for the verandah, skittle-alley, and interior fittings of the house.

The smallest contributions would be most thankfully received, and can be sent either to Messrs. Child & Co., Bankers, 1, Fleet-street, Temple Bar, London, E.C., for "Miss A. Brooke's Reading-room Fund, at Coombe, Oxon"; to Mrs. Pinckard, Coombe-court, Witley, Surrey; or to Miss Adela Brooke, Coombe House, near Woodstock, Oxon.

ADELA BROOKE.

## The Student's Column.

## WATER-SUPPLY.—XIII.

## FILTRATION (continued).

HAVING, in the last article, touched on the general results obtained by sand in filtering on a large scale, we will reserve our remarks on its comparative advantage, or otherwise, over other filtering media, until the more prominent of these latter have also been briefly described. For many years it has been recognised that charcoal is an effective filtering substance, and engineers have frequently been urged to adopt it in lieu of, or in addition to, sand for waterworks filter beds. A sharp distinction has always been made between animal and vegetable charcoal, for the majority of authorities showed by experiment that the former was a powerful purifier in removing organic matter dissolved in water; whilst it was agreed that the latter was incapable of doing much in this respect. In fact, the purifying effects of animal, over vegetable charcoal, was so completely demonstrated that the latter, for many years, was barely alluded to as a filtering medium, certainly never on a large scale. Experiments in recent years, however, have shown that its value has been very much underrated. So far as the removal of organic matter in solution is concerned, it is true its position is not substantially altered from a chemical point of view, but as we have shown in our observations on the quality of water, chemistry is not wholly capable of determining the suitability of water for drinking purposes. Let us, therefore, consider vegetable-charcoal as a filtering medium.

The question as to the relative amount of organic matter in solution, removed by animal and vegetable charcoal respectively, has often formed the subject of direct experiment. Many results could be quoted, but, for the sake of an example, we may refer to some of the more important of them in respect of vegetable charcoal, arrived at by Mr. Edward Byrne, M.Inst.C.E. He showed\* that in one case, where he passed 5 gallons of water through a wood-charcoal filter, the filtering medium acted on the water in such a manner as to increase its natural amount both of organic and inorganic matter. This action ceased as regards the inorganic matter at the third gallon, after which the wood-charcoal commenced to have a removing effect, but not until the fifth gallon did it cease to increase the natural amount of organic matter in the water. From this it would seem that, at first, wood-charcoal has an injurious effect, but it would be interesting to know how much of the increase of foreign matter is due to vegetable, and how much to animal, organic carbon, and whether the addition of either, or both, is in any way deleterious to health. From the nature of the filter we should think it was not injurious in this case. The hardness of the water was only slightly affected. Mr. Byrne was of opinion, however, that had the experiments been carried further, most likely it would have been found that both organic and inorganic substances would be removed, though to a less extent than by animal-charcoal. For the 5 gallons of water passed through the wood-charcoal seemed to have been just sufficient to wash out those substances that were imparted to the water, and which interfered with its removing power. Precisely the same results were obtained from peat-charcoal.

Other observers have also agreed that wood-charcoal gives only negative results. Some,

indeed, have stated that it is absolutely inert in its action on organic matter in solution in water. From a general review of the scientific results, we may admit, perhaps, that a vegetable-charcoal filter does, very slightly, remove this matter after the first few hours' use, but it adds to it after the lapse of a few months. Of course, when in good condition, like other fine filters it keeps back a certain proportion of both organic and inorganic matter which was in suspension in the water.

But vegetable carbon, either in the form of charcoal or coke, is a powerful remover of micro-organisms from water, far more so than is animal-charcoal. This has been very ably demonstrated by Dr. Percy Frankland. From his remarks\* we may construct the following table:—

Filtering material.	Efficiency.	Organisms per cubic centimetre.		Reduction.	Approximate rate of filtration per foot per hour.
		Unfiltered water.	Filtered water.		
Fine wood charcoal	Initial (second day).....	2,998	0	100	0.22
	After one month's action.....	2,230	107	95	0.22
Coarse and fine wood charcoal mixed ..	Initial (second day).....	26,000	0	100	0.26
	After three weeks' action.....	2,230	508	77	0.59
Fine coke.	Initial (second day).....	26,000	0	100	0.59
	After three weeks' action.....	2,230	339	85	1.32
Ditto .....	Initial (second day).....	26,000	0	100	0.67
	After three weeks' action.....	2,230	219	90	1.03
Ditto .....	Initial (second day).....	3,000	0	100	—
	After five weeks' action.....	6,000	80	98.5	0.50

"It is thus seen," he observes, "that the efficiency of the fine wood-charcoal at the end of one month is less than that of the coke with the slow rate of filtration, but greater than that of the more rapid coke filters at the end of three weeks, the rate of filtration in the case of the charcoal being markedly less than in any of the coke experiments." When the rate of filtration through wood-charcoal approaches that through coke, the improvement in the water is, biologically, much less; although coke removes even a more minute quantity of dissolved organic matter in it than does vegetable-charcoal.

The result of his experiments led Dr. Percy Frankland to conclude that, as biological filters, wood-charcoal and coke held a much higher position than had previously been assigned to them, and that they were destined to be of great service in the purification of water. The student will, however, remember, what we have said about "bacteria colonies." Although vegetable carbon removes a great proportion of micro-organisms from water, the mere statement is not a sufficient guarantee of wholesomeness. Dr. Frankland admits this,† and even in the case of the best filtering materials, frequent renewal is necessary.

Pounded cinders have proved a good medium in regard to the removal of very finely-divided particles in water. Mr. G. Higgin, referring to the River Plate, says that the water contains such exceedingly minute particles of suspended matter, that after allowing twenty-four hours rest, only the grosser of them subsided, and the remainder imparted a yellowish appearance to the water, which it was almost impossible to get rid of. Repose even for three or four months scarcely made any appreciable change in its condition; and passing it through three folds of fine filter-paper had no effect upon it; whilst filtration through 3 feet of fine sand, at a rate so slow as  $\frac{1}{2}$  gallon per square foot per hour, effected no material improvement. Ultimately, he introduced a thin layer of pounded cinders in the sand, and this completely removed the yellowish opalescent matter of the water, rendering it brilliant and pellucid. This result was obtained with the filter running at the rate of 5 gallons per square foot per hour.

With regard to animal-charcoal, without going much into detail, we may say that authorities are not in accord with each other as to the benefit derived from this substance in filtering impure water. All are agreed that

when first used it is a very powerful eliminator of organic matter in solution, but, whilst some believe that this action is continued for a considerable length of time, the organic impurities being largely removed from the water by a chemical process, others deny this, saying that after the filter has been at work a short time, it not only does not purify the water, but assists in further contaminating it. The first-mentioned authorities argue that the organic matter extracted is entirely removed from the filter; whilst their opponents say that it is largely absorbed by the animal-charcoal, which, after being impregnated, commences to part with it to the water passing through, thus making the water worse in quality than before it was put into the filter.

The latter view, with certain modifications, has of recent years been gaining ground, and, from a general examination of the results of experiments, we are inclined to believe that animal-charcoal filters do remove a considerable quantity of organic matter from water, but, like the vegetable-charcoal, this action is much more effective when the filters are nearly new than when they have been in constant use for a short period. There seems to be no doubt that, in time, animal-charcoal often favours the development and growth of certain low forms of life, for experimentalists have shown that the water issuing from filters made of this substance is then frequently found to be charged with minute annelids, &c., apparent to the naked eye.

To further emphasise this, we may mention that Dr. Percy Frankland, in the same series of experiments above referred to, shows that water, after having passed through an animal-charcoal filter, instead of making a reduction of the amount of micro-organisms, actually, after one month's action, gave an increase of 447 per cent. There is very little doubt, however, that many of these are innocuous, and we are far from saying that the complete elimination (if this were possible) of all micro-organisms would produce the best water for drinking purposes. Some of them may, indeed, be necessary for the preservation of health. It would be well if some system of filtration could be found which would remove only the disease-producing kinds, but this ideal state of things will probably never be reached, and in the meantime the innocent have to suffer with the guilty.

## Books.

*Bibliographie der Klassischen Alterthumswissenschaft. Grundriss zu Vorlesungen über die Geschichte und Enzyklopädie der Klassischen Philologie.* VON E. HÜBNER. Zweite vermehrte Auflage. Berlin: Hertz. 1889.

WE gladly welcome a second revised edition of this invaluable Bibliography. The book is as handy and convenient as its title is cumbersome. The first edition appeared in 1876, and had its value been adequately appreciated outside Germany, we should scarcely have had to wait twelve years for a second. Of its use to literary scholars and philologists this is not the place to speak, but it will be obvious that the enormous strides made by classical archaeology in the last ten years made a second edition imperative for that department of the subject. The student may still bemoan the vast and widely-scattered field which he is expected to survey, but he can no longer complain that he does not know where to look for his material. Under the comprehensive heading, "Die Bildende Künste," he will find a bibliography of the books that have appeared in all European languages, not only on general questions of ancient art history and aesthetics, and the more important and conspicuous branches,—architecture, sculpture, painting, and numismatics,—but also the specialist works that have appeared on minor arts,—bronzes, terra-cottas, ivory work, vases, mosaics, and the like. Moreover, not only are the books noted in chronological and geographical order, but all important reviews that have appeared on them, and most valuable of all to archaeologists, all the scattered articles, monographs, &c., that appear in the various foreign periodicals. A full list of these periodicals is also given. The vast material of the book is rendered easily accessible by two excellent indexes, one for names of authors, the other for subjects,—indexes which, already, in the few weeks that have elapsed since the book appeared, we have had abundant occasion to test.

\* Min. Proc. Inst. C.E., vol. xxvii. (1886), pp. 202-4.

† J. Id., vol. xli. (1879), p. 272.

\* Min. Proc. Inst. C.E., vol. xxvii. (1887), p. 552.



**The Strength of Beams and Columns.** By ROBERT H. COUSINS, of Texas. London and New York: E. and F. N. Spon.

THIS little treatise, as might be supposed emanating from the pen of a civil engineer who formerly held the position of Assistant Professor of Mathematics at the Virginia Military Institute, Lexington, partakes of a decidedly mathematical character. In it, the ultimate and the elastic limit strength of beams and of columns is computed from the ultimate and the elastic compressive and tensile unit strength of the material to be dealt with. The results of these considerations are of the highest importance to the designer, as it must be borne in mind that the strains of compression and of tension in the fibres of a beam are directly proportional to their distances from the neutral surface, but the author attaches too much value to the comparatively new theory, when he supposes his results to be other than approximate, as this condition would require the quality of the material to be invariable. By deducing general formulae, for the moments of the tensile and the compressive fibre strains in a transverse section of a given shape, and equating them to one another, the relative distance of the neutral plane in which the so-called "neutral axis" lies can be arrived at by calculation. From this we can determine the areas in which the compressive and the tensile elastic fibre strain limits act, and thus learn whether the area upon one side of the neutral plane is being unduly strained while the area upon the other side is approaching its maximum elastic limit load, or whether destruction would ensue by means of continued extension or compression. The general conditions of the failure of struts, and the effect of lateral deflection on their strength, are carefully investigated by the author. Combined beams and columns, and the place they take in roofs and other structures, are also discussed, but the author expresses his regret that chapters upon "the strength of arches," "the deflection of beams," and of "beams of maximum strength with minimum material," are unavoidably omitted, because he was not fully protected by letters patent at the time of going to press. We also regret that the illustrations in this treatise are not so well produced by the publishers as the letter-press, and the many readers will regret that the unit stresses employed by the author are, throughout the book, expressed in pounds instead of in hundredweights or in tons per square inch.

**Solutions to the Questions set at the May Examinations of the Science and Art Department, 1881 to 1886.** London: Chapman & Hall; 1889.

THESE are six small grey-covered books containing the questions and answers on "Building Construction," by Professor Henry Adams; "Hygiene," by Mr. J. H. E. Brock; "Magnetism and Electricity," by Mr. W. Hibbert; "Principles of Agriculture," by Mr. H. J. Vebb; "Animal Physiology," by Mr. J. H. E. Brock; and "Elementary Physiographic Astronomy," by Mr. John Mills. These are most useful little books, putting questions and answers on the subjects treated in such a way as to make the student think for himself; and containing, in this form, a great amount of practical information compressed into a small space. The special object of the publication of these questions and answers of past years' examinations is, we presume to afford a guide and a degree of mental training to students tending to go in for future examinations, where they will not indeed meet with the same questions, but will have acquired a knowledge of the system of examination employed and of the kind of study required to prepare for it. Professor Adams' "Building Construction" book consists mainly of questions which are answered by reference to a separate sheet of diagrams given in a cover at the end of the book. The student is to make the explanatory diagram himself (or had better do so), and then compare it with the diagram given in the answers. The questions and answers in Mr. Brock's "Hygiene" book seem also exceedingly practical and true.

**Surbiton: Thirty-two years of local self-government.** By ROWLEY C. RICHARDSON, late Chairman of the Surbiton Improvement Commissioners. With illustrations. Surbiton: Bull & Son.

ITS handsomely got-up quarto volume does not pretend to being anything more than a

history of the facts attending the development of what is now one of the pleasantest and best-ordered residential neighbourhoods in the immediate vicinity of London. It can hardly be said that the result is what is called interesting reading, but it is a register of the principal facts in connexion with the growth of the district, its architecture, drainage, water-supply &c., and we may presume that the author, from his official position, had every means of obtaining correct information.

In reference to the history of the drainage of Surbiton, it is pointed out, and is a fact to be remembered to the credit of the Surbiton Improvement Commissioners, that when the Rivers Pollution Commission in 1864 recommended that sewerage should not be allowed to go "to what until then appeared to be the natural source of disposal," the Commissioners did not wait for the passing of the Thames Conservancy Act in 1867, but took voluntary action on their own part three years before this, with the object of disposing of the sewage otherwise than in the river.

A number of photographs of the principal modern buildings (mostly churches and chapels) are given, with particulars as to their construction and cost. None of these, to say truth, are of very much architectural value; but these illustrations will be of interest to residents in Surbiton, to whom the volume ought to be welcome as a history of their district.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

14,286, Artificial Stone. J. W. Ransome.

In the manufacture of artificial stone, it is usual to mix the materials—say Portland cement and sand—with water, and then to introduce the wetted materials into a mould or shape, to produce the block. In this invention the materials are introduced in a dry state, exposed to pressure, and water is admitted preferably from below. The materials then absorb only the necessary water, and set into a solid block, after which the mould is removed.

14,853, Brick, Tile, or Slab. G. Pankhurst.

In the improved form of these bricks, &c., they are constructed with ribs or projections which, forming a cavity, obviate the use of wall battening, lathing, &c., and provide a perfectly dry water-proof and fire-proof wall.

15,152, Brick Machines. J. Denham.

The improvements in this invention are principally designed to automatically count and register the number of bricks made, and a suitable mechanism is provided for this purpose.

15,176, Fireplaces. L. H. Teale.

According to this patent, the chimney is prolonged downwards behind the back of the fireplace, and an opening or door is provided by which the falling soot may be removed. Under the bars is an ash tray or drawer and as much firebrick as can be conveniently used in the construction is employed.

15,203, Drains, &c. I. Shone.

The improvements which are the subject of this patent are principally designed to ventilate the sewer by creating a partial vacuum and admitting a regulated quantity of fresh-air by suitable inlets to the trap or sewer.

16,214, Eaves Gutters. J. Phelps.

In this invention, in order to make the gutters lighter and to prevent their blocking by snow or other accumulation, sheet iron, so bent as to form a roof for the gutter and a gutter itself, is used. Here and there holes are made so that some water may drain into the ordinary gutter, but the principal surface snow or water is carried off by the improved eaves gutter which is so made as to offer no obstruction to the slipping off of masses of snow.

### NEW APPLICATIONS FOR PATENTS.

Sept. 9.—14,175, J. Beattie, Ventilators.—14,177, J. Pring, Sliding and Reversible Casement Window.—14,182, J. Forsyth and R. Blackett, Sash-stay and Fastener.—14,201, J. Reid, Drawing-boards and T-squares.

Sept. 10.—14,237, W. Thompson, Flushing Apparatus.—14,249, J. Girdlestone and S. Tatham, Ceiling Fixings for Electric Lights, &c.—14,252, C. Rogers, Screws.—14,252, H. Leach, Door-bell Mechanism.

Sept. 11.—14,310, J. Newbham, Registering Mortice Lock.—14,320, J. McRobbie, Window Sashes.—14,343, W. Dixon, Preparation of Wood Pavements for streets.—14,355, J. Tall, Construction of Doors and Windows by the Combination of Wood Frames and Metal Framing.

Sept. 12.—14,396, C. Cavill and S. Laurence, Window Fastener.

Sept. 13.—14,419, T. Widdowson, Raising and Supporting Sashes, Shutters, &c.—14,433, G. Deacon, Glazing Roofs and Horticultural Buildings.—14,471, G. Baldwin and H. Varley, Door Knockers.—14,476, A. Robertson, Draught Excluder for Doors.

Sept. 14.—14,483, J. & A. Duckett, Waste Water-closets.—14,493, B. Meriam, Drain Tester.—14,499, R. Hannan, Protecting Windows and Doorways.—14,512, J. Donkin, Combination Saw.—14,515, A. Paris, Fireproof Plaster Cloths for Ceilings, Walls, &c.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

9,841, F. Clare, Terra Cotta Knobs and Handles.—11,492, R. Stone, Construction of Buildings.—12,526, A. Patrick, Manufacture of Bricks, &c.—12,559, J. Bristow, Repairing Slated Roofs.—13,028, H. Darby, Stoves for Warming and Heating Buildings, &c.—13,105, De Pennefather & M. Walker, Chimney and Ventilating Cowl, &c.—13,118, A. Clark, Moulding Planes.—13,160, W. Cruwys, Preventing Down Draughts in Chimneys, &c.—13,671, T. Fawcett, Brick-making and Pressing Machine.—13,764, J. Tall, Sash-frames, Sashes, &c.—13,765, J. Tall, Doors, Shutters, Sashes, and Sash-frames.—13,872, P. Parsons, Moistening, Heating, and Ventilating Factories.

### COMPLETE SPECIFICATIONS ACCEPTED.

#### Open to Opposition for Two Months.

15,601, C. Harcourt, Electric Bell Pull Fittings.—16,185, A. Smith, Dressing White Lead, &c.—16,197, M. Bowring, Moulding Bricks, &c.—16,234, J. James, Calcining Cement Materials, &c.—16,646, E. Calone & F. Chapman, Stoves and Ranges.—11,620, T. Charteris, Wood Block Flooring.—12,803, D. Hoey, Trapping Soil Pipes, Drains, &c.

## RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

Sept. 16.—By T. Woods.  
Bromley-by Bow—101, 103, and 105, Marner-st., f., r. £45, 16s. 6d. 2310

Sept. 17.—By BRADSHAW BROWN.  
Bethnal Green—119, 121, 123, and 125, Coventry-st., f., r. £27, 4s. 6d. 780  
Stepney—32 and 34, Walsley-st., u.t. 35 yrs., g.r. £6, 6s., r. £45, 10s. 6d. 315

By EASTMAN BROTHERS.  
Sydenham, West Hill—The residence called "Fair-light," u.t. 69 yrs., g.r. £23 p.a. 1,340  
Bow—35, Carpenters-rd., f., r. £36, 8s. 6d. 450

By OSGILL, SWIFT, & OSGILL.  
Banstead, Surrey—"The Victoria Inn," f. 3,100

Sept. 18.—By GLOVER & HARRISON.  
Holloway—11, Arthur-rd., u.t. 63 yrs., g.r. £26, 8s. 4d., r. £15 p.a. 520  
Hendon, Middlesex.—A plot of land, f. 60

By J. DAW.  
Holborn, Fetter-lane—A profit rent of £160 p.a. u.t. 14 yrs. 1,300

By DOUGLAS YOUNG.  
Clapham—31, 33, and 48, Selton New-rd., u.t. 90 yrs., g.r. £18, 15s., r. £26 p.a. 590

By F. JOLLY & Co. (at Worthing).  
Worthing—9 to 23 (odd) London-st., and 1 and 3, Angelsea-st., f., r. £166 p.a. 1,625

Sept. 19.—By F. J. BISLEY.  
Rotherhithe—89 to 93 (even) Silwood-st., u.t. 98 yrs., g.r. £21, 5s., r. £110, 4s. 6d. 800

By J. FRYER.  
Chelsea—64, Beaufort-st., u.t. 26 yrs., g.r. £4, 6s. 250

Sept. 20.—By KING & CHAMBERS.  
Pulborough, Sussex—"Streets and Tanners' Farms, containing 118a. 3r. 13p., f. 2,210

[Contractions used in this list.—f. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.t. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

### TUESDAY, OCTOBER 1.

Society of Engineers.—Visit to the Deptford Station Works of the London Electric Supply Corporation, and the Deptford Foreign Cattle Market.

Gloucester Architectural Association.—Mr. J. J. Joass, jun., on "The Perpendicular Style of English Gothic."

### WEDNESDAY, OCTOBER 2.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting. 8.30 p.m.

Liverpool Engineering Society.—The President (Mr. H. H. West) will deliver his Inaugural Address. 8 p.m.

Royal Historical and Archaeological Association of Ireland.—Quarterly General Meeting, when nine papers will be read. 4 p.m.

### THURSDAY, OCTOBER 3.

University College.—Professor T. Roger Smith will deliver his Opening Lecture, the subject being "Sir Christopher Wren and his Architecture." 7.30 p.m.

### FRIDAY, OCTOBER 4.

Architectural Association.—Conversation, to be held at the Westminster Town-hall. 8 p.m.

**Stourbridge.**—Additions are about to be made to St. Thomas's Church, including a new semi-circular apsidal projection to the chancel, a new staircase wing to the north gallery, alterations to the entrances, vestries, and seating, with other minor improvements. Messrs. Cotton & Bidlake, of Birmingham, are the architects. The church is an interesting specimen of the Queen Anne type of English architecture, and the new additions are designed to strictly harmonise with it.



## Miscellaneous.

**School Board Contracts.**—Another "meeting of metropolitan builders," for the purpose of protesting against the proposed action of the London School Board in placing the repairing work of the Board schools, now performed by 143 so-called small builders, into the hands of six larger ones, was held at Anderton's Hotel, Fleet-street, on Tuesday evening last, when a large number of builders were present. An invitation circular had been sent to all the members of the School Board, several of whom attended, including the Rev. H. Curtis, Mr. B. Lucraft, Mr. E. Barnes, Mr. R. Bourke, and Mr. A. G. Cook. The chair was occupied by Mr. Lawrence Stevens, L.C.C.—Mr. Barnes gave a summary of the system of tendering in vogue at the Board, and in concluding said that the large contractors had been appointed to do work under a schedule of prices, and according to that schedule the charge for the repair of a lock was tenpence. He asked a contractor who had been appointed to do work under these prices how the repair of a lock could be done for tenpence? "Oh, it's the other things, you know!" was the reply.—Mr. Bourke said he strongly objected to such an alteration being made without the matter coming before the whole Board. When the proposed change passed the Works Committee, Mr. Helby (Chairman of the Committee) came to him and said, "We have done it!" "Done what?" "Why, the open tender system is doomed!" He (Mr. Bourke) said such a matter ought not to have passed without discussion, but Mr. Helby replied that it was open to the meeting to have voted against it. A certain firm in Finsbury had the work of two divisions to do—both Finsbury and Hackney—and he wanted to know why the work should not be split up? It was said that the list of contractors could not be increased, but the contractor knew very well that this was not so.—Mr. Hart said he could not understand the action of the Committee. He deprecated the old system of allowing everybody to tender who chose, for some of the tenders were of such low amounts that it was out of the question for good work to be performed at such prices; but he did believe in good local men having local work.—Mr. Lucraft said that the matter was a ratepayers' question quite as much as a builders' question, and he felt thankful to them for the action they were taking; for it appeared to him that they were stopping a very gross job. A few members of the Board were gradually getting power into their own hands, and they were doing it by vilifying those who had done their work faithfully for years past. This was not the whole of the scheme, for if the question was successfully carried, it was intended to give the building of all their schools to half-a-dozen builders. He was a member of the Works Committee, and at its meeting, when the question was brought forward, he asked that it should be put to the vote so that he might have an opportunity of voting against it. He felt confident that the Board would never consent to such a state of affairs, but he advised all at the next election to put practical working men on the Board to see that the work was properly done by skilful and fairly-paid men.—Mr. Cook, a member of the School Board, said he did not like such a sweeping condemnation of the Works Committee. He never contemplated that such a scheme would be brought forward to exclude the builders of London, and he would localise all work so as to prevent the possibility of a fraud.—Several builders having addressed the meeting, it was resolved that Messrs. Cook and Barnes be requested to present a memorial to the School Board.

**Shaw's Sewer Air Disinfectant.**—In reference to a notice of this on page 193 *ante*, the patentee writes:—"The purified air as it passes out is so little tainted with the smell of paraffin that several who were unaware of the nature of the liquid I use failed to detect it."

**Exhibition in Vienna.**—The Austrian Foreign Office notifies that a forest culture and agricultural exhibition is to be held in Vienna, in the Prater Rotunda, next year, between May 15 and October 15.

**International Exhibition in Cologne.**—An international military exhibition, including models of garrisons, barracks, bridges, hygiene, &c., is to be held next year in Cologne.

**Ham House, Surrey.**—According to the *Surrey Comet*, Ham House, so rich in historic memories, is at the present moment undergoing thorough restoration. It was built by Sir Thomas Vavasour, and was completed in 1610. It is said to have been designed as a residence for Henry Prince of Wales, elder brother of the ill-fated King Charles, but owing to his early death it was never occupied by him. On May 22, 1651, it became the property of Sir Lionel Tollenmacher, whose wife was made Countess of Dysart in her own right. From that day to the present time it has remained in the Dysart family. The mansion is built of red brick, and has two fronts. The north front is approached from Ham Common by a magnificent avenue about a mile in length; but the massive gates which bar the entrance to the grounds have never been opened since the deposed King James II. drove through them in making his escape from Ham House; and, although the fine trees remain, what was once the carriage-way is all overgrown with grass. The south front is the principal one, and faces the Thames, and a very singular feature which at once strikes the visitor is a range of busts, cast in lead but painted stone-colour, which are placed within oval niches in the brickwork between the basement and the first story, and also in the side walls bounding the lawn. There is in the middle of this lawn a colossal statue of Father Thames, who is depicted leaning on a large urn. So carefully have the family abstained from interfering with the old house, that to competent persons it appears nothing short of marvellous that the whole place has not collapsed. The interior had not been touched for 160 years, and the exterior is said to have received its last coat of paint seventy years ago. On August 14, 1887, however, owing to pieces of plaster falling from the fine old ceiling in the hall, workmen were sent to restore it, and such serious defects were continually brought to light that, after due consideration, a thorough restoration of the whole building was determined upon. Many of the ceilings in the house were painted by Verrio. In the restoration of these ceilings the greatest care has had to be taken, nearly all the woodwork above them having to be renewed, iron joists fixed, and new floors laid. Where the ceilings are not painted the original plaster has also been carefully preserved. It has been found necessary to put in fifteen new iron girders, each weighing 26 cwt., besides a great many smaller ones, in order to support the new floors. The roof was entirely stripped, fired up, re-boarded, and felted, the old slates being then replaced; and over 80 tons of lead have been placed upon the roof, the inside of which has been re-tiled. Every room retained wherever practicable, and the new work hidden. During the work several magnificent old carved stone chimney-pieces have been brought to light, which were bricked up 160 years ago. A thorough system of drainage has also been introduced, and the house has been fitted with the electric light,—the same engines that pump the sewage serving to generate the electricity. There have been as many as 130 men employed on the work, and at the present time 114 are engaged upon it, but it will probably not be completed before the middle of next year, and it will cost quite 30,000*l*. Messrs. Bodley & Garner are the architects for the work of restoration, and Mr. H. R. Franklin, of Deddington, Oxon, is the builder; the resident foreman being Mr. R. D. Goodbody.

**York School Competition.**—At an adjourned meeting of this Board, held on Monday last, at the offices of the Board, Low Onsegate, where the designs of the competing architects were displayed, Mr. A. N. Bromley, F.R.I.B.A., the architect of the Nottingham School Board, was introduced, and reported on each design. He considered that all were more or less meritorious, but in five of the seven the playgrounds were cut up too much, and in one point or another did not give the advantages possessed by the designs, "Light and Air," and "Economy I." He unhesitatingly gave the preference to the design "Light and Air." Mr. Tennant moved:—"That the Board approve of the plan named 'Light and Air.'" Mr. Wragge seconded, and the motion was carried unanimously. The envelope marked with that motto having been opened, the authors were found to be Messrs. Demaine and Brierley.

**The English Iron Trade.**—A strong upward tone characterises the English iron market, while a full current of business is being transacted. In pig-iron the tendency is rather to hold back, but this has not in the least checked the steady upward movement. Middle-brough pig is quite 6*d*. a ton dearer this week, while in Scotland makers' iron, in which further advances, ranging from 6*d*. to 2*s*. 6*d*. a ton are announced, is giving an impetus to the warrant market. Bessemer pig in the North-west has recovered 1*s*. 3*d*. on the week. Lancashire pig-iron shows a rise of 1*s*. a ton, while Midland brands are quoted higher. In the finished iron trade, which shows more animation, the general tendency is towards a further advance at the forthcoming quarterly meetings. In the North of England, manufacturers quote 2*s*. 6*d*. a ton more. The steel market is active and stiffer. Steel rails have been put up 2*s*. 6*d*. a ton in the North-west. The rise in building materials somewhat retards orders being placed for ships. Engineers continue very briskly employed.—*Iron*.

## PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	.....ton	12	0	14	0	0	0
Teak, B.G.	.....ton	7	0	7	15	0	0
Sequoia, U.S.	.....foot cube	0	2	0	0	0	0
Ash, Canada	.....load	3	10	0	5	0	0
Birch	.....	5	0	0	0	0	0
Elm	.....	4	0	0	5	0	0
Fir, Dantio, &c.	.....	2	0	0	3	10	0
Oak	.....	2	10	0	4	10	0
Canada	.....	7	10	0	7	10	0
Pine, Canada red	.....	3	0	0	4	0	0
yellow	.....	3	10	0	5	0	0
Lath, Dantio	.....fathom	4	10	0	5	0	0
St. Petersburg	.....	6	5	0	10	0	0
Wainscot, Riga, &c.	.....log	2	15	0	4	5	0
Deals, Finland, 2nd and 1st	.....std. 100	9	0	0	11	0	0
" 4th and 3rd	.....	7	0	0	8	15	0
Riga	.....	7	0	0	8	0	0
St. Petersburg, 1st yellow	.....	11	0	0	15	0	0
" 2nd	.....	10	0	0	11	0	0
" white	.....	7	10	0	7	10	0
Sweden	.....	8	0	0	13	0	0
White Sea	.....	9	0	0	17	0	0
Canada, Pine, 1st	.....	16	0	0	22	0	0
" 2nd	.....	11	0	0	17	0	0
" 3rd, &c.	.....	8	0	0	10	0	0
" Spruce, 1st	.....	9	0	0	11	0	0
" 3rd and 2nd	.....	7	10	0	8	0	0
N. Brunswick, &c.	.....	8	0	0	18	0	0
Battens, all kinds	.....	6	0	0	18	0	0
Flooring Boards, sq. 1 in., prepared, First	.....	0	11	0	0	14	0
Second	.....	0	8	0	0	10	0
Other qualities	.....	0	6	0	0	7	0
Cedar, Cuba	.....foot	0	0	44	0	0	5
Roussin, Cuba	.....	0	0	44	0	0	5
Mahogany, Cuba	.....	0	0	44	0	0	5
St. Domingo, cargo average	.....	0	0	44	0	0	5
Mexican	.....	0	0	44	0	0	5
Tobacco	.....	0	0	44	0	0	5
Roussin	.....	0	0	55	0	0	5
Box, Turkey	.....ton	4	0	0	13	0	0
Rose, Rio	.....	15	0	0	23	0	0
Balti	.....	14	0	0	18	0	0
Satin, St. Domingo	.....foot	0	0	6	0	1	0
Porto Rico	.....	0	0	9	0	1	3
Walnut, Halls	.....	0	0	44	0	0	5
METALS.		£.	s.	d.	£.	s.	d.
Iron—Pig, in Scotland	.....ton	0	0	0	0	0	0
Bar, Welsh, in London	.....	0	0	0	8	6	0
" Staffordshire, in London	.....	0	0	0	10	0	0
Copper—	.....	47	10	0	0	0	0
British, cake and ingot	.....ton	48	10	0	0	0	0
Best selected	.....	48	10	0	0	0	0
Sheets, strong	.....	68	0	0	0	0	0
Chili, bars	.....	43	5	0	0	0	0
Yellow Metal	.....lb.	0	0	5	0	0	5
Lead—Pig, Spanish	.....ton	12	13	0	0	0	0
English, com. brands	.....	12	18	0	0	0	0
Sheet, English	.....	14	0	0	0	0	0
Tin— Banca	.....ton	93	0	0	0	0	0
Billion	.....	92	0	0	0	0	0
Strait	.....	90	15	0	0	0	0
Australian	.....	91	10	0	0	0	0
English Ingots	.....	95	0	0	0	0	0
Bars	.....	96	0	0	0	0	0
Refined	.....	97	0	0	0	0	0
Zinc—English sheet	.....ton	24	0	0	24	15	0
OILS.		£.	s.	d.	£.	s.	d.
Linseed	.....ton	21	15	0	22	0	0
Cocunut, Cochín	.....	27	10	0	0	0	0
Ceylon	.....	24	0	0	24	0	0
Palm, Lagos	.....	38	0	0	0	0	0
Rapeseed, English pale	.....	31	15	0	32	0	0
" brown	.....	30	10	0	0	0	0
Cottonseed, refined	.....	28	10	0	28	0	0
Lubricating, U.S.	.....	21	0	0	40	0	0
" refined	.....	5	0	0	0	0	0
Tallow and Oleine	.....	7	0	0	13	0	0
Tar—Stockholm	.....	1	5	0	0	0	0
Archangel	.....	0	15	0	0	16	0

## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 Noon on Thursdays.]

**BRONDESBURY.**—For erecting bank premises at Brondesbury for the London and South-Western Bank, Limited. Mr. George Treadell, architect—  
 Cross & Son ..... £1,330 0 0  
 Low & Son ..... 1,225 0 0  
 Hunt ..... 1,170 0 0  
 Oldroyd ..... 1,145 0 0  
 Prior ..... 1,125 0 0  
 Tennant & Co. (accepted) ..... 1,120 0 0



## COMPETITION, CONTRACTS, &amp; PUBLIC APPOINTMENT.

Epitome of Advertisements in this Number.

## COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Board School .....	Barnley School Board	Not stated	Nov. 14th ii.	

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Street-Making Works .....	Southend Local Board	P. Dodd .....	Oct. 1st x.	
Engine and Deep Well Pump .....	Hackney Union .....	Official .....	do. ii.	
New Sewer, &c. ....	Holborn Bd. of Works	Lewis H. Isaacs .....	Oct. 7th ii.	
Post-Office, Birmingham .....	Com. of H.M. Works.	Official .....	Oct. 8th ii.	
Broken Gurnsey Granite .....	Willowden Local Board	C. Charles Robinson .....	do. ii.	
Road Repairs .....	Croydon Corporation .....	W. Powell .....	do. ii.	
Drain Pipes, Stores, &c. ....	do. ....	do. ....	do. ii.	
Brick Saver .....	St. Giles (Camberwell)	Official .....	do. ii.	
School and Outbuildings, &c., Guildford .....	Vestry .....	Official .....	do. ii.	
Broken Granite and Gravel .....	The Committee .....	Official .....	Oct. 12th x.	
Police Station and Magistrates' Courts .....	East Barnet Valley	G. W. Brunell .....	Oct. 16th x.	
Four Brick-built Huts, &c., Shorncliffe .....	Boatle-cum-Lanacre Corporation .....	C. J. Anderson .....	Oct. 23rd x.	
	War Department .....	Official .....	Not stated ii.	

## PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
New Streets Surveyor's Assistants (2) .....	Fulham Vestry .....	22. each per week.	Oct. 10th xvii.	

CARDIFF.—For new church parlour, Charles-street Congregational Church. Mr. J. Wilson Siddall, architect, Penarth:—  
 E. Turner ..... £688 0 0  
 L. Purcell ..... 608 0 0  
 S. Shepton & Son ..... 688 0 0  
 Bowers & Co.\* ..... 495 10 0  
 S. Evans ..... 495 10 0  
 C. C. Dunn (revoked and accepted) ..... 870 0 0  
 \* Of Hereford, the rest of Cardiff.

CARDIFF.—For erecting new stable and alteration of coach-house, at 48, Park-place, for Mr. J. G. Marshchurch. Mr. J. Wilson Siddall, architect, Penarth:—  
 C. C. Dunn, Cardiff ..... £380 0 0  
 J. Thomas, Cardiff ..... 380 0 0  
 Bowers & Co., Hereford ..... 250 0 0

CHUDLEIGH (Devon).—For rebuilding the "Globe" Hotel, Chudleigh, for Messrs. Finnest & Sons, Newton Abbot. Mr. S. Seger, architect, Newton Abbot:—  
 Lewis Besant, Newton Abbot ..... £1,111 10 0  
 [No competition.]

CODFORD ST. MARY (Wilt).—For the extension of schools at Codford St. Mary, Wilt. Mr. E. H. Lingen Barker, architect:—  
 Webb & Co., Salisbury ..... £250 0 0  
 Ford, Codford St. Peter ..... 237 17 0  
 Doughty, Codford St. Mary ..... 218 9 3  
 Ponton, Warminster (accepted) ..... 182 16 3

COLCHESTER.—For extension of Osborn-street Depot, for the Colchester Urban Authority. Mr. H. Goodyear, Surveyor:—  
 Dobson ..... £1,947 0 0  
 Everett & Son ..... 947 0 0  
 Parson ..... 930 0 0  
 Ward ..... 912 0 0  
 Orfeur ..... 887 0 0  
 Dupont ..... 853 0 0  
 Dias (accepted) ..... 800 0 0

DARTFORD.—For the building of the new West-hill Schools for 800 children:—  
 Burroughs, Maidstone ..... £2,407 0 0  
 Slade, Maidstone ..... 5,127 0 0  
 King Bros. .... 7,980 0 0  
 Knight ..... 7,328 0 0  
 Mullin ..... 6,540 0 0  
 Lobb & Oliver, New Southgate ..... 6,200 0 0  
 Wallis, Gravesend ..... 6,190 0 0

EALING.—For additional works at 30, High-street, Ealing, for Mr. S. Dyer. Mr. G. Ashby Lean, architect and surveyor, 41, Broadway, Ealing, W.:—  
 H. & A. J. Jones, Ealing ..... £180 0 0  
 A. Bailey, Ealing ..... 149 0 0  
 W. Loving, Ealing (accepted) ..... 102 10 0

EAST DERHAM.—For 300 tons of broken granite, for the East Derham Local Board:—  
 s. d.  
 Shackleton & Son, Gooles ..... 16 0 per ton.  
 Paton & Sons, London ..... 28 8  
 Ellis & Everard, Barton Hill ..... 19 0  
 Charwood Granite Company ..... 12 8  
 Skelton & Co., London ..... 12 0  
 Grimley & Son, Sutton Bridge, for Mount Sorel (accepted) ..... 11 8  
 Judkins, Nuneaton ..... 11 6

EAST HAM.—For about 30,000 ft. run of granite kerb for the East Ham Local Board:—  
 8x13 12x6  
 Shelton & Company for Gunnis-lake granite ..... 1s. 5jd. 1s. 4jd.  
 G. G. Rutty, for Newdegan granite (accepted) ..... 1 3½ 1 ½  
 per foot run.

EAST OGWELL (Devon).—For building a stable at Core Farm, East Ogwell, for Mr. Daniel Robert Norton. Mr. S. Seger, architect, Newton Abbot:—  
 Williams & Webber, Denbury ..... £31 17 9  
 F. Barrow, Newton Abbot ..... 129 0 0  
 Parker Bros., Newton Abbot ..... 129 0 0  
 Hugh Mills, Newton Abbot ..... 129 15 0  
 Accepted.

GLOUCESTER.—For erecting the new Municipal Buildings. Mr. G. H. Hunt, architect. Quantities by Mr. R. Briggs:—  
 John Reed, Plymouth ..... £23,810 0 0  
 Thomas Lowe & Sons, Burton-on-Trent ..... 21,500 0 0  
 Henry Lovatt, Wolverhampton ..... 21,450 0 0  
 William Gibson, Exeter ..... 21,280 0 0  
 Edmund Gabbett, Liverpool ..... 20,924 0 0  
 Alfred King, Gloucester ..... 20,768 0 0  
 D. C. Jones & Co., Gloucester ..... 20,775 0 0  
 William Bissett & Sons, Birmingham ..... 20,690 0 0  
 Stephens, Bawtrow & Co., Bristol ..... 20,469 0 0  
 Henry A. Pons, Bristol ..... 19,989 0 0  
 William Jones, Gloucester ..... 19,762 0 0  
 G. F. Smith & Sons, Leamington ..... 19,623 0 0  
 William Bowers & Co., Hereford ..... 18,300 0 0  
 Accepted.

LEAMINGTON.—For the erection of a complete block of school buildings in Clapton-terrace, to accommodate 1,000 boys, girls, and infants, for the School Board. Mr. F. Foster, architect, Leamington. Quantities supplied by the architect:—  
 C. Gray Hill, Coventry ..... £3,100 0 0  
 Parnell & Sons, Rugby ..... 2,631 0 0  
 Claridge & Bloxham, Banbury ..... 7,432 0 0  
 Lowe & Sons, Burton-on-Trent ..... 7,300 0 0  
 F. & H. Herbert, Leicester ..... 7,229 0 0  
 R. Bowen, Leamington ..... 7,050 0 0  
 G. F. Smith & Sons, Leamington ..... 6,990 0 0  
 J. Hill, Leamington (accepted) ..... 6,900 0 0  
 Jenkins & Sons, Leamington ..... 6,650 0 0  
 [Architect's estimate, £8,550.]

LEEDS.—For the erection of new premises for Messrs. Thorne & Co., Lady-lane. Mr. William Bakewell, architect, Leeds:—  
 Craven & Unpleby (accepted) ..... £4,301 0 0

LIANELLY.—For the extension of Lakfield Schools, Llanelli, South Wales. Mr. E. H. Lingen Barker, architect:—  
 E. Giles, Hereford ..... £230 0 0  
 G. Davies, Llanelli ..... 220 0 0  
 D. Davies, Llanelli ..... 208 0 0  
 J. Davies, Llanelli ..... 183 0 0  
 D. Edwards, Llanelli ..... 177 0 0  
 T. Hughes, Llanelli (accepted) ..... 172 0 0

LONDON.—For erecting stabling, &c., &c., at Hanover-street, Peckham, S.E., for Mr. F. H. Clapp:—  
 Hillier, Croydon ..... £2,248 15 3  
 Waite & Co., East Dulwich ..... 2,113 0 0  
 Millward & Co., Waltham-green ..... 1,840 0 0  
 Soper, St. John's ..... 1,834 0 0  
 Gale, Old Kent-road ..... 1,521 0 0  
 George Lusk, Mile End ..... 1,760 0 0  
 Jenney, Camberwell ..... 1,700 0 0  
 J. Edwards, Cambridge Heath ..... 1,695 0 0  
 Finnest, Peckham ..... 1,676 0 0  
 Pickersgill & Co., Loughboro' Junction ..... 1,645 0 0  
 Ansall, Lambeth ..... 1,655 0 0  
 Whitehead & Co., Clapham ..... 1,645 0 0  
 Garner, Peckham ..... 1,479 0 0  
 Joselyne & Co., Southwark ..... 1,410 0 0  
 Prout, Southgate ..... 1,050 0 0

LONDON.—For alterations, additions, and repairs at Exeter Hall, Strand, W.C. Mr. Alfred E. Pitt, architect, 8, Bloomsbury-square, W.C. Quantities by Mr. Joseph Rookwood:—  
 Wall Bros. .... £2,971 0 0  
 Peto Bros. .... 2,894 0 0  
 Grover & Son ..... 2,834 0 0  
 Geary ..... 2,794 0 0  
 Simpson & Son ..... 2,756 0 0  
 Patman & Co. .... 2,742 0 0  
 Newton & Co. .... 2,720 0 0  
 Lills & Sons ..... 2,689 0 0  
 Heyward & Son ..... 2,655 0 0  
 Lethy Bros. .... 2,620 0 0  
 Kilbey & Gayford ..... 2,619 0 0  
 Higgs & Hill ..... 2,672 0 0  
 Baker (accepted) ..... 2,552 0 0

LONDON.—For alterations, &c., to the "Letchmere" Tavern, Battersea-park-road, Battersea, S.W., for Messrs. Brown Brothers. Mr. H. L. Newton, architect, 49, Victoria-street, Westminster, S.W.:—  
 W. Shurmer, Clapton ..... £2,681 0 0  
 S. R. Lambie, Kentish Town ..... 2,621 0 0  
 H. Burman & Sons, Kennington-park ..... 2,596 0 0  
 W. L. Kellaway, Clerkenwell ..... 2,541 0 0  
 S. Godden, Bryanston-square ..... 2,220 0 0  
 Turtle & Appleton, Wandsworth ..... 1,980 0 0  
 Accepted.

LONDON.—For covered way, retiring-rooms, and galleries in connection with covered lawn-tennis court, for the Queen's Club, Limited, West Kensington. Mr. Alexander Payne, architect, 4, Storey's-gate, S.W. Quantities by Mr. E. J. Pain:—  
 H. & E. Lea ..... £1,587 0 0  
 Williams & Son ..... 1,540 0 0  
 Leslie & Co. .... 1,530 0 0  
 T. Boyce ..... 1,589 0 0  
 Longuire & Co. .... 1,569 0 0  
 W. Downs ..... 1,549 0 0  
 Perry & Co. .... 1,525 0 0  
 Barrett & Power ..... 1,783 0 0  
 S. Bartram ..... 1,780 0 0  
 Bywaters & Co. .... 1,769 0 0  
 Peto Bros. .... 1,768 0 0  
 Simpson & Co. (accepted) ..... 1,713 0 0

LONDON.—For the completion of five shops, Freeman's-road, Custom House Estate, for the Rev. J. Roe. Mr. E. P. Loftus Brock, architect:—  
 Noakes ..... £1,355 0 0  
 Mattock ..... 1,355 0 0  
 Hackett ..... 1,350 0 0  
 Batchelor ..... 1,239 0 0  
 Meers ..... 1,187 0 0  
 Kean ..... 955 0 0  
 Horsh ..... 860 0 0  
 Constable ..... 775 0 0

LONDON.—For the erection of additional stabling for thirty-three horses, for Messrs. Carter, Paterson, & Co., Limited, at their Depot, Deptford. Mr. Wm. Eves, architect, 10, Union-court, Old Broad-street, E.C.:—  
 Burman & Son ..... £1,077 0 0  
 Dabbs ..... 1,075 0 0  
 Chessum ..... 1,060 0 0  
 Holliday & Greenwood ..... 1,055 0 0  
 Harris & Wardrop ..... 1,044 0 0  
 Johnson ..... 997 0 0  
 Holland ..... 994 0 0  
 Higge ..... 994 0 0  
 Godfrey & Sons, Evering Works, Clapton, N.E. (accepted) ..... 990 0 0

LONDON.—For the erection of stabling for 43 horses, for Messrs. Carter, Paterson, & Co., Limited, at Camberwell, S.E. Mr. Wm. Eves, architect, 10, Union-court, Old Broad-street, E.C.:—  
 Johnson ..... £1,233 0 0  
 Dabbs ..... 1,230 0 0  
 Holland ..... 1,200 0 0  
 Chessum ..... 1,190 0 0  
 Harris & Wardrop ..... 1,174 0 0  
 Holliday & Greenwood ..... 1,156 0 0  
 Higge ..... 1,117 0 0  
 Burman ..... 1,079 0 0  
 Dabbs, Portland-avenue, Stamford-hill, N. (accepted) ..... 1,068 0 0

LONDON.—For proposed alterations to the "Pitt's Head" tavern, St. John's Wood, N.W., for Mr. Woodman. Mr. Alfred J. Hopkins, architect, 27, Mortimer-street, W. Quantities supplied:—  
 Mattock Bros. .... £1,281 0 0  
 Patman & Fotheringham ..... 1,263 0 0

LONDON.—For new drainage and plumbing works at 9, Courtfield-road, S.W., for Mr. R. W. Haubury, M.P. Mr. Charles Edward Gritton, surveyor, London and Brighton:—  
 Aldin & Pater, Queen's Gate-gardens, S.W. (accepted) ..... £128 0 0

LONDON.—For alterations and repairs to premises Northampton-street, Essex-road, for Mr. W. Hughes:—  
 T. Hooke ..... £130 0 0

LONDON.—For the erection of offices and premises in Harrington-road, South Kensington. Mr. Alfred J. Bentley, architect and surveyor. Quantities supplied:—  
 Williams ..... £1,589 0 0  
 Brass & Son ..... 1,675 0 0  
 Garlick & Horton ..... 1,617 0 0  
 Kenley ..... 1,446 0 0  
 A. White & Co. .... 1,437 0 0  
 Parks ..... 1,387 0 0  
 Heath ..... 1,370 0 0

LONDON.—For alterations to No. 4, Ennismore-gardens, for the Right Hon. Lord Halsbury:—  
 Charles Wall, Chelsea ..... £275 0 0  
 [No other tenders.]

LONDON.—For sundry repairs to houses in Bath-street, Mitchell-street, and Richmond-street, City-road, St. Luke's, for the Executors of the late Mr. F. Odell. Mr. W. F. Foster, architect:—  
 C. Dearing & Son, Islington ..... £171 7 0  
 B. Cook, Stonecutler-street ..... 123 10 0  
 S. Hayworth & Sons, Kingsland ..... 121 0 0  
 W. Wythe, Dalston (accepted) ..... 96 0 0

LONDON.—For alterations and repairs to No. 18, Berners-street, W., for Mr. J. H. Stratton. Mr. Alfred J. Hopkins, architect, 27, Mortimer-street, W.:—  
 Ashwell (accepted) ..... £367 0 0

LONDON.—For skating-rink for the Queen's Club, Limited, West Kensington. Mr. Alexander Payne, architect:—  
 W. Downs ..... £761 0 0

LONDON.—For certain works in rebuilding five warehouses, Landers-buildings, Aldergate-street. Mr. Delius Joseph, architect, 7 and 19, Baughall-street:—  
*Cut and Rolled Ironwork and Steel Girders.*  
 Moreland & Co. (accepted) ..... £241 0 0  
*Bath and Portland Stone.*  
 G. Herriage (accepted) ..... £145 0 0

LONDON.—For erecting stores, Mare-street, Hackney, for Mr. E. Telf:—  
 J. Hoake ..... £233 0 0

LONDON.—For the erection of two shops in High-street, Stoke Newington, for Mr. A. Hart. Mr. Wm. Eyo, architect, 10, Union-court, Old Broad-street, E.C.:—  
 Harris & Wardrop, Wallwood-street, Limehouse, E.\*  
 \* Accepted at 5 per cent advance on schedule of prices for similar shops built by them.

NEW BARNET.—For erection of business premises and dwelling-houses on The Triangle, New Barnet, Hertfordshire, for Mr. G. A. Warren. Mr. E. Fergusson Taylor, surveyor, 55, Chancery-lane, W.C.:—  
 Miller ..... £1,158 0 0  
 Meers & Co. .... 1,084 0 0  
 Voller ..... 877 0 0  
 Daniels (accepted) ..... 858 0 0  
 Baughen (withdrawn) ..... 730 0 0

NEW SOUTHGATE.—For additions and alterations to "Glenholme," Holly-park, for Mr. George Wood. Dr. D. Taylor, architect and surveyor, Queen's-road, Bowes-park, N.:—  
 Brown & Sweetland, Holly-park\* ..... £234 0 0  
 \* Accepted.

NORTHAMPTON.—For house and stabling. East Park, Northampton, for Mr. F. W. Wheeler:—  
 T. Reynolds, Northampton ..... £2,200 0 0  
 Clayton Bros., Coggeshoe, near Northampton ..... 2,018 0 0  
 J. Dunceley, Northampton ..... 1,958 0 0  
 J. Robinson, Northampton ..... 1,988 0 0  
 H. Martin, Northampton ..... 1,944 0 0  
 J. T. Wagrove, Northampton ..... 1,937 0 0  
 Green Bros., Northampton ..... 1,868 0 0  
 W. Heap, Northampton ..... 1,844 0 0  
 J. Fisher, Northampton ..... 1,840 0 0  
 W. Beardmore, Northampton ..... 1,836 0 0  
 \* Accepted.

PORTSMOUTH.—For the extension of Kingston Cemetery, roads, paths, drainage, lodge, gates, boundary-wall, &c. Messrs. Rake & Cogswell, architects, Portsea:—  
 Perkins, Lymington ..... £2,670 0 0  
 Clarke & Son, Portsmouth ..... 6,950 0 0  
 Leamouth, Portsmouth ..... 6,800 0 0  
 Ward, Portsmouth ..... 6,800 0 0  
 Bramble, Portsmouth ..... 6,327 0 0  
 Corke, Portsmouth ..... 6,330 0 0  
 Quick, Portsmouth ..... 5,990 0 0  
 Lewis, Portsmouth ..... 5,909 0 0

RAMSEY (Hunts).—For the erection of a new villa residence. Mr. R. Hutchinson, architect, Huntingdon:—  
 J. Fishburn, Keston ..... £1,385 0 0  
 J. Brown, Warboys ..... 1,939 0 0  
 Lyon & Rouse, Stamford ..... 1,836 0 0  
 Saint & Sons, St. Ives ..... 1,793 0 0  
 Willmott & Sons, Cambridge ..... 1,790 0 0  
 A. J. Bateman, Ramsey ..... 1,747 0 0  
 Thoday & Son, Cambridge ..... 1,745 0 0  
 W. Wade, St. Neots ..... 1,710 0 0  
 J. Bridgeton, Wodehouse ..... 1,702 0 0  
 Filwood & Sons, Sandy ..... 1,700 0 0  
 W. Howard, Huntingdon ..... 1,678 0 0  
 M. Allen, Brampton ..... 1,674 0 0  
 T. Kidd, Woodstone ..... 1,669 0 0  
 F. Giddings, St. Ives ..... 1,620 0 0  
 J. Lesfe, Boston ..... 1,600 0 0  
 W. Hawkins, Fletton ..... 1,600 0 0  
 J. T. Machin, Peterborough ..... 1,595 0 0  
 A. Bunting, Fenstanton ..... 1,594 0 0  
 Coates & Son, Thrapstone ..... 1,580 0 0  
 S. Hipwell & Son, Wisbech ..... 1,580 0 0  
 G. Page, Buckden ..... 1,540 0 0  
 Gray Bros., Peterborough ..... 1,515 0 0  
 Thackray & Son, Huntingdon ..... 1,489 0 0  
 Guttridge, J., Feteborough ..... 1,360 0 0

UXBRIDGE.—For the erection of house and shop in the Cowley-road, Uxbridge. Messrs. George and W. Eves, architects, Uxbridge:—  
 Brown & Sons, Harefield ..... £925 0 0  
 Kearley, Uxbridge ..... 866 0 0  
 Fawcidge & Sons, Uxbridge ..... 815 0 0  
 A. & B. Hanson, Southall ..... 489 0 0

ST. PETER'S (Isle of Thanet).—For the erection of collegiate buildings, St. Peter's, Isle of Thanet. Mr. Alfred R. Pile, architect, 5, Bloomsbury-square, W.C.:—  
 Wilson, Canterbury ..... £4,901 0 0  
 Home, Ramsgate ..... 4,890 0 0  
 Forwick, Ramsgate ..... 4,820 0 0  
 Port, St. Lawrence ..... 4,778 0 0  
 Wise, Deal ..... 4,764 0 0  
 Bowman, Ramsgate ..... 4,710 0 0  
 Parmer, Margate ..... 4,650 0 0  
 Jarman, Ramsgate ..... 4,495 0 0  
 Denne, Deal ..... 4,488 0 0  
 Cozens, Canterbury ..... 4,377 0 0  
 Brown, Margate ..... 1,245 0 0  
 Martin, Ramsgate (accepted) ..... 4,200 0 0

WARGRAVE (Berks).—For additions and alterations to "The Shanty," at Wargrave, for Sir Mervil Muckenzie, M.D. Mr. Arthur Ardron, architect, 8, Foultry, E.C.:—  
 Silver & Sons, Maidenhead (accepted) ..... £212 10 0

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# The Builder.

VOL. LVII. No. 2435.

SATURDAY, OCTOBER 5, 1890.

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Beredos, Elvestham Church, Hants.—Mr. A. H. Shipworth, Architect	Double-Page Ink-Photo.
Manor House, Melcombe Bingham, Dorsetshire.—Sketched during Pugin Tour by Mr. Rowland W. Paul	Single-Page Photo-Litho.
Ford Abbey: The Porch.—Sketched during Pugin Tour by Mr. R. W. Paul	Single-Page Photo-Litho.
Sketches about the Golden Valley, Gloucestershire.—Drawn by Mr. Ralph Nevill, F.S.A.	Two Single-Page Photo-Litho's.
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### Roman and Medieval London.



SOME interesting excavations are progressing at London-wall, and it is anticipated that they will contribute some addition to our knowledge of the aspects and condition of this

locality in early times, inasmuch as the site has long afforded materials for the theories and speculations of London antiquaries, although up to the present time no opportunity has been afforded for accurate investigation.\* The works are within the limits of the ancient city, and face the line taken by the Roman wall in its course to Moorgate and Cripplegate. The land excavated will disclose the character of the soil which at this spot represented the *Pomerium*—the space reserved when laying out a city by the Roman architects and engineers, both within and without the walls, for sanitary purposes. The buildings now in course of demolition are those situated in Leathersellers'-buildings, Little Bell-alley, Crosskey-court, and near to the Coleman-street Ward Schools, with other tortuous ways and passages, in what has hitherto been a densely-populated district, with numerous squalid and dirty though picturesque old buildings, illustrating the domestic architecture of the seventeenth and early portion of the last and present centuries. The greater part of these houses are now being removed, and a new street constructed, with substantial offices and warehouses on either side, which will form a leading thoroughfare running from London-wall in the direction of the Bank of England. The properties immediately under consideration are owned by the Leathersellers' Company, and it is a matter of satisfaction that so needed and advantageous a public improvement has been undertaken by so influential a Corporation. It is well-known that in ancient times the dealers and workers in leather were principally located at the northern edge of the city, and within the walls. The curriers established themselves

in Cripplegate Ward; the tanners, tawyers, and leathersellers were grouped together near to the upper part of the river Walbrook, where they were enabled to obtain a plentiful supply of water necessary to the conduct of their business. The western, or principal estate at London-wall possessed by the Leathersellers' Company, was purchased by them in the fifteenth century. It is the land now under excavation, and was acquired for the purpose of building a hall adapted to the requirements of the craft. This is not alone a matter of tradition, but is borne out by divers entries in the "City Records." It appears that by an Act of Common Council, passed in the year 1475, it was ordered that the Masters, Wardens of the Misteries of the city, should "assemble the good men of the Misteries in their halls, or in other convenient places" to proceed in their liveryes to the Guildhall at the election of the Mayor and Sheriffs, and the Leathersellers' ordinances of the year 1509 require that they should meet in their own "Common Hall."

As early as the year 1477 the Company certainly possessed a hall in this locality, for it appears, from the earliest inventories and rentals, that there was "a house under the hall" from which the Company derived a rent, and that in 1531 there was a *kytchen* as well as a *parier* occupied by the Company. Hence it may be inferred that the upper part of the buildings along the frontage of the Company's western and present estate, at London-wall, constituted the *Hall*. This must have been the place of "assembling" mentioned in the accounts of the Founders' Company, in 1516, thus: "Item, *payd at Leddyrsellers Hall, at the fyrate ssemblyng, iiii<sup>d</sup>.*" Also again in 1519,† That Company had previously met at the Brewers' Hall, and at Armorer's Hall, in 1497-8; again at the latter, in 1529, and at other times, before its own hall was built in 1531.

In 1543 the Leathersellers acquired the St. Helen's estate, and occupied the buildings of the dissolved priory of Benedictine Nuns as their own hall and offices. Thenceforward all the Company's houses and land at London-wall were let to various tenants. In 1560 "the *olde Halle*" was let on lease, with a bond; and in a rental made in 1563 it is said, "of Master Penington, for his houses at London-wall, sometime named the *Lether-*

*sellers' Hall*, yearly rent 9*l*." In a list of leases, made about the year 1594, the first entry is as follows:—

"A lease of *th'olde Hall at London-wall* for the term of xxj<sup>ii</sup> years beginning at the feast of the Annunciation of Our Lady, Anno 1588, ix<sup>th</sup> yearly rent, and ix<sup>th</sup> yearly fine, at two several payments, within fifty and six days; after upon forfeiture and a covenant for reparations within six months after warning given. And a covenant for *th'emplements* to be *prayed* at th'end of the lease as they shall be found to be worth."

Accordingly, in the Company's rental of 1596 it is thus mentioned:—"Imprimis, the house of Widow Rawlyns, called *th'olde Lethersellers' Hall*, yearly rent 9*l*." "Item the same house, yearly fine 9*l*." After the expiration of that demise it was resolved, by the Court, that "The Old Hall" should be altered, and divided into "reasonable dwelling-houses," June 29, 1613; after which time its individual existence is not clearly traced. For, in a ground-plan drawn by Robert Treswell, senior, in 1614, the frontage of the Company's western estate, being 94 ft., was divided off (beginning from the east) into two shops,—a passage leading to the gardens, a kitchen, a chamber, shop, and yard, and another shop; behind all these were three gardens bounded by the "Common Sewer" of Wall-brook, which sloped off in a south-easterly direction.

Adjoining this early building, of which some few indications have been recently discovered, ran the old watercourse, and many traces have been found of the line it took in the form of numerous wooden piles which once formed its banks, and the black, moist character of the soil. Its line has been identified in many places, and as the excavations proceed, the line of the new street will in many cases follow the bed of the ancient river, which, now degenerated into a sewer and lost to sight, once formed the western boundary of the earlier Roman London. It did not in Roman days flow precisely in a line with the present thoroughfare, but took a route somewhat to the west of the modern street. It rose in the fields near Hoxton, ran through the wards of Coleman-street, Bread-street, Cheap, Walbrook, Vintry, and Dowgate, and thus to the Thames. It is probable,—and, indeed, modern excavations illustrate the notion,—that more than one brook supplied the river. The western arm commenced to the north-west of Finsbury-square, then ran in the direction of Wilson-street. The eastern branch rose near to the

\* For detailed description of discoveries made in former years in the various districts mentioned, reference may be made to "Roman Antiquities, Mansion House," by John E. Price, F.S.A. "The Roman Pavement in Bucklersbury," by the same author; and to the "Transactions London and Middlesex Archaeological Society." To the Council of the latter we are indebted for the use of such woodcuts as may appear in this or succeeding papers.

\* Corporation Records, September 13, 15 Edward IV., Book V., fol. 113.  
† Williams's "Worshipful Company of Founders," pp. 17, 52.



south end of the present New North-road, in the direction of Pitfield-street, Hoxton, then by Willow-walk across the Curtain-road by King John's-court to Holywell-lane, and thence east of Long-alley; then by the old burial-ground of Bethlehem Hospital along Blomfield-street to the west of the churchyard of Allhallows-on-the-Wall. Here it fell into the City ditch of the City Wall.

There were many other little brooks or rivulets which became absorbed in the City ditch; indeed the present excavations fully bear out the descriptions given by Stow and by the chronicler Howes, in the edition of his work printed in the year 1631. The field, he says, speaking of Moorfields, was until the year of King James, 1606-7, "a most noysome one and offensive place, being a general laystall, a rotten morish ground, whereof it first took its name. This field for many years was burrowed and crossed with deep stinking ditches and noysome common showery, and was in former times held impossible to be reformed."

In certain seasons much inconvenience was felt by the water being penned or kept back, and among the civic records of the year 1415, it appears that "by reason thereof, as well many cellars and dwelling-houses were overflowed in divers streets and lanes to the said moor near and adjoining," and provision was then made for the efficient escape of the accumulation of water, "as easement to the dwelling-houses and cellars aforesaid—by reason of the immunity which they so greatly stood in need of from the overflow of the

abounds in bones of animals, among them relics of the ox, *Bos Longifrons*, the horse, sheep, goats, dogs, &c., together with a skull of an ancient pig or boar, with both tusks complete and in sound preservation. The locality probably marked the site of the slaughter-houses and shambles of Old London, for some curious specimens of butchers' knives of the Roman age have been exhumed, among them one well known as a *cutter*, larger than is usually found in City diggings, and with a wooden handle in fair condition. These for the present are preserved at the Company's Hall in St. Helen's-place.

The practice of constructing such massive masonry upon wooden piles is well known and is of great antiquity. With the Romans great care was invariably exercised. As a rule, their builders excavated until they arrived, as in the present case, on solid ground, and as deep as necessary. Vitruvius records how, if the land was soft or marshy, they strengthened the work by introducing piles of alder, olive, oak, or other timber, a little singed by fire, frequently filling the intervening spaces with charcoal. The same practice continued with Saxons and Normans alike, the foundations of many of their structures in this country having been prepared in like manner,—for example, the old London Bridge erected in the year 1176; the foundations of the stone bridge over the River Grant; and, to refer to a still earlier period, the Church of Croyland Abbey, in Lincolnshire, erected as early as the year 716.

The accompanying woodcut preserves a

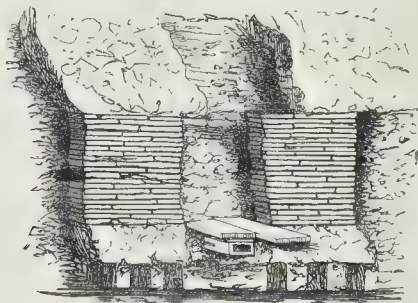
other, a marble fragment, fluted on each side, and measuring 18 in. long, by 4½ in. in width. Upon one of its squared edges are the letters —"RISE AGAYN AND LIVE." Whether it is to be associated with a sepulchral monument or a portion of a running inscription connected with the ancient hall, is at present difficult to determine.

There have been found, in addition, various knives of divers form, but belonging to the Roman Age; Durobriyan and Upchurch ware, of the latter two perfect urns, decorated with the familiar dotted ornament, and coated with metallic glaze; figured Samian ware, and fragments bearing potters' names; specimens of Roman glass, together with Norman and Medieval pottery.

There are other associations of interest in connexion with this immediate neighbourhood of later date. In Coleman-street the five members accused of treason by Charles I. contrived to conceal themselves; and at a tavern, known as the "Star," Oliver Cromwell and his comrades were wont to meet. In Swan-alley, upon the east side of the thoroughfare, one Venner, a wine cooper and Millenarian, preached and advocated the opinions of his followers "to the soldiers of King Jesus." An insurrection ensued, resulting in Venner being hanged and quartered in Coleman-street, Jan. 19, 1660-1. It was John Goodwin, Minister of Coleman-street, who waited on Charles I. the day before his execution and tendered his religious ministrations. The King expressed his thanks, but remarked that he had selected Dr. Juxon, whom he knew. Bloomfield, the well-known author of the "Farmer's Boy," followed his calling of a shoemaker at 14, Great Bell-yard,—the poet's card described him, "Bloomfield, ladies' shoe maker, 14, Great Bell-yard, Coleman-street, the best real Spanish leather at reasonable prices." Adjoining the "Swan's Nest" tavern is a charming oasis, in what at present is a city desert. In a small, well-paved, and carefully-kept square, are six almshouses, founded in the year 1617 by Christopher Eyre, who gave 240*l.* for their building and 400*l.* for the purchase of the land. They were erected for the maintenance of six poor couples. There is also a house containing six rooms, to be occupied by six unmarried women. Formerly there was a small square, known as Printing House-square, which abutted upon the building; this was removed, and its boundary wall pulled down for the erection of Moorgate-street-buildings. During the recent summer months these houses have had a charming and attractive appearance, for their occupants have vied with each other in promoting window gardens, and the festoons of creepers, geraniums, and other floral decorations have presented a scene probably but little known to the citizens save to casual passers-by.

As much more remains to be done, further results may be anticipated. The works are daily visited by Mr. John E. Price, F.S.A., and notes and memoranda taken. It is satisfactory to know that every facility is given by the Company for investigation, considerable interest having been taken in the matter by its members through the present Master, C. D. E. Ardley, Esq., who is desirous that all information that it is possible to gather should be obtained. The objects, as found, are for the present conveyed from time to time to the Hall in St. Helen's-place, Bishopsgate.

**Resignation of the City Surveyor of York.**—At a special meeting of the York City Council, held in the Council Chamber on Tuesday last, the Lord Mayor (Alderman J. Agger) who presided, read a letter from Mr. E. B. Mawbey, the City Surveyor, stating that the Corporation of Leicester, having unanimously elected him Borough Engineer and Surveyor, he desired respectfully to tender his resignation. The resignation was accepted, and the Council, by resolution, recorded their high appreciation of the ability, energy, and courtesy which had characterised Mr. Mawbey's tenure of office as City Surveyor. It was resolved to advertise for a successor, at a salary of 400*l.* per annum.



watercourse before mentioned." It is known that Walbrook passed beneath the City Wall near to old Bethlehem Hospital to the east of the modern Moorgate-street, and a little westward of the end of Little Bell-alley in London-wall, the site of the present excavations, and which in these results have revealed what has been conjectured, viz., that it was at this point the "sluys" or "speye" must have been placed, for the river ran, as shown by the lines of wooden piles now discovered, very nearly in the line of the alley, possibly at its northern end, and continuing along its western side. It was at this point, adjoining the Swan's Nest Tavern, a quaint old building which yet stands, that, in the year 1835, an interesting discovery of Roman remains was made. A pit or well was disclosed which had been carefully planked with boards, and which was found to contain a store of earthenware vessels of divers patterns and capacities, together with a coin of Allectus. Some interesting indications of a red brick arch for the transit of water have been observed, but are now entirely gone. This structure was in Bell-alley, and will, doubtless, be observed in other places. In height it measured nearly 6 ft., and 4 ft. in width. It was supported on either side by massive piles of elm, between which the river ran. These were firmly driven into the natural soil, and were 6 ft. long, the total depth of the structure being nearly 18 ft. from the level of the street. Some of the stakes have been preserved as relics, and, with the exception of a little external wear, the timber is as sound as when first utilised for the purpose. The black soil which marks the river bed

good illustration of the Roman practice. It represents what was discovered in the year 1869, at the finding of the mosaic pavement in Bucklersbury. These two walls of tilework had to be removed, and it was noticed that they were supported by wooden piling. Blocks of chalk had been placed upon the timber-work, and upon these the tiles were laid. It affords an excellent illustration of the custom; and the close joints, with so little mortar intervening, are proofs of a very early method of construction. Similar work was noticed a few years since, when a vast number of Roman walls and foundations were removed for the necessities of the new City Market at Leadenhall. One large pile of this early work was considered to be of such interest that arrangements were made by the Corporation for its preservation on the site.

Opposite to the main thoroughfare of London-wall is a narrow court or alley, known as Cross-key-court, and adjoining the Ward schools; here, at a depth of about twenty feet the maiden soil is reached, and a good gravelly foundation is at hand for the requirements of the new buildings. It was in removing the buildings at this spot that two interesting pieces of worked stone were exhumed. They had in past days been utilised as building materials. The one is the upper portion of a carved mantelpiece of Tudor design, and may represent an Elizabethan or Jacobean relic. On the spandrels are carved ornaments, and a shield in the centre, upon which has been carved some heraldic device, now decayed; it shows evidence of having been decorated both in gold and colours. The



## ONE LESSON FROM THE RECENT STRIKE.

**I**T is to be hoped that the recent dock labourers' strike will not pass into oblivion with the same rapidity as most events of the present day. Though primarily a strike of dock labourers, its occurrence is a matter for the serious consideration of all engaged in building or contracting business, and it would be unwise for practical and thoughtful men to let the event pass without thought for the future. We will shortly state a few considerations which should not be forgotten.

In the first place, the late strike was one of unskilled labour. It therefore differed vitally from most of the northern strikes, which have been strikes of skilled labour. It has shown the power of masses of men whom, as workmen, the ordinary skilled artisan would regard with contempt, to disorganise the whole trade of the metropolis; it may even be said of the kingdom, and of many parts of the civilised world. Among those who have to carry on business for their livelihood, builders and contractors are peculiarly dependent on unskilled labour. The plasterer and the bricklayer each have their labourer. In fact, as there was a knight and a squire in the Middle Ages, so now there is the skilled workman and the labourer. The labourers all over the kingdom have by this strike been enabled to obtain an idea, if not of their power, at any rate of their capacity to cause inconvenience, and it is hardly likely, in these days of wide knowledge of events, and of energetic Socialist leaders, that the success of the dock strike should not cause labour movements more or less formidable and more or less inconvenient to arise from time to time throughout the kingdom. The fact that at the head of the late movement were pronounced Socialists is a pretty certain augury that similar movements will be attempted whenever and wherever practicable in carrying on the war of labour against capital. It behoves all practical business men, therefore, carefully to review their position; to consider their relations with their workmen, and the form and substance of their contracts with third parties. For example, if there are employers who are aware that their labourers are underpaid, it is most shortsighted not, so far as possible, to remedy such a state of things. It is equally foolish not, so far as possible, to safeguard themselves against strikes by having in their employ permanent workmen, whose interests thus bound up with their own. Again, the late strike ought certainly to give an impetus to all labour-saving apparatus. There are many farmers,—to take an instance from a different business,—who employ a reaping and binding machine,—i.e., a machine which cuts the corn, binds it, and lays it in sheafs on the ground,—not because they prefer it for its own sake, but because it renders them independent of manual labour. It is the province of science, and it should be the object of men of business, to make machinery take the place of unskilled labour. These are, shortly stated, some of the general considerations which should for a long time to come occupy the thoughts of every man who is a builder or a contractor,—or, indeed, is engaged in constructive work which requires much manual labour.

A more particular matter for consideration is one which relates to the Dock Companies of London. By a strike between the Dock Companies and their labourers, shipowners, consignors, and consignees of cargo, and consumers, have been inconvenienced and probably, in some instances, ruined. Builders and contractors have a vital interest, therefore, in safeguarding themselves against a similar event in the future. Placed at the East-end of London, amidst the most Socialistic elements of the metropolis, the workmen at the Docks are quite likely to be again aroused into a strike. It behoves members of the building trade, therefore, to assist shipowners, so far as possible, in rendering themselves less dependent on the Dock Companies, so that

goods and raw material from abroad may be less likely to be again delayed in transit. The particular subject of contention in the strike itself was outside of our special province, and we forbore to meddle with it. We only wish to point out the lesson it has left for other large employers of unskilled labour, many of whom are connected with building trades and building operations.

## NOTES.

**W**E congratulate the London County Council on their decisive and sensible action, recorded in our brief note of their proceedings in another column, in regard to the Strand improvement in the neighbourhood of St. Mary's. In spite of some opposition from timid members, the Council has taken the right and the spirited course of resolving at once to apply for powers to pull down the houses on the south side of Holywell-street, by way of opening up the roadway to the north of the two churches. This is the course which we have repeatedly advocated as the only rational one to pursue. We may now, we believe, consider St. Mary's safe, for the duller person will see, when the houses are once down, how fine a treatment of the site, both practically and architecturally, can be secured by taking the Strand roadway round on each side of the two churches. The determination of the Council is a gratifying indication that it is, at all events, a more enlightened body in regard to architectural matters than the Metropolitan Board of Works.

**I**T appears that at the eleventh hour a memorial is being got up in the diocese of St. Albans to protest against the havoc Lord Grimthorpe has been allowed to make with the Abbey. The memorialists say that he has utterly destroyed the north and south transepts instead of restoring and repairing them, and that they consider the fate that has befallen the church to be "a national misfortune and disgrace." "National misfortune" is perhaps rather too solemn an expression, but the other words are warranted, for it is no less than a "national disgrace" that the general public and the press in this country should be so ignorant and indifferent about architecture as to think that any blunderer should have the right to pull about and deface a great architectural monument for his own amusement, because he can afford to pay for it. As we have before said, we believe such a thing would be impossible in any other country in Europe. But why did not the memorialists say all this long ago? The mischief is nearly all done now.

**I**N *L'Architecture* for September 28, M. Fevrier makes a protest against the injustice to French architects arising from the responsibility put upon them by the law in regard to practical failures in their buildings: injustice which he maintains would be far greater even than it is if the law were actually applied in its rigour. This is a subject on which French architects are frequently protesting, though they always end by declining to recommend the abolition of the law which visits them with the pecuniary responsibility for any failure in their buildings. They have generally come to the conclusion that the effect of the law is practically to render the profession in France more respected than they would be without it: and we are inclined to think they are right. M. Fevrier, though he writes rather bitterly on the subject, does not propose the abolition of the law, but he enlarges on the peculiar hardship with which it presses or may press on the provincial architect in a country practice, who is obliged to oversee buildings at a distance from one another, as well as look after his office and receive his clients, and is at the mercy of a contractor who can only be looked after personally at long intervals. M. Fevrier's proposition to ameliorate the case amounts merely to the compulsory appointment of what we should call a clerk of works, one of whose special duties should be

to enter in a book whatever order the architect has given to the contractor, with the date, &c.; and that, on this written proof that such an order was given, the *onus* for bad work should fall on the contractor and not on the architect. This seems a perfectly reasonable suggestion, which would relieve the architect from anxiety without taking proper responsibility off his shoulders, and would probably, as M. Fevrier says, have a very beneficial effect on the way in which the contractor's work is carried out.

**W**E have received from the American Society of Civil Engineers the report of the Special Committee on the New Notation of Time, with the opinions of railway managers and others in favour of the 24-hour system. From the report we learn that the 24-hour system of reckoning has been thoroughly tested for two or three years on 3,657 miles of railway in the United States, "that no difficulty whatever has been experienced in introducing the change, that it has been readily accepted by the public without a single objection being heard, that its extreme simplicity and the impossibility of errors resulting from its use facilitates the movements of trains and promotes the public safety. The new system having thus proved so satisfactory in every way, it has now been determined to employ it on 3,053 additional contiguous miles, which will make a total length of 6,710 miles of railway shortly to be operated under the new notation." We readily accept the testimony here given to the increased convenience of the 24-hour system of reckoning, the universal introduction of which we believe to be only a question of time, and of a comparatively short time.

**W**E are glad to see that the Metropolitan Public Gardens Association, which has done good work in preserving and acquiring open spaces for London, is desirous to co-operate with all who are interested in "saving Holland Park from the hands of the builder," and preserving it as a public open space. Their proposition is that an offer for the Park for some definite period should be obtained, in order to give time for raising the requisite amount by public subscription. Our own generation has already seen a considerable curtailment, for building purposes, of the demesne attaching to what represents the Manor-house of Kensington. Yet the fields remain, to the south, wherein Lady Sarah Lennox,—the lass of Richmond-hill,—used to coquet at hay-making as the young King George III. rode along the road to Windsor. That lady, afterwards mother to the three Napiers,—Charles, George, and William,—was daughter to Charles, second Duke of Richmond. Her eldest sister, Georgiana, married Henry, son to Sir Stephen Fox, who in 1763 was created Baron Holland of Foxley, county Wilts. In or about 1762 Lord Holland had bought this property,—at one time held by the De Veres, Earls of Oxford,—of William Edwardes (created Baron Kensington in 1776), who had succeeded to the estates of the Rich family, upon the demise, *s.p.* in 1721, of his kinsman Edward, seventh Earl of Warwick of that house. In 1607 John Thorpe built the central portion and the turrets of Holland House (his drawings may be seen in the Soane Museum) for Sir Walter Cope. Cope's daughter and co-heir, Isabella, brought the estate after marriage to Henry Rich, afterwards Lord Kensington and Earl of Holland, the Royalist who, together with Arthur, Lord Capell, and James, Duke of Hamilton, was beheaded in front of Westminster Hall on March 9, 1649. This Lord Holland added the wings and arcade on to Thorpe's building. The eastern stone gateway, with its steps, designed by Inigo Jones, was fashioned by Nicholas Stone; the lodges and gates on the Kensington high-road were added fifty years ago. Of the various residents whose names are less commonly remembered in connexion with this house, may be mentioned the Lord-General Fairfax, and his wife,—the "starry Vere" of Marvell's lines; Sir John Chardin, the



receptacles; Katharine Darnley, Duchess of Buckinghamshire, a daughter of James II.; Bishop Atterbury, William Penn, and the honest Jacobite, the "downright Shippen" of Pope.

A CORRESPONDENT writes to us that he has "recently visited four new country houses in a picturesque district within fifty miles of London, and in each case the stables have been placed close up to the house." Even if a building owner desires to have stables close to the house, the architect should do his best to have this plan changed. It is the greatest possible mistake, when there is a reasonable space on which to build, to put the stables very close to the house. In the first place, the space near the house is much better utilised as a part of the garden; in the next, the stables, being usually of inferior design to the house, take away from its effect. Again, however well managed stables may be, there are often smells from them, noise of horses stamping, and washing of carriages. When very close to the house, idleness in both indoor and outdoor servants is encouraged; the coachman runs in to have a word with the cook, and the housemaid to have one with the groom. In fact, stables ought to be several hundred yards from a house.

THE Australian Builders' and Contractors' News, referring to an extensive fire that took place at Melbourne on Aug. 10, remarks on some of the special difficulties experienced in this case in contending with fires "in the very lofty buildings with which it has become the fashion to disfigure Melbourne." The fire-escapes, it is observed, were of no use at all, as they got entangled in the network of overhead telegraph wires. This suggests a new danger in connexion with overhead telegraph wires, especially in cities where there is, as there certainly is in London as well as in Melbourne, a growing ambition to build Towers of Babel in the shape of residential chambers.

THE report made by Dr. Gresswell to the Local Government Board on the general sanitary condition of the Buckingham Rural Sanitary District gives a melancholy account of dilapidated, damp, and unventilated houses, and drinking-water drawn from ground polluted with perennial filth. In regard to water supply we may quote the following:—

"At Steeple Claydon there is a public pump-well at the top of the village; a sewage swamp lies some eight yards to one side of it. Ten or twelve cottagers get their water from a pump-well in a garden; a sink catch-pit is close by the well and vault privies and slop-holes are round about it.

At Thornborough the water for about thirty cottages is taken from one or other of two dip-wells on the village common; one of these wells is about twenty yards below the burial-ground, and about ten yards below the school privy, which has evidently been overflowing on all sides. Six cottagers take their water from a roadside dip trough, the supply to which quickly fails in dry seasons; two others depend upon a well, about which lies a large sewage swamp; three others upon a well close by an outdoor sink, an open drain and cesspool; and so on.

Tingewick is supplied in the main from dip-wells, sunk in soil which must be permeated with filth from slop-holes, privy vaults, and cesspools.

At Twyford, where there are about sixty cottages, water has to be fetched from the church well at the very lower end of the village; this well is sunk 10 ft. deep in loose drift about eleven yards from and below the cemetery; some of the villagers have to go close upon a mile for this water."

Imagine the chances for common cleanliness under those circumstances! But what follows about the schools is worse:—

"The sanitary circumstances of the schools deserve special mention. At Thornborough the school, which has an average attendance of eighty-six children of both sexes, is supplied with but a single privy (!), and the receptacle (a vault) has evidently been overflowing on all sides. At Twyford the privy for the school-girls is so placed that emanations from it must needs enter the school-room. The privy receptacles at this school discharge into a closed cesspit, the overflow from which is carried off by piping into a ditch. The gases formed in the cesspit, which has not been cleared out for four years, can escape only by way of the privies. At the Padbury school the privy

receptacles are vaults; the urinal discharges, it seems, directly into the roadway; and the pump, from which the children obtain water while at school, is not ten yards from the privy vault."

A pleasant outlook for the physical well-being and moral decency of the rising generation.

THE Art Journal for October contains the second part of a suggestive and thoughtful article by Mr. Aldam Heaton on "Beauty in Colour and Form; and where to seek them," in the course of which Mr. Heaton gives one of the best brief definitions or illustrations we have met with of the process by which the painting of natural objects pictorially is reduced down to their decorative treatment, by elimination and simplification. Mr. Heaton takes the treatment of a rose in art as an example, and shows what is necessary to suit the original flower for appearing as wall decoration or painting on china,—and why it is necessary. One remark in the article, as to form, may however mislead some readers: the writer says that "Nature is always making severe and delicate curves, and we are always making exaggerated and wobbly ones;" and that a drawing of a holly leaf, without direct reference to the original, is almost sure to be exaggerated in the curves. This is quite true, and the delicacy of curves in Nature cannot be better appreciated than by practice in drawing carefully from flowers and foliage. But in such matters as the ramification of plants, on the other hand, Nature is always making angles and elbows which we are obliged, in decorative treatment, to change into curves for our purpose; a necessity which has been felt even by many who cannot analyse the reason for it.

IN consequence of the death of the late Lord Ashburton, it is announced that Bath House, at the south-western corner of Bolton-street, Piccadilly, will be offered for sale by auction on December 5th next. This mansion, conspicuous for its sumptuous fittings, and a central hall which rises to the entire height of the building, was erected on the site of a former Bath House,—belonging to William Pulteney, Earl of Bath,—by Alexander Baring, President of the Board of Trade and Master of the Mint, who was elevated Baron Ashburton, of Ashburton, county Devon, on April 10, 1835. Here Lord Ashburton formed a well-known gallery of works of art, comprising several examples of the Flemish, Dutch, and Italian schools, together with paintings by Velasquez and Murillo; the Dutch and Flemish pictures being from the Talleyrand collection. This house is famous for the parties which used to be attended by Tom Moore, Rogers, Croker, Chantrey, Wilkie, Sydney Smith, and other celebrities. The property is held for a term of thirty years unexpired, at a ground-rent of 50*l.* per annum.

IN the Portfolio for this month Mr. Hamerton publishes a short article on "A Tendency in Contemporary Painting" which is worth the attention of artists. The "tendency" is the too obvious one at present to be content with the most commonplace and vulgar subjects. "There are French landscape-painters," he observes, "who will take any bit of ugly field, any turn of a common highway, and paint them as seriously as if the object presented some kind of interest, when in fact the only interest is that of manual skill. . . . In figure-painting the same tendency shows itself very strongly by the increasing habit of representing the most commonplace personages in the most ordinary attitudes and occupations, with vulgar though appropriate surroundings." If it be answered that the great Dutch painters did the same and got fame for their works, Mr. Hamerton replies that though they chose vulgar subjects they did not make them into vulgar pictures. They gave refined thought and perception to composition and light and shade, and the execution of detail; matters which too many of the modern school referred to regard as beneath them. The painters of this school

will be very much scandalised at finding their work classified by Mr. Hamerton as "good manual work" (is it always that?) with no intellectual quality in it. For some reason, we observe that the painters of these pictures with no subject seem to regard themselves as on a higher intellectual level than their contemporaries. Mr. Hamerton's note of interrogation on the subject is much to the point at present.

#### LETTER FROM PARIS.

As announced in our last letter, Dalou's monument to the Republic was solemnly inaugurated on the Place de la Nation on Saturday, the 21st of September, the anniversary of the first proclamation of the Republic. It was however only a plaster model, bronzed, that carried off the honours of the day, for the actual permanent work, which the founder Bingen is now reproducing by the *cire perdue* process, will not be ready for six months. The model, the size of the original, has been executed within a few weeks with extraordinary rapidity, and gives an absolutely realistic representation of the actual work. The design, of which the *Builder* gave an illustration some years ago, has undergone little modification. The figure of the Republic has been a little disengaged from its draperies, so as to define the figure more; otherwise the design remains as before illustrated.

The group, of which the figures are about four metres in height, is placed on a pedestal in three stages, from which the water flows in cascades into a basin surrounded by lawns, flower-beds and plantations. Subsequently, when the real work has been substituted for the temporary model, the basin will be altered by elongating its axis, and the Municipal Administration intends to commission from M. Dalou figures of Nereids and Tritons which will combine their *jets d'eau* with the cascades of the central monument.

The inauguration ceremony was the occasion of a triumph for the distinguished artist, on whom the President, amidst the applause of the spectators, conferred the Cross of the Legion of Honour.

The monument to Eugène Delacroix, also the work of M. Dalou, is to be shortly erected in the Luxembourg Garden, near the new museum. The marble pedestal is already in position, and only awaits the sculptural portion, and the work in connexion with the fountain is nearly completed.

The distribution of awards in connexion with the Exhibition took place on Sept. 29 at the Palais d'Industrie.\* Without going into a detailed description of the ceremonial, one may well spare a word of special commendation for the fine decorations painted there by MM. Lavastre and Carpezat for a recent fête, the only fault of which was that the architectural details in connexion with them seemed a little too heavy for a building of which the main construction is iron.

We have now arrived at the last month of the existence of the Great Exhibition. While the attendance still numbers about 200,000 daily, the question of closing is being discussed, and various reports are circulated in reference to it. The general impression, however, is that Oct. 31st will be adhered to, unless exceptionally fine weather and a continued large attendance should possibly prolong the days of the Exhibition for a fortnight.

The "Comité de la Presse" met last week to award the prize offered by M. Osiris for the most useful work in connexion with the Exhibition. Rendering all appreciation to the Palaces of "Des Beaux Arts" and "Des Arts Libéraux," of M. Fournigé, and the central dome of M. J. Bouvard, it was finally decided to award the prize for the Galerie des Machines. Accordingly M. Dutert, who made the general design, will receive 20,000 fr.; M. Contamin, the engineer-in-chief for the ironwork, 15,000; MM. Charton and Pierron, the engineers, as well as the architects Deglane, Blavette, and Hénard, 3,000 each. The other 50,000 fr. will be divided among the workmen who took part in the construction.

In a few days will take place the inauguration of the new Bourse. The works, commenced in 1888, have been carried on with great rapidity by the architect, M. Blondel, who, by the terms of his engagement with

\* A selection from the list of awards will be found in another column.



the Municipal Administration, will remain for seventy-five years "propriétaire" of the works, which will then revert to the city of Paris.

This building, which replaces the old Halle aux Blés, itself built on the site of the ancient Hotel of Catherine de Medici, is in the style of Louis XVI., built in white stone and occupying an area of 2,500 square metres. In the interior is an immense circular hall of 1,200 metres in area, the walls pierced with doors and windows separated by an order of columns. This hall is covered by an iron domed roof constructed by Creusot, and decorated with paintings "marouffées" on zinc, and which represent Commerce and the principal products of the old and new world. The arrangement of these decorations had been already indicated by the groups in *grisaille* on the entablature, the last work of the lamented artist, Mazerolle. Between each of these groups are the following compositions: "Le Nord," a heavy and laboured piece of work by M. D. Langeé; "Europe," by M. Lucas, a fine piece of colour; "l'Orient," by M. Clairin, which exhibits the "loud" colouring and glitter always characteristic of that artist's work; and "America," by M. Luminai, a cold and characterless composition, very inferior to some other works by the same painter. Externally the pediment of the main entrance is decorated with a group in stone executed by M. Croisy, and representing the City of Paris, surrounded by figures representing Commerce, Industry, Arts, and Agriculture. The attic of the facade is to be decorated with a series of figures which have been entrusted to various well-known artists.

The building of the Bourse de Commerce has had the effect, as a concomitant result, of changing completely the aspect of one of the oldest quarters of Paris. M. Blondel has completed the scheme by building a series of fine blocks of offices, the facades of which form an effective group in relation to the principal entrance of the Hall.

We may mention the recent inauguration, in the Cour d'Honneur of the Alfort Veterinary School, of a memorial statue to Henri Bouley, a former president of the Académie des Sciences, who was for many years the director of the Alfort establishment. The statue, in white marble on a pedestal of grey Jura granite, is the work of M. Allouard, the plan of the monument having been designed by the architect M. Montzaue.

During the holiday time of the year artistic doings and news are scarce, or one would hardly mention the exhibition (the fifth) of the "Artistes Indépendants," three hundred pictures and a dozen statues; more interesting to their authors, probably, than to any one else.

A new series of mural paintings has been uncovered at the Panthéon, on the wall in the north transept facing that on which Cabanel has illustrated the life of St. Louis. The Government had originally entrusted this work to Baudry, who was to illustrate some episodes in the life of Joan of Arc. On the death of Baudry, M. Leneveu was chosen to replace him. He has executed four large compositions representing the initiation at Domremy, the fight at Orleans, the glorification at Reims, and the martyrdom of Jeanne at Rouen.

Speaking of the Panthéon leads us to mention that M. Larroumet, the Directeur des Beaux Arts, has addressed a report to the Minister of Public Instruction in regard to the sculptural decoration of the building, the suggestions in which have been approved by the Government. According to the terms of the report, the projected decoration will include placing on the longitudinal axis of the nave a monument to the Republic, which will have for its principal motif the figure of France surrounded by figures of Liberty, Equality, and Fraternity. This will be supplemented by four reliefs on the piers which carry the dome. These bas-reliefs will consist each of three or four figures surrounded by architectural canopies, recording or suggesting the epoch to which the principal monument refers. All the architectural portion of the work will be executed under the direction of M. Desbault, Government architect.

The Mediæval group, of which the architectural encadrement will be Gothic, will represent Religious Faith and its influence on various manifestations of human thought and action (in Art, Poetry, and Military heroism). The Renaissance group will represent the Art and Literature of the sixteenth century, but indicating Art in its three forms, and more especially in architecture and sculpture, as the most

remarkable manifestation of that epoch in France. The group of the seventeenth century will represent Literature (Moral Philosophy, Dramatic Poetry, Oratory), which was the chief glory of France in that century. The group of the eighteenth century will represent Philosophy, or the French school of thought of that century, which was the precursor of the new social movement. This ensemble will be completed by the statues of Descartes, Voltaire, Rousseau, Mirabeau, Carnot, Hoche, Kléber, and Victor Hugo.

Of course such a scheme as this, which comprises about eighty figures altogether, will demand considerable time for its realisation; but the Ministry has decided on the immediate execution of the monuments to Mirabeau and Victor Hugo, which will each cost 75,000 fr. M. Injalbert is commissioned to execute the statue of Mirabeau, to represent him as speaking from the Tribune. M. Rodin, who is to execute the statue of Hugo, will represent the poet seated on a rock, supposed to be on the Guernsey coast, and attended by the Muses of "Jeunesse," "Age Mûr," and "Vieillesse." We shall probably have occasion more than once to revert to the subject of this great decorative scheme, which will entirely change the character of the interior of the Panthéon.

The neighbourhood of the Luxembourg and the Rue Soufflot will in a short time undergo considerable alterations. It is at this point, at the corner of the Rue Medicis and the Boulevard St. Michel, that the Orleans Railway Company are to place their station for the railway from Paris to Soaux and Limours, which is now situated in the Place Denfert-Rochereau. The work necessary to carry out the scheme will occupy about two years. The railway will be an underground one with the station between the Luxembourg and the existing terminus. This change will place the neighbourhood of the Rive Gauche in direct communication with the picturesque valley of the Chevreuse, now neglected owing to the difficulty of access, but which will probably be a popular holiday resort when rendered more accessible.

The Louvre is to be enriched with two of the best pictures of Millet, the "Glanceuses" and the "Meules de Paille." The first of these, which was in the *Salon* of 1857, was bought by Madame Pomey, of Reims, in order to present it to the National collection. The second, which is in the retrospective exhibition on the Champ de Mars, has been offered by Madame Sanson-Davilliers, who lately presented also to the Louvre the "Printemps" of the same artist.

The noble example set by these generous ladies appears to be contagious, for it is now said that Madame Maurice Cottier, widow of a rich amateur well known in the Parisian world, has left or intends to leave to the Louvre her collection of modern pictures, and that Madame Roderer intends to present to the State a pastel by Millet of the "Angelus," a replica of the celebrated painting, which is considered by some to be, if anything, superior to the original.

Now that the cupola of the Pavillon Daru at the Louvre is completely finished, there should be no delay in the completion of the staircase which it covers. M. Guillaume, the architect, has prepared the necessary designs, and it is understood that the Minister of Fine Arts will now ask for the necessary vote for the work. The staircase in question, which has remained unfinished since the construction of this portion of the Louvre, consists of 125 steps separated by eleven landings. In its actual state, with its bare stone walls of little better than rough masonry, it contrasts pitifully with the fine mosaics of the cupola. The cost of the work, including marble facing to the walls, would be about a million francs. It is a large sum, no doubt, and possibly Parliament may hesitate to vote it this winter.

At the Ecole des Beaux-Arts, where the "Grande Médaille d'Emulation" has been awarded this year to M. Breffendille, pupil of M. Guadet, a certain number of competitions have also been adjudicated on, of which the most important was that in landscape for the Troyon prize. The subject given was "Spring." Thirty-nine competitors submitted pictures, and the prize was adjudged to M. Albert G. Rigolot, pupil of M. Delouze. The jury have also given their awards in the Abel Blouet competition (Architecture) and the Jay competition (Construction). In the first the prize was awarded to M. Eustache, pupil of M. Ginain; in the second, to M. Du Bois d'Auberville, pupil of M. Pascal.

Two recent inaugurations may be noted: that of the monument executed by M. Rodin to the memory of Bastien-Lepage, and that of the new Lycée Buffon. The Bastien-Lepage monument, unveiled on September 29, stands in the painter's native town, Damvillers. The Lycée Buffon, of which M. Vaudremer was the architect, is a very large Secondary Education establishment, of a very plain and austere style of architecture. It will accommodate 450 "externes" and 350 day boarders. The works were commenced in May 1885, and the building altogether has cost 6,400,000 francs.

We have to mention the death of two artists, M. Albert Claris, an architect, and M. Camille Saglio, a painter. M. Claris was a pupil of Questel, and obtained a troisième médaille in the *Salon* of 1879. M. Saglio, who was born at Strasburg, studied in the atelier of Jolivard and in that of Camille Roqueplan, and obtained a deuxième médaille in the *Salon* of 1846. He was a landscape painter of talent who for a long time exhibited, in every annual *Salon*, paintings of scenes in Normandy and Italy. He had latterly fallen rather into oblivion, though he had his days of celebrity.

#### WREN AS A DESIGNER AND DRAUGHTSMAN.

THE following is the latter portion of Professor Roger Smith's opening lecture on Thursday last to the architectural students at University College, the subject of which was "Sir Christopher Wren and his Architecture." The earlier portion of the lecture was a *résumé* of the well-known facts as to Wren and his work.

"Turning in the first instance, as an architect instinctively does, to the plans, one is struck at the outset by the immense variety which they exhibit, and the great skill shown in producing effect by the simplest means; and a further examination reveals the wonderful picturesqueness attained in a style to which most architects would say the picturesque is foreign, while the formal and the symmetrical are its natural expression. It must not be forgotten that these churches not only occupy old sites, but stand with their walls, and even their columns in some cases, on old foundations, so that the ruins which had to be dealt with limited the architect to a great extent. To an ordinary designer these limits would have been fetters; to the man of genius they were suggestions, and though we can never have the means of knowing precisely how much of all this clever planning is entirely original, and how much grew partly out of the condition of each building-site, there is none the less credit due to Wren for this remarkable series of church plans, and his perfect and entirely novel adaptation of the style in which he worked to those plans. In not a few instances the site was nearly square, but as often as not it failed to be truly rectangular, and we have to admire many clever devices for masking the irregularity, and others for making an interesting interior out of a mere square room. In not a few instances there is an aisle at one side only; in some there is no aisle, but columns, of which the entablatures are so disposed as to break up the interior in some way. Of the churches of moderate size, that of St. Stephen, Walbrook, is the most beautiful and the most famous. Here the whole effect of the interior is due to the skilful employment of columns and to the domical ceiling which they carry, so that within the limits of four plain walls the architect has known how to produce the effect of a nave, choir, and transept, with a dome over the intersection. The ground-plan of St. Stephen's is that of a rectangular room, measuring 82'7" by 60'0", with a projection, consisting of the tower and porch, at the west end. This is transformed into what I have described by means of the introduction of sixteen Corinthian columns on pedestals, and carrying a compressed entablature, above which rise arches. Eight of these columns are so placed as to carry the pendentives under a flatish dome of about 43'0" diameter, lighted by a lantern; and the columns are so disposed that by the simple device of returning the entablature back against the side and end walls, all the effect of nave, choir, and transept is produced. The lighting is well disposed, all the windows being high up, and as usual the fine oak panelled dado forms a dark and vigorous base for the architectural features to rest upon. I have searched on Mr. Clayton's



drawings for some of those geometrical relations between the main dimensions which are generally to be found in Wren's designs, and I believe always exist there—discovered or not; and I have found that the radius of the opening of the dome appears to have been used as a dominant dimension. This radius is exactly one-third of the width of the interior; the height of the dome from the cornice upward exactly equals that radius, and the height from the floor to that cornice is very slightly more than twice the same dimension; so that the diameter of the opening through which the dome is seen is two-thirds the width of the building, and is (within about 6 in.) equal to its own height from the floor; and as there may be some slight inaccuracies, I fully believe this was intended to be exactly so. There can be little doubt that in such geometrical relations of one part to another as these lies no small part of the subtle charm of Wren's best interiors. Attached to this church is an extremely plain tower, surmounted by a comparatively small but very graceful stone terminal, which forms a very good example of Wren's treatment, both of the design and construction of such spires. The tower finishes with a balustrade. Within this, on a stilted pedestal, rises a smaller square structure, with three engaged shafts at each angle, and pilasters within them again. These carry an entablature, and above that comes a second story, consisting of a kind of attic, surmounted by a gradually-diminishing finial. The whole outline above the top of the first order is carefully kept within a pair of raking lines which (having seen how Wren uses them in his design at Oxford for a somewhat similar but richer spire) there is no difficulty in applying. The construction appears to depend upon a device which is met with frequently,—a truncated dome springing from the walls of the tower, and carrying the weight of the inner part of the spire. Of churches of the largest type the two best are St. Andrew's, Holborn, and St. James's, Piccadilly. In each of these we have an arrangement very nearly like that of a Roman basilica, the church having a regular nave and aisles, and deep galleries filling the upper part of the aisles and the western end of the church. The exterior of these churches of Sir Christopher Wren did not, as a rule, receive much elaboration. Contrary to a good deal of modern church-building practice, Wren seems to have considered a church as an interior first. He adapted it as well as he could to the purposes of those who were to make use of it. He lavished upon the interior the best resources of his art, and, as a rule, probably devoted the chief part of such outlay as he could dispose of for purposes of architectural effect to making that part slightly and seemly, and he appears to have cared but little for the effect which the exterior was to produce. To this, however, there is in its practice one notable exception,—his treatment of the steeples. Probably most of the Medieval churches of London which perished in the Fire had each a tower,—and in many cases a spire or lantern; however this may have been, it is an all but universal rule with Wren to provide a tower, and, in many cases, to crown it with an ornamental structure, and on this part of the exterior of a church he customarily bestowed the greatest pains,—indeed, it is in the designs of his towers and spires that Wren's originality is most shown. It was a remark of that acute critic, Professor Cockerell, that in the design of a tower and spire for a town church, the entrance, if the lowest story served as a porch, should receive architectural enrichment; all passed it, all could see it, its treatment appealed to every person entering the building. The upper part again, raised high above the roof, is the token that here is a church, and is the appropriate ornament of such a building seen against the sky line, and as such should be rich and of effective outline. Between these extremes the main wall of the tower is of little use save to lift its crowning feature well above the roofs of the houses among which it stands, and there is no reason, therefore, for it to be other than plain. Almost every one of Wren's church towers conform to these maxims: take Bow Church as an example. The entrance is rich and noble. The crowning feature is characteristic and highly worked up. The intermediate mass,—that is to say, the upper stories of the tower,—cannot be termed anything else than plain. In not a few of the churches that had perished, the tower had been surmounted by a spire, in others by a lantern, and I think I

am correct in saying that no Renaissance building which Wren could have seen would furnish the smallest suggestion as to how to make out of Classical materials a spire appropriate to the tower of a parish church, though in Jacobean buildings there were examples of the successful treatment of the lantern. Something like Wren's solution of the problem appears in views of some Spanish buildings; but it is in the highest degree improbable that such examples were known to Wren, even if they were in existence in his day. It is also remarkable that, supposing the dates in Mr. Elmes's life of Wren to be correct, the earliest London church to be completed was one of which the spire is inferior to none in beauty, elaboration, effectiveness, and appropriateness. I refer to Bow Church, which, according to the above authority, was finished as early as 1677. Of this steeple there is an illustration and description in Fergusson's modern volume, and it was excellently illustrated by Mr. J. T. Christopher some years ago. Simpler than this, but extremely graceful, is the spire of St. Bride's, Fleet-street, with its three arcaded stories alike in design, but each smaller and lower than the one below. Above these comes a fourth story, somewhat simpler, crowned with a little spire. The outline of this composition adheres more closely to the straight line of an ordinary spire than any other, and a great charm is produced by comparatively simple means. In the sections nothing strikes the eye more than the constant appearance of a finely-designed dado of oak panelling, beautifully proportioned, which forms a base to the internal walling, and usually clothes the pedestals on which the internal columns stand. Much bold carpentry must exist in the roofs, of which, in some few cases, we can obtain indications, and which appear, as a rule, to have stood well. But it must not be forgotten that this carpentry was executed at a time when oak was the timber habitually used,—a timber of great strength, and capable of remaining unmoved at the joints when framed together. Now we employ fir timber, which is weaker, and in which, unfortunately, the joints cannot be trusted to resist much strain, owing to the soft nature of this wood. The most famous, and probably the most ingenious, of Wren's timber roofs contrived to support a plaster ceiling of elaborate design is that over St. James's Church, Piccadilly; but though that church is one of the best examples of Wren's good sense and skill as a constructor, its exterior is painfully inferior to its interior in design. Here, somewhat unwillingly, I must stop in my examination of Wren's buildings. I will content myself with naming Greenwich Hospital, Chelsea Hospital, the Sheldonian Theatre, Oxford, and the additions to Hampton Court as specimens of his important secular works.

It would, however, be impossible to say anything that would have any value as criticism about these works which Wren carried out, unless I were to omit all mention of Wren's drawings, which, on various accounts, I am unwilling to do. It appears to me that they form a part of the subject of much interest to us who are mostly ourselves engaged in making architectural drawings. There exist at St. Paul's two large volumes of working drawings which were used on the building, and these, by the great kindness of Mr. Penrose, I was permitted to examine a few days ago. Many of them are clearly from Wren's own hand, and in the case of others, which appear to be draughtsman's work, one frequently finds along with the drawing the original draft by the master. Few of these are large drawings, though some of them are to a large scale; but, as a rule, each drawing deals with a portion of the building, and does so very thoroughly. The great bulk of what I examined are masonry drawings. The drawing is clear, definite, and unobscured; a very clear line is used, and the profiles of mouldings are drawn with such precision that some of the  $\frac{1}{4}$  in. scale masons' elevations,—for example, those showing the entablature of the order used,—might almost have been worked from without profiles being furnished. One of the most interesting of these drawings is a plan of part of the piers supporting the dome, with superposed over it a plan of the structure at a higher level showing exactly how much of the drum rested directly over the great piers, and how much on the great arches that go from one to the other. An extremely interesting drawing, in part, I think, by Wren, and one among the few that could be called general drawings, is a careful elevation of the entire west front in outline, the treatment up to the apex of the pediment being

what we see; but the upper part showing the dome and western towers before the last revision. A remarkable detail drawing, full of energy and vigour, and yet precision, and undoubtedly an autograph, and necessarily executed when Wren was an old man, shows the ball and cross on the summit of the lantern, with the whole of the rather elaborate system of ties and bolts by which they are held down, and the foundation upon which they are formed. It is remarkable to note how thoroughly the author of all these working drawings seems to have been aware of just what guidance the mason or other workman required; and carefully, definitely, and unmistakably that guidance was given. Sir Christopher Wren as a draughtsman may perhaps, however, be best understood by a study of the large but miscellaneous collection of his drawings in the library of All Souls College, as there studies, general drawings, first sketches, and finished plans are all to be seen. These, by the courtesy of the authorities, I have very recently inspected and examined for the purposes of this lecture. In four large folio volumes are stored part of the contents of the great architect's portfolios; fortunately that part includes a good many drawings belonging to the series made for St. Paul's, along with many connected with his other works. In one or two cases we can here trace the way in which he worked, and though there may be a doubt about some drawings, whether they are his own handiwork or no, and a certainty about others that they are the work of an assistant, there remains a large body of work about which no one accustomed to architectural design can entertain any hesitation as to their being the manuscript work of the master just as he left it. Curiously enough, there is extremely little writing on these drawings, though I note with some interest, as falling in with a strong prejudice of my own, that there is a scale on not a few. The autograph drawings were evidently for the most part rapidly produced, yet with a strong leaning towards precision and exactitude. Nearly all of them are in ink, and brown ink is usually employed, and the elevations are often washed a little in Indian ink, while plans and sectional parts are sometimes left uncoloured, sometimes coloured red, and not unfrequently etched. There is a great preponderance of plans, and the geometrical shines out in all of them. In not a few cases the centre lines and setting-out marks remain in pencil, and it is interesting to note how constantly Wren worked from centres and centre lines. In his sketch of the approved plan of St. Paul's, for example, a centre line in pencil runs up the nave and choir, and a similar line up each aisle from end to end of the plan; but it is in his sketch of the ground-plan of the earlier design, which we may call the model design, that these centres and centre lines are most visible and most interesting. It is possible on this drawing to learn the whole process adopted in setting out that intricate and remarkable plan. An elevation, clearly and firmly drawn, and vigorously shaded in lines, accompanies this plan, and there is also a section washed. These drawings strike one as perhaps the most masterly in the series, and are, without doubt, autographs. I have already alluded to Wren's autograph drawing,—for it is clearer than a sketch,—for the approved plan. There is also a sketch by him of the singularly weak elevation which accompanied it. The finished drawings submitted to the king are here. They may or may not be his handiwork,—probably not. A very interesting drawing in connexion with St. Paul's is a pencil study in perspective of the interior of the present cathedral, hasty in execution, but true. There are other studies in perspective in the series, bearing out an injunction of the master's in one of his essays on architecture. "The architect ought, above all things, to be well skilled in perspective, for everything that appears well in the orthography may not be good in the model, especially where there are many angles and perspectives; and everything that is good in model may not be so when built, because a model is seen from other stations and distances than the eye sees the building. But this will be universally true, that whatever is good in perspective, and will hold so in all the principal views, whether direct or oblique, will be as good in great (i.e., in execution) if this only caution be observed,—that regard be had to the distance of the eye in the principal station." Not the least instructive place is a very small perspective study of Greenwich Hospital, in-



tending apparently to show him how the two domes would look. Another drawing of St. Paul's, which, though probably an assistant's work, possesses historical value, is a careful south elevation of the cathedral, corresponding to the outline west elevation already named by me. Up to the parapet, this drawing, which is carefully tinted and shaded, shows the building very nearly as erected; but it is interesting to note that the design of the upper part, both of the dome and the west tower as it stood at that time, was not what was ultimately carried out, and not anything like so good. Where the drum surrounds the building there was then prepared a series of buttresses, each one ending in an engaged column. This feature—of which, by the bye, a plan exists in the St. Paul's collection carefully elaborated—has now given place to a smaller number of large piers with columns between. There are some other differences in the dome, and especially in the lantern; but the change in the west towers is even more marked. At the time when the drawing was made it was intended that a small dome should surmount each western tower, and the extremely elegant composition in which these towers actually finish is not figured on the drawing. Perhaps in nothing did Wren make a greater improvement than in the design of these campanili. In connexion with the dome of St. Paul's I may name an extremely careful study (which I entertain little doubt is an autograph) of the two great domes of St. Peter at Rome and Sta Maria dei Fiori at Florence. At the bottom of the sheet is a quarter plan of the one and a quarter plan of the other, and set up over each is drawn carefully a half-section, a centre line separating the two; while on a separate part of the sheet is a portion of the plan of each dome at a higher level. This drawing is carefully and broadly executed. As usual, it is in brown ink; it is slightly shaded in sepia and the sectional parts are tinted in a colour something like Venetian red. The baldacchino, and other ornaments in the interior of St. Peter's, are most beautifully drawn; but the human heads, &c., are not well done, and it is noteworthy that wherever the figure is introduced into the undoubtedly autograph drawings the draughtsmanship is imperfect. Nothing could be better as a study of great domes than this drawing, and the pains taken with the work, and the precision and care of the execution, are most instructive, as showing the trouble which a great man considered he ought to take in order that he might master the two most famous domes in Europe, which he studied as examples of work similar to what he was himself charged with. In a different way one of several carefully-finished drawings for Bow Church is interesting. I have it from Mr. Christopher that there is a tradition that, when Bow Church was first designed, Wren proposed a lantern on the tower; but the parish, being wealthy and influential, desired to have something more ambitious. Accordingly Wren redesigned the spire, adopting something of the same outline, but vastly expanding it. Being, however, pleased with his lantern, he employed it for the tower of another church, St. Magnus, London Bridge. Accordingly here is an elevation of Bow Church, with the lower part of the tower as built, but the upper part quite different, and bearing a close resemblance to the picturesque lantern so conspicuous an object to those who daily cross London Bridge, which crowns the above-named church. A drawing which is extremely instructive, as showing how Wren worked, is an unfinished pencil study of the campanile of a building (No. 85, in the 4th volume). This was to have been in four stories of unequal height, and it bears so great a resemblance to the lower part of St. Bride's spire that I take it to be an early study for that design. Half the drawing was to have been a section on half his elevation. How the proportion between the heights of the stories was arrived at the drawing does not show; but their projection was regulated by drawing a sloping line from the top of the tower (exclusive of a cornice) to some point (out of the paper) on the centre line, and the projection, and consequently the height, of each cornice, was regulated by a second similar line from the edge of the lowest cornice. I had long been aware that the section of the dome of St. Paul's conforms to a similar line, and it was, therefore, extremely instructive to find another composition in course of being worked out by the aid of such a line, and to find the whole machinery of working left visible. Another noteworthy feature of this unfinished

design is that Wren had apparently intended, as his manner was, to carry the highest story of this construction by means of a kind of internal tower resting on a stone vault, or else to provide for a stone stair resting on a masonry arch; and in this section he had taken the trouble not only to show the outline of the vault or arch, but to indicate every voussoir, and to show how he proposed to work the extrados of each stone so as to form a kind of step. A staircase in exactly this position is shown in Clayton's drawing of St. Bride's church spire. Another instructive pencil drawing in this series is one identified by Mr. Penrose as a plan of the north-west tower of St. Paul's. This exhibits the construction of the tower at four levels. It was rapidly done, and, contrary to custom, no attempt to ink it in has been made; but it shows what it is meant to show sufficiently to enable a working drawing to be made from it, possibly sufficient to guide a good mason, accustomed to Wren's work, without further details in setting out the masonry and building it. A set of six very careful drawings, which Elmes refers to the year 1665, embodying the design of a library for St. John's College, Cambridge, deserve a notice as an early work, and as being accompanied by a report which exists in Wren's handwriting, and is printed in Elmes's life. From this report it appears that no such thing as keeping copies or duplicates was in use in Wren's time, as he asks that, when enough has been taken off from these drawings to permit a start to be made, the originals may be returned to him in order that he might give details for the mouldings. With these drawings there is a very spirited sketch in perspective, doubtless from Wren's own hand, of a reading-table and desk, such a drawing as would be a sufficient guide to a good workman. The collection includes a series of large and highly-finished drawings for Greenwich Hospital, probably prepared to show to the king, and entirely draughtsman's work. There are plans of alterations, surveys, and miscellaneous traces of a large practice, and of the various calls which it makes on time and trouble. One considerable plan is noteworthy for being sketched on paper previously divided up with pencil lines into squares, just like what is called "section paper" by engineers at the present day. There are a good many sketches of plan, mostly in ink, drawn to a small scale, and apparently without the use of a ruler, such as lead one to surmise that Wren possessed the faculty which is, from time to time, met with in architects, of being able to sketch the plan of an existing building or locality approximately true to scale, with but few dimensions to guide him. I ought not to omit that a few pencil sketches,—mostly of scenes including some building,—usually some mansion, but in some cases of picturesque spots interesting to a passing traveller—are preserved. I am inclined to believe that these are all Wren's. They are boldly and roughly drawn in pencil, trees are indicated by an impatient scribble, and the buildings are hurriedly drawn, but sufficiently well to show what they were, and the perspective is always good. These must not be looked upon as studies; they are a traveller's jottings. The shape of them is curious; they are almost all long and narrow, and with a crease in the middle, as though a sheet of paper had been cut into long strips, and then each one doubled and shut into a book or folio till wanted. The sum of these rather desultory observations may perhaps be this. The drawings show Wren to have been a rapid, free, but very accurate geometrical draughtsman. Geometry seems to be suggested by his methods as the inspiring motive of his work, as one might indeed expect to find it, when one reads in one of his fragmentary essays the following words:—"It seems very unaccountable that the generality of our late architects dwell so much upon the ornamental and so lightly pass over the geometrical, which is the most essential part of architecture." The contents of these folios testify to a fertile invention; but, I am inclined to think, not a fastidious taste. Wren seems, probably from having a great pressure of work to encounter, to have been apt to content himself with the first idea, and that not always a good one; but it is to be observed that in execution he generally revised and refined where, as in the case of St. Paul's, his constant supervision of the work gave opportunity for doing so. It appears pretty clearly also that structure was never absent from his mind. Not only were his designs things that could be built, but from the first the question of how to build them was con-

sidered at the same time as the question of what shape to give them, and long before the question of what ornament to bestow. The two or three professional reports and estimates preserved at Oxford concur with the various papers given in the "Parentalia," to produce the impression upon us of a most trustworthy, methodical, sagacious, energetic man of business, and it is almost as interesting to turn over these fragments of his writing and calculating as to scan his drawings. The whole thing brings the man himself very near to one; you trace the lines he drew, note the very holes left by the point of his compasses, you try to infer his modes of thinking and working from the traces here left, and you come away feeling as if you had had a glimpse into his very mind, and had seen him alive and at work; a feeling to which the cast of his features taken after death, and preserved in the Library, gives a pathetic tinge, for so startlingly real is it that the sight of it is much as though one had seen the old artist in his coffin. Her gentlemen, I propose to leave the subject, and if, in addition to giving you some information, I have succeeded in to any extent awakening your interest, and possibly have caused you to reflect that some lessons for the guidance of a nineteenth-century student of architecture may be gathered from the example of this keen investigator and strenuous worker of the seventeenth, my object in asking you to meet me to-night will have been fully attained."

#### SANITARY CONGRESS AT WORCESTER.\*

CONTINUING our notes of the Sanitary Institute's Autumnal Congress at Worcester, we may first of all make brief mention of a paper by Mr. J. T. Arlidge, M.D., F.R.C.P., on "The Sanitary Aspects of the Pottery Manufacture." In it the author noticed the sources of danger to health in the materials employed,—in the clay, flint, lead, and colouring matters; in some of the processes as carried out; in the high temperatures so often involved; and in the modes of working. Over and above all such intrinsic conditions, he briefly called attention also to collateral or extrinsic circumstances affecting the well-being of pottery artisans. But of all the causes of illness to be discovered, dust from the clay stands pre-eminent, and happily it is one that can be overcome to a great extent by those means of ventilation and of extraction modern mechanical science has brought to so great perfection. He concluded by adding that there have been vast changes for the better during the last twenty years and upwards, that the factory laws have been enforced. Child labour has been greatly curtailed, work rendered much more regular, and that at night practically almost abolished; numerous new factories, well built and roomy, have taken the place of dilapidated, damp, and confined structures; machinery has been introduced, reducing materially the number of unskilled hands employed, facilitating work and giving it greater development; means of ventilation by fans and other contrivances have been adopted in most factories where there is steam power, with a consequent enormous reduction of the most active cause of illness, the inhalation of dust; and, as might be anticipated, improvements in the mechanical and general sanitary conditions of their labour have been accompanied by a perceptible material and moral advancement of the employed. There is, nevertheless, ample scope for more; and ever onward progress may surely be looked for in proportion as more correct notions of sanitation extend and themselves among all classes; as the ingenuity of mechanicians improves the appliances of labour and invents means for lessening evils attaching to it, and as education spreads and succeeds, instructing artisans in their true interests, both in respect to morals and to health.

The Section devoted to "Engineering and Architecture," was opened on the morning of Thursday, the 26th ult., when the President of the Section, Mr. Henry J. Marten, M.Inst.C.E., delivered his opening address. In the course of it, he took a retrospect of some of the advances made during the last forty years in connexion with fen drainage, town and village sewerage, house drainage and domestic sanitation, water supply and fittings, smoke consumption, and other matters. On the subject of town drainage, he said:—

"I remember the early reports of the Sani-

\* See Builder, p. 226 ante.



tary Inspectors of what was then termed the Board of Health, as to the state of things forty years since, with regard to these subjects. The reports disclosed, as then almost universally existing, a most horrible state of affairs, which is now, happily, only exceptional. Open and almost stagnant sewers in close proximity either to the front or back doors of rows of houses, and whilst festering there, giving off large volumes of poisonous gases. Leaky dumb-wells, sunk in porous ground, receiving the sewage from large numbers of houses, with the pumps for the supply of the said houses drawing their water from shallow wells sunk in close proximity to those dumb-wells. Drains, where they did exist, untrapped, and through which at night, when all the doors and windows in the house were closed, the only supply of air for the inmates could be obtained. Sewers, properly described as only 'elongated cesspools,' much too large for the work to be performed, constructed in many cases of porous materials, of very unsanitary section, and with but little regard to gradient.

No one whose memory does not carry him back to that period can now conceive of the amount of ignorant and selfish opposition which Mr. (now Sir Edwin) Chadwick encountered. When, acting as Secretary to the Board of Health of that period, it became his duty to call public attention to this state of things, and to suggest the remedies for them.

One of the great difficulties with which Sir Edwin Chadwick had to contend was the then existing idea that every sewer must be a 'Cloaca Maxima.'

Classical gentlemen when visiting Rome were shown, amongst the other antiquities of the place, the mouth of that sewer, and being in the humour to fall down and worship any work of the imperial and practical Romans, they, of course, fell down and worshipped that particular work, which was all very well in its place, but which was not adapted for universal and indiscriminate application. If this worship had been in the nature of a 'silent cult' it would probably have done very little harm, but, unfortunately, the worshippers were zealous to make proselytes, and everywhere preached the doctrine of large sewers—'nothing smaller than such as a full-grown man could walk upright in,'—and, in fact, everywhere and for all sewage purposes, 'Cloaca Maxima, Cloaca Maxima,' was the cry. . . . Shortly after the advent of Sir Edwin Chadwick, however, 'Cloaca Maxima' worship received more of that gentleman's attention than its worshippers altogether appreciated; and after being severely wounded in several vulnerable points by that veteran sanitarian, this form of worship was, after a severe struggle, finally and ignominiously done to death in, I believe, a backyard in Westminster.

The way of it was this. Some practical but scientific sceptics one day took a peep into one of the old-fashioned metropolitan 'Cloacas Maxime.' To their astonishment they found more than four-fifths of the sectional area of our 'Cloaca Maxima' filled with putrid mud, over the top of which a little stream of gas-bubbling sewage was dribbling along; that is, they found the boasted 'Cloaca Maxima' to be nothing more than a putrid mud trough with a trickle of sewage passing through it.

Having digested this fact, they bethought themselves of trying what would happen if this trickle of sewage were passed through a small glazed earthenware pipe.

Pursuing this inquiry in a methodical and practical manner, a length of such small earthenware pipe was laid down, and the 'Maxima' quantity of the sewage was poured down its throat, and to everybody's astonishment the little 'pot-pipe' accomplished not only all that 'Cloaca Maxima' did, but even more, for it not only freely discharged the whole of the sewage passed into it, but left no festering sediment behind in the pipe.

Here was a great fact established,—namely, that a small glazed earthenware pipe, laid at the same gradient as 'Cloaca Maxima,' could not only discharge all the sewage usually passed by its big brother, but was, in addition, 'self-cleaning,'—that is to say, it not only left no sedimentary matter in it, but removed any extraneous matter purposely placed therein.

Now began the battle between the 'Cloaca Maxima' principle and what in derision was termed the 'pot-drain,' and a right royal battle it was. Architects, engineers, and builders were at first almost universally on the side of 'Cloaca Maxima,' whilst 'pot drain' was supported by Sir Edwin Chadwick, backed only by stubborn facts. However, after a

hard struggle little 'pot drain' gained so complete a victory over 'Cloaca Maxima' that even its greatest devotees were eventually obliged to discard it as a species of antiquated demon worship. This is the early history of our present system of sewage removal by water carriage, and so complete has been the revolt from the 'Cloaca Maxima' principle, that I may mention as an instance of its discomfiture I have for several years past, without stoppage or inconvenience, been passing by gravitation, up hill and down dale, the whole of the sewage of Dudley, a town in this county, containing nearly 30,000 inhabitants, through a pipe five miles in length and only 13 in. internal diameter."

Among the papers read in this section was one by Prof. Henry Robinson, M.Inst.C.E., on "Sewage Disposal," in which he briefly reviewed new processes and proposals. His concluding remarks were as follow:—"The regulations which are enforced in this country to diminish death-rate by proper sewerage and sewage disposal works should be applied abroad, wherever our influence can be exerted to mitigate sanitary evils which abound in many great centres of population in the British Empire. At the recent International Congress of Hygiene in Paris, the insanitary condition of Alexandria was referred to, and its state was denounced as a danger to all Europe. The necessity for properly dealing with the sewage of Calcutta has long been recognised, and it is understood that steps are being taken to remedy the existing unsatisfactory state of things that prevails there, Mr. James Kimber, C.E., being now engaged in advising the Commissioners of that place what ought to be done. Numerous similar large centres of population under our influence could be quoted where much-needed sanitary reforms are demanded. There is a great waste of public money throughout the country in regard to sewage disposal. Many towns are continuing the employment of systems which have long since been superseded, and I consider that at a time has arrived when an investigation by an impartial and qualified Commission into the question of sewage disposal would lead to most valuable and useful results to the community, both from a sanitary and economic point of view."

Mr. Robert Godfrey, Assoc.-M.Inst.C.E., also read a paper on "The Amies Process of Sewage Treatment," a process which we described and commented upon in the *Builder* for September 21 (p. 206).

Mr. Henry Law, M.Inst.C.E., read a paper on "A Method of Regulating the Maximum Discharge of Sewers," and Mr. Harry R. Newton, F.S.A., F.R.I.B.A., followed with one on "On the Errors of Exposing Sewage to Light and Air, and on the Remedy for such Evils." Mr. B. H. Reeves also read a paper, "On Experiments in Sewer Ventilation, considered in relation to the Public Health." To these three papers we may return.

Professor C. R. C. Tichborne, F.I.C., read a paper on "The Interception of Miasmatic Emanations from the Subsoil of Dwellings." In the course of it he said:—"Centuries ago the Romans had arrived at a knowledge of the requirements of a good dwelling-house, which puts us in the year 1889 to the blush. Vitruvius would smile at our modern hygiene. One of the points which received their special care was the construction of their basement floors, the barrier between miasma and their domiciliary supply of air food. When a man lays his head upon his pillow to enjoy those precious eight or nine hours of rest, does he, in nine cases out of ten, breathe the natural atmosphere of the district, wherever that may be? In my opinion he does not. He has simply placed himself under an inverted bell-jar, or a structure of a similar nature, which collects, and before morning is filled with, the volatile sweatings of the surface soil. This soil is distilling (I use the term as being strictly correct) into the building all the contaminations which it has received during the day. But the soil has besides its special poisons, which it generates in its own laboratory. The old Roman mansions were protected by layers of concrete, and one of these upper layers consisted of powdered charcoal. Some little attention has been given, within the last few years, to the subject of basement floors, but chiefly in isolated cases, where scientific men have personally superintended the construction of their own houses. Wherever trouble has been expended it has been attended with the best results. I take this not from hearsay, but from personal

knowledge. In approaching upon a scientific basis the subject of the concreting of basement floors, the following question at once presents itself to our minds: What is the actual extent to which cement will prevent the passage of miasmatic or deleterious vapours. Deleterious vapours may be divided into two distinct classes: 1st, the permanent gaseous poisons, such as sulphuretted hydrogen; 2nd, organisms such as microbes, bacilli, &c. Where the first class ends and the second commences it will require the bacteriologists of the next century to define, and for our purposes it will be as well to consider them as distinct forms of matter. First, then, to consider the question of porosity, or in other words, how far are these different cements capable of passing gases. This point is roughly, but efficiently, determined by the following simple experiments, or series of experiments:—

Thin tubes were taken, 1 ft. long and  $\frac{1}{2}$  in. internal diameter. These were carefully plugged with the cements to be tried, an exact inch of each cement being set in the ends of the tubes. Some of these tubes were allowed to stand four months before being used, so as to get perfectly set. The following materials were used as being typical:—No. 1, fine mortar, made by adding one part quicklime to two of sand; No. 2, plaster of Paris or anhydrous gypsum; No. 3, Roman cement; No. 4, Portland cement; No. 5, hygienic cement. This last is a cement with which we have obtained some very successful results in Dublin, and many of the tests given further on prove that it is specially applicable to basement floors. The specimen experimented with contained about five per cent. of carbolate of calcium, naphthalene, &c.

These different tubes were air-dried; each tube was then closed at the end by an indiarubber cap, which could be removed at will. They were then filled with mercury and inverted in a mercurial trough, so that a toricellum vacuum was formed in each tube. The caps were then removed, and by observing the order in the fall of mercury, the relative porosity could be determined. It stood in the following order:—

	Relative amount of Porosity.
1. Mortar .....	100
2. Plaster of Paris .....	75
3. Roman cement .....	25
4. Portland cement .....	10
5. Hygienic cement .....	10 or 8

Their relative position as regards porosity could be determined with certainty; but in the second column is an endeavour to give the relative amount of porosity. This last column, although it conveys a very good idea, is only a rough approximation. It was arrived at by performing a number of experiments, and noting the respective times the mercury took to fall. Even if elaborate apparatus had been constructed to arrive at these results with great precision, such precise experiment would be of little use, as hardly two samples of similar kinds of cement would agree to a nicety.

The fall of a foot of mercury, in the case of mortar, is called one hundred, because it is the most porous material,—in fact, it is almost instantaneous, and lasts about half a second. It can just be followed with the eye. The Portland cement is extremely slow, the last inch of mercury taking nearly a quarter of an hour.

A series of experiments were then performed with similar tubes, to determine the rate of diffusion of gas through these different materials. These experiments are confirmatory, but yet in a degree are distinct from the previous ones in the bearing. In such experiments we are drawing important inferences as to how layers of these different kinds of materials would influence what has been aptly called the "ground respiration." Any gas that may pass through such septums or layers of cement will obey Graham's law of diffusion, viz.:—That the rate of diffusion is in inverse ratio to square-root of their gravity. Hydrogen was the gas selected to try against atmospheric air. The tubes were again capped with indiarubber, and were filled by displacement with hydrogen gas. They were then inserted into a trough of water, and the caps were removed. A partial vacuum was created in each experiment, which raised the level of the water in each tube according to the respective rate of the diffusing hydrogen, which, as it was the lighter gas, passed through more rapidly than the atmospheric air passed in.

The relative heights of the column of water,



above the level in the trough, are given according to the time observed.

	Min.	Min.	Min.	Min.	Min.
	1	3	13	20	30
	in.	in.	in.	in.	in.
Lime mortar	1	1	0	0	0
Plaster of Paris	1	1	2	2	0
Roman cement	1	1	2	2	1
Portland cement	1	1	1	1	1
Hygienic cement	1	1	1	1	1

It will be observed that lime-mortar is hardly worthy of being called a septum, and is practically without any controlling action upon gases—in fact, under such circumstances, it should be viewed merely as a coarse sieve. It could not exert any control over gross respiration. In the case of the cements it is very perfect, but necessarily slow. The practical reading to my mind is that any ground gas would pass through such materials as the hygienic cement very slowly, if at all, because the atmosphere being of a lighter density than such gas as sulphuretted hydrogen, or carbonic acid gas, a downward diffusion would take place; or we may put it that a ground inspiration would be set up, and that atmospheric oxygen would be carried into the surface soil. The atmospheric oxygen would oxidise the noxious organic matter exactly on the same principle as it destroys the pollution of rivers—if we only keep the organic matter in a sufficient state of attenuation.

So far, we have merely treated the question of gaseous diffusion, but it is probable that the most important part of the investigation is the action of cements on the germ contamination. Tyndall has pointed out that plaster-of-Paris, and even a surface of strong sulphuric acid, is incapable of separating germs. In fact, the only filter which he found successful was cotton wool. This observation has been thoroughly indorsed and made use of by subsequent workers in bacteriology. Now, to determine the action of cements in separating germs, a series of Pasteur's retorts, or flasks, were filled with sterilised hay-infusion, and were then plugged with different cements. The retorts, contents, and plugs were all sterilised at a temperature of 212 for some days. On being closed they were placed in an incubator. In a short time all of these solutions went with the exception of the hygienic cement—one which is perfect still.\* It is also interesting to observe that the next best flask is the plain Portland cement. There is only one conclusion to arrive at,—that the air, in passing through this inch of hygienic cement, was perfectly sterilised.

Asphalte acts as a perfect plug, but I should say that it is objectionable, because, if we have every large area cemented by this material, the surface gases will be more or less under pressure, and if so will force their way through any of the numerous cracks and fissures, which must exist in an ordinary house; besides this, it will largely permeate up the walls, which we now see are formed of very porous material.

As regards the permanency of the antiseptic action of hygienic cement, I may as well give here the analysis of a sample of concrete made with it and laid down in Gray's Inn-road in 1885.

It was taken up in 1889, when it gave on analysis:—

Moisture	3.00
Antiseptic matter of an extractive nature	1.98
Carbonic acid	0.74
Granite with cement	94.90
	100.00

When broken it smelt strongly of the antiseptic used.

I believe that these experiments throw considerable light upon the question of atmospheric contamination from the basement of houses, and I have, therefore, thought it desirable to place them in a concise form before the Sanitary Institute."

**Croydon Improvements.**—The Croydon Town Council unanimously resolved on Monday last to apply to Parliament for powers to purchase by compulsion property in High-street, Middle-row, and Surrey-street, in order to widen the High-street, and abolish a series of rookeries behind. The scheme will cost at least 100,000, and has been before the local authority nearly thirty years. The Council have already decided to acquire the Central Croydon Station of the Brighton Company and land adjoining, and to erect a new Town Hall and municipal buildings, including a central free library.

#### THE LONDON COUNTY COUNCIL.

THE first meeting of the London County Council after the summer vacation was held at the Guildhall on Tuesday last, Lord Rosebery presiding. Before the ordinary business was proceeded with, the Chairman referred to the untimely death of the Deputy-Chairman (Mr. Firth). Lord Hobhouse moved, and Mr. Fardell seconded, "That this Council desires to place on record its sorrow for the severe loss it has sustained by the untimely death of Mr. J. F. B. Firth, who, by his industry and ability in obtaining a perfect mastery of London affairs, and by his courtesy, patience, and devotion in discharging the arduous duties of Deputy-Chairman of this Council, has rendered priceless services to the inhabitants of London." The resolution was carried, and it was resolved that a copy of it should be forwarded to Mr. Firth's widow.

**Strand Improvements.**—The Improvements Committee have been entrusted, by resolutions passed by the Council on April 9 and May 7 last, with the consideration of "the best method of increasing the accommodation for vehicular traffic in the Strand, having regard at the same time to the desirability of preserving the church of St. Mary-le-Strand," now reported that they were not at present prepared to report upon the whole of the questions embraced in the above references, but that they thought it desirable, as time pressed with regard to the requisite Parliamentary Notices, to report upon that part of the subject which has reference to the widening of the narrow portion of the Strand which lies between the churches of St. Mary-le-Strand and St. Clement Danes. The report of the Committee goes on to state that:—

"The part where the greatest obstruction to traffic exists is between Surrey-street and the church of St. Clement Danes, a portion of which measures only 40 feet in width, and it is manifest that the widening of this portion of the thoroughfare is a matter of the most pressing necessity. Your committee have no hesitation, therefore, in advising the Council to apply for powers to demolish the block of buildings on the south side of Holywell-street, and it may be pointed out that if this be done the Strand will offer a favourable comparison with the eastern sections of the line of thoroughfare of which it forms part (Fleet-street, Ludgate-hill, and Cheapside).

No doubt the accumulation of vehicles at the time of exit from the theatres is considerable, and imposes serious difficulties upon the police; but it must not be forgotten that if the Strand were widened sufficiently to comfortably accommodate this traffic, it would have to be very considerably wider than at present, which, of course, is out of the question.

In addition to the removal of the buildings on the south side of Holywell-street, it appears to your Committee desirable that powers should be obtained to deal with the enclosed land adjoining the two churches, and also to make better arrangements than those which now exist with regard to the places of convenience in the locality of the two churches. The recommendation which your Committee have now to submit is as follows:—"That the Council do apply in the next Session of Parliament for powers to remove the block of buildings on the south side of Holywell-street, and to deal with the enclosed spaces, together with the public conveniences adjoining the churches of St. Mary-le-Strand and St. Clement Danes."

This report called forth considerable discussion, the recommendation of the committee being supported, amongst others, by Mr. Augustus Harris, who said that while many improvements had recently been effected in every part of the Metropolis, nothing had been done in the Strand. The smallest contribution would be thankfully received, and he hoped that the committee would not prevent some portion of the proposed improvement being considered. Colonel Hughes and Mr. Harben objected to their going to Parliament at present, before they knew what the cost of the improvement would be.

An amendment was moved to the effect that the matter should be referred back, but was lost, as also was an amendment moved by Mr. Beacherot, to apply for power during the next Session of Parliament to deal with the widening of the Strand between the churches of St. Mary-le-Strand and St. Clement Danes.

The Chairman said that if the improvements were postponed until next year, that would be the last year of their existence. He thought that they ought not to reject a partial improvement, provided it would not interfere in any way with a larger scheme. The recommendation of the committee was ultimately approved, the voting being—for the recommendation, 50; against, 36.

Reports from the Bridges and Building Act Committees were brought forward and passed, and soon after the Council adjourned.

#### FURTHER NOTES OF THE SANITARY EXHIBITION AT WORCESTER.\*

THE "Archer" air and water tight sewer-pipe joint, which was described and illustrated in the *Builder* for July 14, 1888, and was again referred to in our columns on Jan. 12, 1889, is exhibited under rather trying conditions. Two lengths of stoneware pipe with Archer's patent joint are placed girderwise on bearings as far apart as the two lengths of pipe will allow, with the joint in the centre of the span. This improvised beam or girder is then loaded with a load of more than one hundredweight, but it stands the ordeal well. Other lengths of jointed pipe are placed on end and used as water-reservoirs (the bottom end being plugged up), without any leakage being apparent at the joints.

The Westminster Patent Flooring Company exhibit their "Disc-Key" block flooring, which is worth notice.

The Worcester Sanitary and Ventilating Company exhibit what appears to be a very good warming and ventilating grate, the outer air being warmed by passing through the fireclay back. They also show "Lloyd's" patent joint for soil and waste-pipes, which consists, briefly described, of an annular socket, into which the next length of pipe fits, whitelead, putty, or some other cement or stopping being previously placed in the narrow annular space. This form of joint may answer for external pipes, but we should be very chary of using it for internal soil-pipes or wastes. Buchan's disconnecting trap, Steven's range ventilator (a very desirable thing to use with close kitchens), a sluice-valve for flushing drains with their own contents, a very good form of slop-pail with valve-lid, and a sanitary dust-bin, are among the many useful items of this stand.

Moule's earth-closets, Morrell's dry-closets and cinder-sifting dustbin, and Nicholls & Co.'s antiseptic pail-closets, may be mentioned together, although they are exhibited on different stands. They each and all have their special merits for use under particular circumstances.

At Stall 8, the Sanitary and Economic Association of Gloucester have a very good display of wash-out and other types of closet, as well as other sanitary appliances, including Angell's improved airtight man-hole covers. Some instructive diagrams illustrate the dangers of bad plumbing work, and show the methods of doing the work properly. These diagrams are further enforced by an "object-lesson" in the shape of a number of "horrid examples" of bad plumbing work.

At Stall 13, Messrs. Peters, Bartsch, & Co., of Derby, exhibit their preparation, known as *Carbolinum Avenarius*, for the preservation of wood. This was noticed in our columns a few years ago, and, judging from the statements made with regard to some specimens exhibited showing tests made by the Midland Railway Company, there appears to be some virtue in the preparation. The same firm also exhibit a preparation named "anti-oxide," for the preservation of iron from rust.

Messrs. C. Kite & Co., of London, have, as usual, a very good display of ventilators, through one of which, of the water-jet type, and 8 in. in diameter, we are assured that 26,000 cubic feet of air were passed in an hour, with a consumption of about 25 gallons of water.

Messrs. H. & C. Davis & Co., of London, make a good show of their "Metropolitan" and other gas-stoves.

At Stall 20, Webb's Worcester Tiles Company make a very good display of encaustic, wall, and other tiles, which, while good in design and colour, have an obvious sanitary value.

Messrs. Joseph Cliff & Co., of Wortley, exhibit some admirable enamelled fireclay baths, sinks, &c. They also show a number of specimens of their new "Wortley Faience," one variety of which is called "Malachite ware." Among their other exhibits is a "Roman-shape" enamelled fireclay bath, with parallel sides; a hospital bath, of fireclay, enamelled both outside and inside, to facilitate cleansing, and to stand without any casing or enclosure; a very good hospital slop-sink; and the "Cecil" slop-sink, with a flushing-rim.

\* September 19, 1889. Three weeks old.

\* See p. 221, ante.



Mr. H. Trott has a bright and showy stand of cases, containing water fittings and valves, and plumbers' brasswork generally.

Messrs. Croggon & Co. have on view a number of galvanised wrought-iron sanitary dust-bins and cinder-sifters, including Clague's patent dust-bin and cinder-riddle. We are glad to see that appliances of this sort are superseding the old-fashioned, ill-constructed, rarely-emptied, and altogether insanitary yard or area dust-bin.

Messrs. Manlove, Alliott, Fryer & Co., of Nottingham, have a very good display of machinery and appliances, including Washington Lyon's admirable steam disinfecter for laundries and public institutions; also models of Fryer's "Destructor," with Jones's fame-creator,—the latter a great improvement. It was described in the *Builder* a year or two ago. Models of sludge-presses and filters, and of "Johnstone's patent dryer," for drying offal and other offensive town garbage,—a very ingenious and quite inoffensive apparatus,—are shown by these exhibitors, whose stand is well worth attention by Town Surveyors and others.

Mr. George Slater, of Sheffield, exhibits a useful glass case entitled the "Hygiene Cabinet," which contains specimens, apparatus, and models of sanitary appliances. The cabinet is intended for use in teaching the general principles and practically demonstrating lectures on hygiene and sanitary science. It is a good idea, well carried out.

Jey's Sanitary Compounds Company (Limited) exhibit not only their compounds, but the ingenious "automatic disinfectant distributor," which was described and illustrated in the *Builder* last week (p. 221).

Mr. Dean (Stall 92), of Guilford-street, London, exhibits his well-known "stench-traps" in an improved form, and a very good grease-trap, with the inlet from the sink discharging below the water line of the trap, so that all new accretions of fat after the initial layer pass into the water below that layer and adhere to the bottom of it. The fat is collected within a wooden float fitted with a metal rim, by the use of which it is claimed that 90 per cent. of the fat passing into the trap is removed at one operation. These and other stoneware goods shown at this stand are made by Mr. J. O. Edwards, of the Ruaton potteries. At the same stand and from the same potteries is shown Messrs. R. Norman Shaw's and T. L. Watson's "Channel Drain-pipe," of which we spoke in a "Note" in the *Builder* for July 20 last. We are still unable to regard it as an ideal form of drain-pipe.

Messrs. Winsor & Co., of Buckingham Palace-road, London, exhibit their intercepting sewer-trap; their admirable channel-pipes and bends for manholes and inspection-chambers (favourably noticed by us three years ago when shown at the Sanitary Exhibition at York); the "Dececo" and "Buckingham" closets; Stokes's gully-trap, specially adapted for giving access to the drain-pipe on the sewer side; and their new air-tight manhole cover with asbestos packing.

Mr. R. W. Tomlinson, of Leicester, has a useful stand, including an enamelled fireclay bath without casing, though the exterior is very absurdly painted and grained in imitation of oak and walnut panelling. The actual wooden boxing or casing has here evidently been given up with a pang, and consolation has been sought in the semblance of the thing that was.

There are, perhaps, other exhibits which would call for notice did space permit, but we have only aimed at giving a general idea of the Exhibition, which, we may repeat, will remain open until Saturday, October 19.

#### OBITUARY.

*Mr. James Holloway.*—The death took place on the 23rd ult., of Mr. James Holloway, the well-known builder, which occurred at his residence, "Normanbury," South Side, Clapham-common. Mr. Holloway, who has assisted in carrying out several important local works, died at the early age of thirty-eight. The remains were interred at Norwood Cemetery on Thursday, the 26th ult., the funeral being well attended.

**Registration of Plumbers.**—A mass meeting of plumbers in the Western District of London is announced to be held on Thursday, October 10, at 5.30, at the Town-hall, High-street, Kensington, for the purpose of considering the registration of plumbers promoted by the Worshipful Company of Plumbers.

#### Illustrations.

##### REREDOS, ELVETHAM CHURCH, HANTS.

THE whole of the work of this reredos is made of wood, all painted and gilded, with the exception of the centre and side panels, which are alabaster. These represent the Crucifixion and the Annunciation.

The woodwork and some painting was carried out by Mr. G. F. Wright, of Westminster, and the alabaster figures by Messrs. Farmer & Brindley. The rest of the painting was done by Mr. H. A. R. Smith, of Lewisham, and the architect, Mr. A. H. Skipworth.

The drawing from which the illustration is taken was exhibited in the Royal Academy of this year.

##### THE HALL, BLACKHEATH, FRISTON, SUFFOLK.

The illustration shows the grand hall at Blackheath, the Suffolk seat of Mr. T. F. C. V. and Lady Harriet Wentworth.

The house, which is entirely new, takes the place of a smaller edifice, originally on the site, of no particular architectural pretensions, and which was pulled down.

The site is a wild and beautiful spot, on the north bank of the Ald, well known to frequenters of Aldeburgh, and distant therefrom about three miles. The house is surrounded on three sides by pines—fine, well-grown trees, which afford splendid protection from the cold winds, and are the home of herons and other wild birds, and whose dark foliage is in beautiful harmony with the red brickwork of the house.

The mansion occupied over two years in building, and was completed and furnished last year.

Thin red bricks, made on the estate, are used for the facings, with cornices, string-courses, and other embellishments in Ancaster stone, and Broseley tile roofs.

The principal entrance is through a tower 65 ft. high, placed on the west side. This leads into the vestibule, 20 ft. square, and through wide swing doors into the hall. The greatest length of the hall is 60 ft. by a width of 32 ft., and from floor to ceiling of lantern is 35 ft. The woodwork is in the finest wainscot and pollard oak, with oak parquet floors, and the walls are hung with damask. The heating is by open fire-places and hot-water pipes, and this system is generally applied throughout the mansion. Around this hall all the principal rooms are grouped, the drawing-room to the south, the dining-room to the west, her ladyship's boudoir and other private rooms to the east, with gun, smoking, and business rooms and sportsmen's entrance to the north.

The dining-room is panelled in wainscot, 11 ft. high, with deep plaster frieze and cornice above, the dimensions being, 30 ft. long, 27 ft. greatest width, and 13 ft. 6 in. high.

The chimney-piece, likewise in oak, is carried up to the ceiling, whilst in the frieze of the wainscoting are sixty-five shields, with various quarterings of the Wentworth family. Similar quarterings are also inserted in the windows of the porch and vestibule, and are all painted in the proper colours.

The drawing-room is 56 ft. by 27 ft. greatest length and width, and the woodwork is of Havanna cedar, a three-centred open archway dividing the room into two parts.

The carvings throughout are of an elaborate and varied character, with the various crests and quarterings of the family freely introduced therein. They were all executed by Messrs. John Groom & Son, of Ipswich.

Messrs. J. & A. Brown, of Baintree, were the general contractors, Mr. W. H. Gibbs, of Saxmundham, executing the bricklaying and plastering, Mr. Alfred Winch, of Ipswich, fitted up the kitchen ranges, &c., and Mr. Barker, of Aldeburgh, did the electric bell hanging.

The whole of the work was carried out from my designs and full-size details, and under my supervision.

R. F. BISSHOPE.

##### BINGHAM'S, MELCOMBE.

THIS is an old house in the centre of Dorsetshire, about four miles from Puddletown. The plan much resembles Athelhampton, and has a gateway facing the entrance-porch shown in the sketch. Not far off is Melcombe Horsey, formerly the residence of the Horsey family. The work at Melcombe Bingham should be compared with the porch at Montacute. This

and the next-named illustration are from sketches made by Mr. R. W. Paul, during a "Pugin Scholarship" tour.

##### ENTRANCE GATEWAY, FORD ABBEY.

THE gateway entrance-porch at Ford forms one of the chief features of Abbot Chard's work, 1521-44. To the left is the hall, and to the right the cloisters,—all the work of the same man. The cloisters are, however, now divided from the porch by a building added by Inigo Jones. There are two floors over the entrance (one only is shown in the sketch), and the tracery of the windows has been cut away in later times, and altered to suit the adjoining Renaissance work. The shields in panels of bay window contain the arms of Courtenay, De Redvers, and Baldwin de Brionis. Over the entrance is a later shield with arms of Trideaux impaling Ivery.

##### OLD COTTAGES, &c., ABOUT THE GOLDEN VALLEY, GLOUCESTERSHIRE.

THESE examples are taken from Chalford, a large village that hangs on the steep side of the hills, and is conspicuous from the railway approaching Brimscombe. The village is full of good "bits."

All the old buildings here are roofed with a local brown stone slate, which, though lacking in colour, gives a solid look to the work. In one instance this stone roof was, during my stay, supplanted by one of slate, with the result that the building was rendered comparatively common-place. The ridges and hips are made of freestone, and in many cases finials similar to those on No. 2 are used. The usual finish is, however, the little triple gablet. A marked feature is the use of string-courses, extending over two or more windows, and in some cases round one side of a house. No. 3 stands on the Thames and Severn Canal, which climbs the valley here at the rate of a lock and a mill to every few hundred yards. The red brick bridges, being of a respectable antiquity, are often very picturesque.



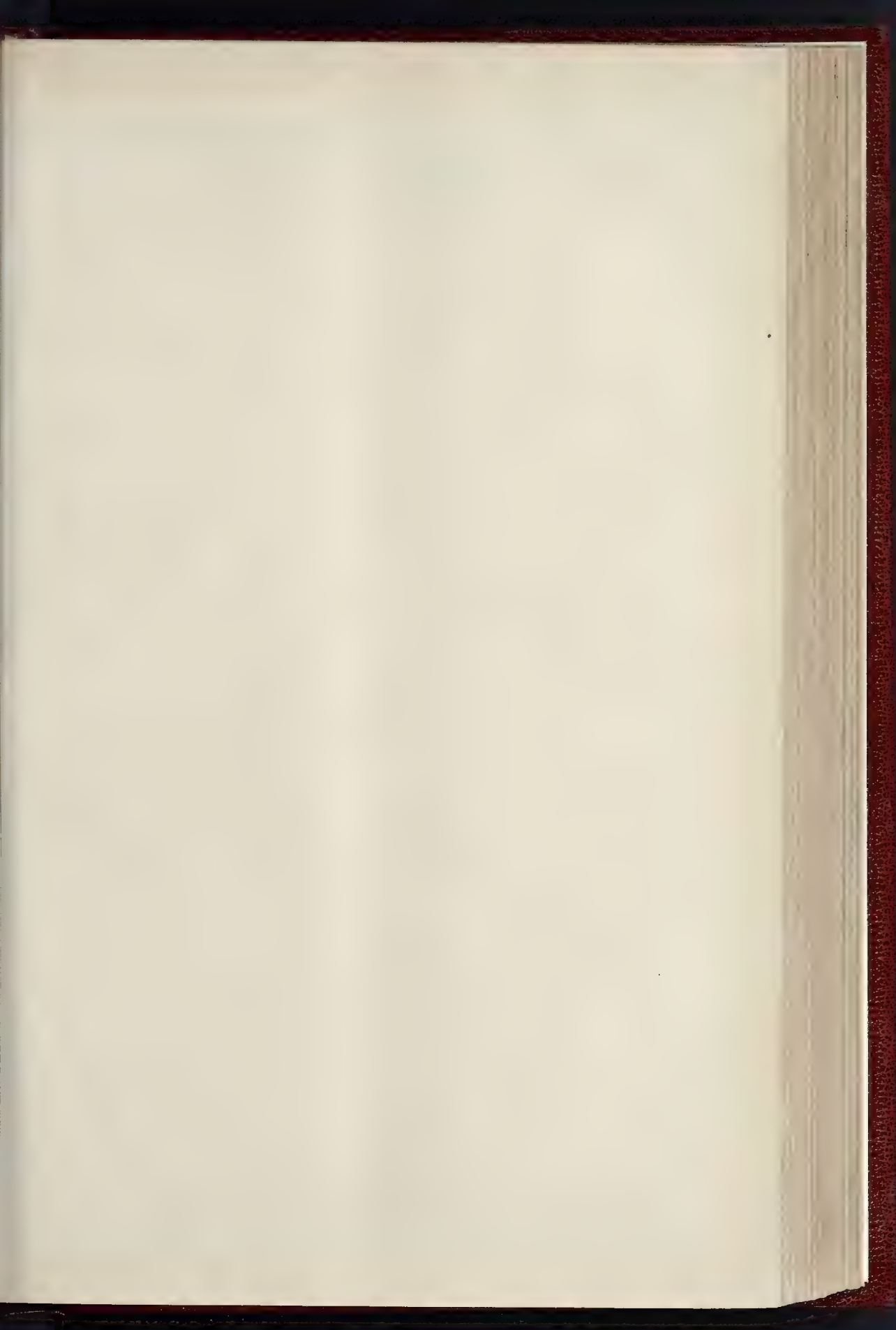
Bagpath House has a very characteristic tower-like ending, perhaps the most picturesque feature of this country.

The house at Brimscombe has the date 1649 on the chimney. The way the coping is worked into the chimney is worthy of notice.

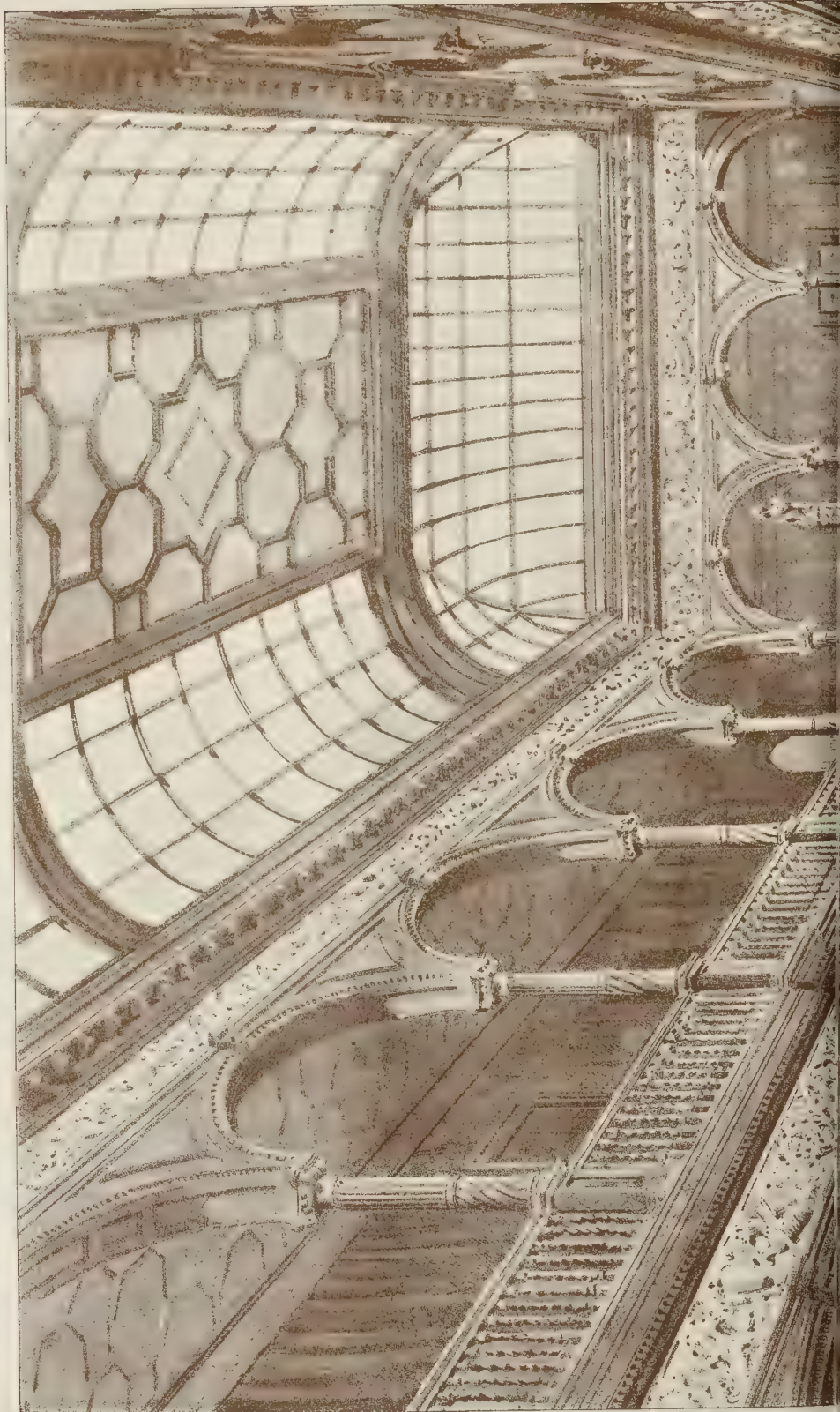
RALPH NEVILL.

**Newchurch - in - Rossendale Board Schools.**—These schools were formally opened on Saturday by Mr. F. H. Freeland, B.A., her Majesty's Inspector of Schools for North-east Lancashire. The building is one story only in height, and has accommodation for about 300 children. The schools are designed on the classroom principle, the larger rooms being subdivided by means of revolving screens. The whole of the external walls are faced with local stone, the heating being by means of hot-water pipes. Boyle's exhaust coils are used to assist the ventilation. The building was designed and carried out under the superintendence of Mr. Thomas W. Cubbon, architect, of Birkenhead, whose plans were selected from 139 submitted in public competition. Mr. A. E. Emmett acted as clerk of works.





THE BUILDER, OCTOBER 5, 1889.



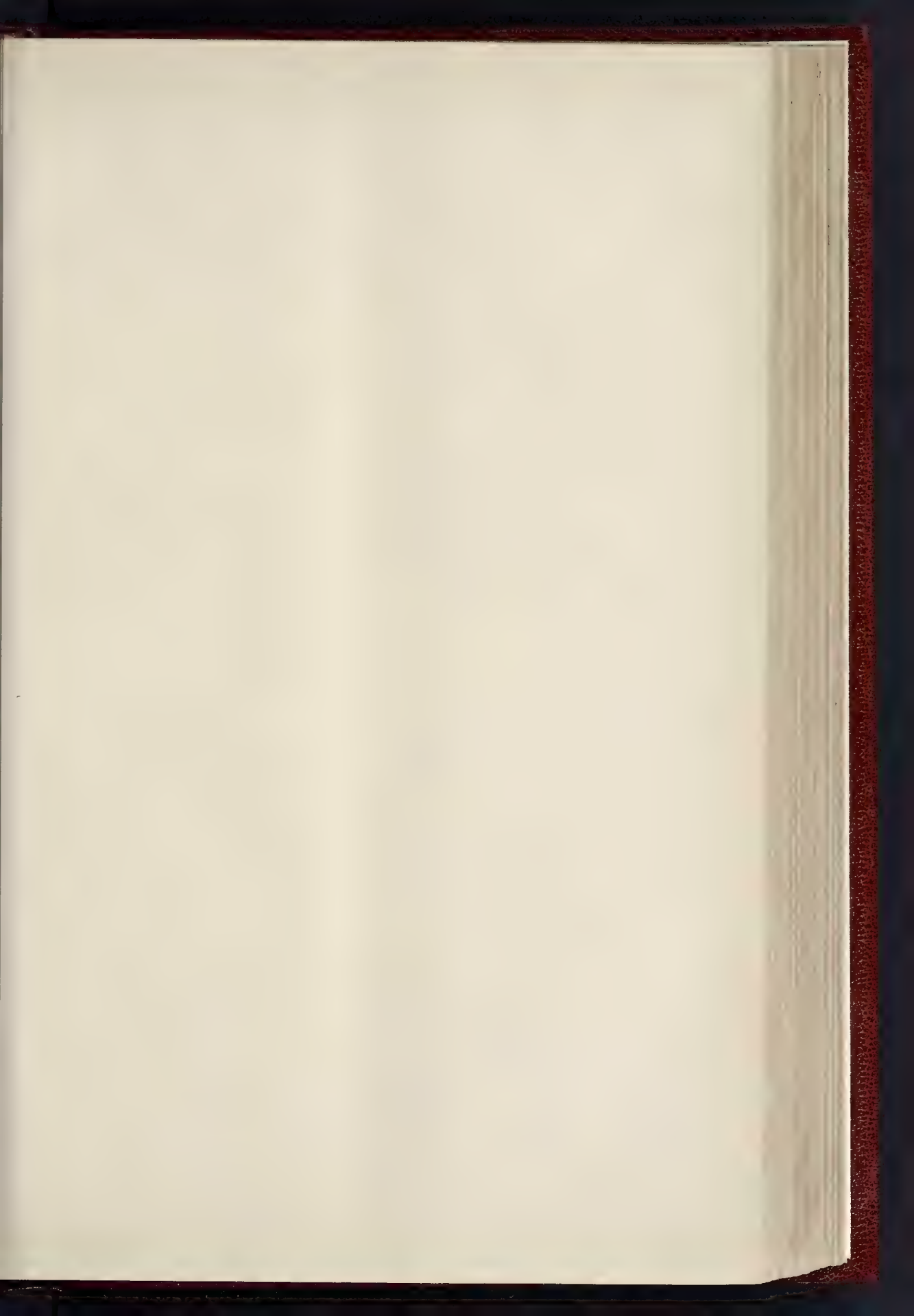




THE HALL, LACKHEATH, FRISTON, SUFFOLK. MR. E. F. BISHOPP, ARCHITECT.

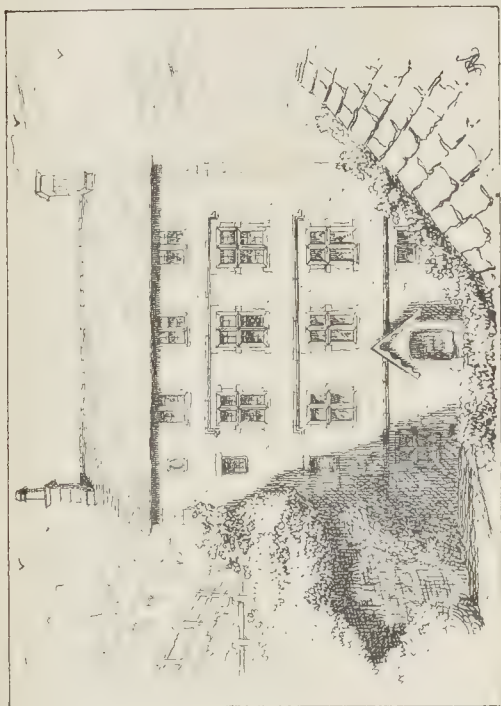








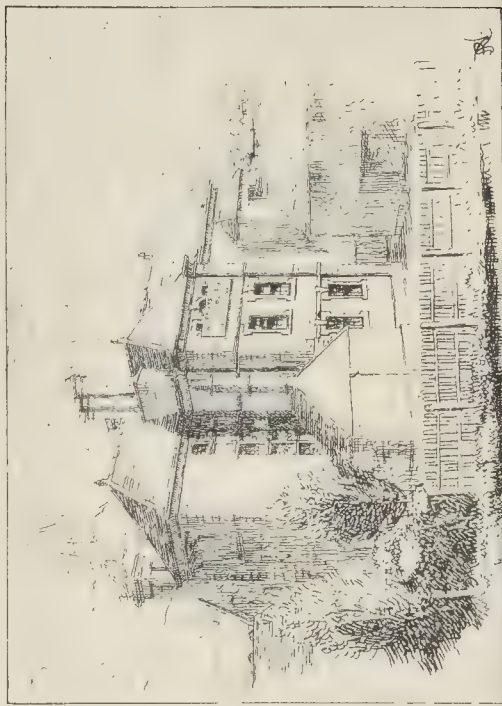
AS-11 NEW YORK



AS-14 NEW YORK

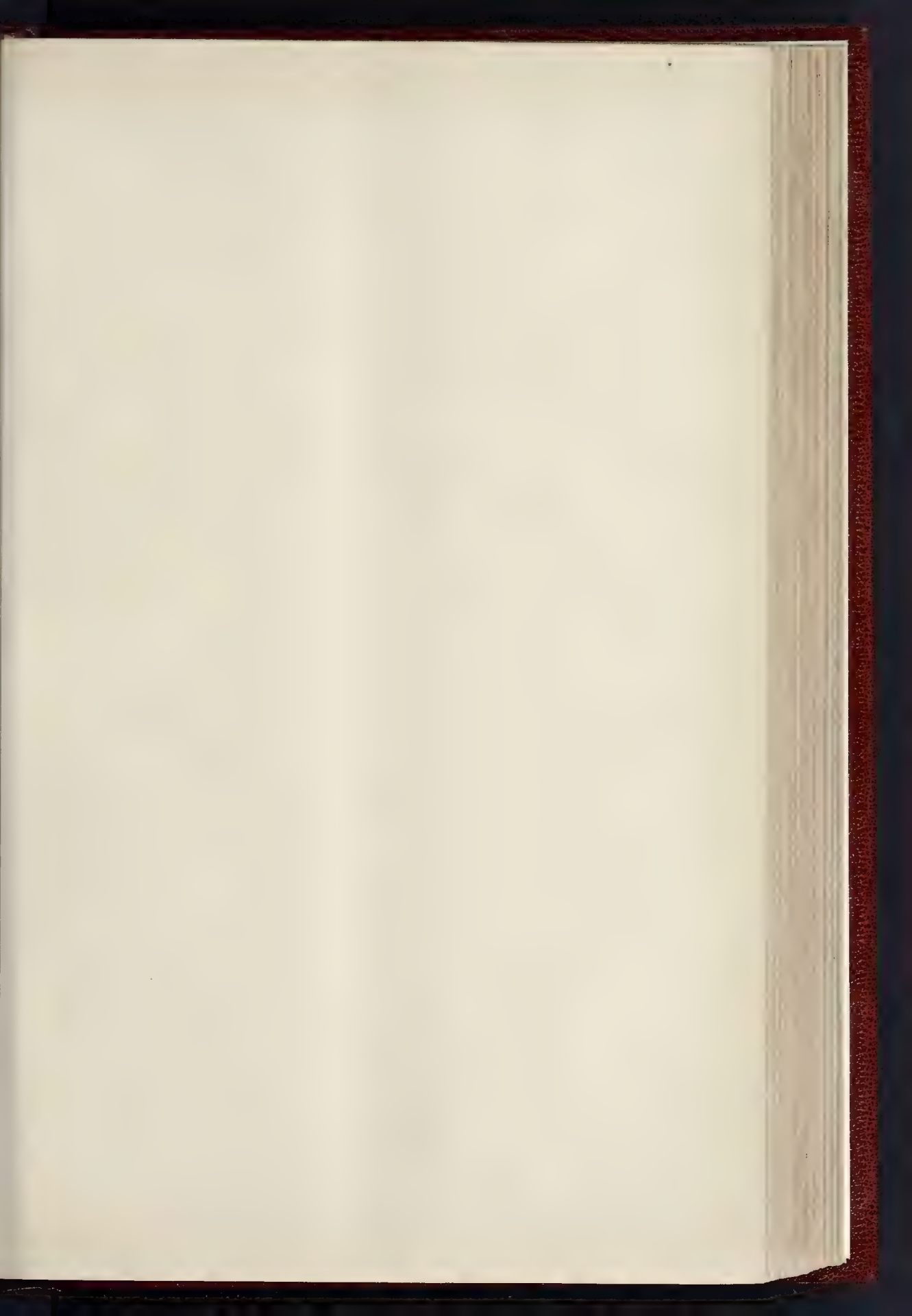


AT BOSTON



AT NEW YORK





THE BUILDER, OCTOBER 5, 1889.

Manor House at Melcombe Bingham,  
Dorsetshire - 5th Floor.

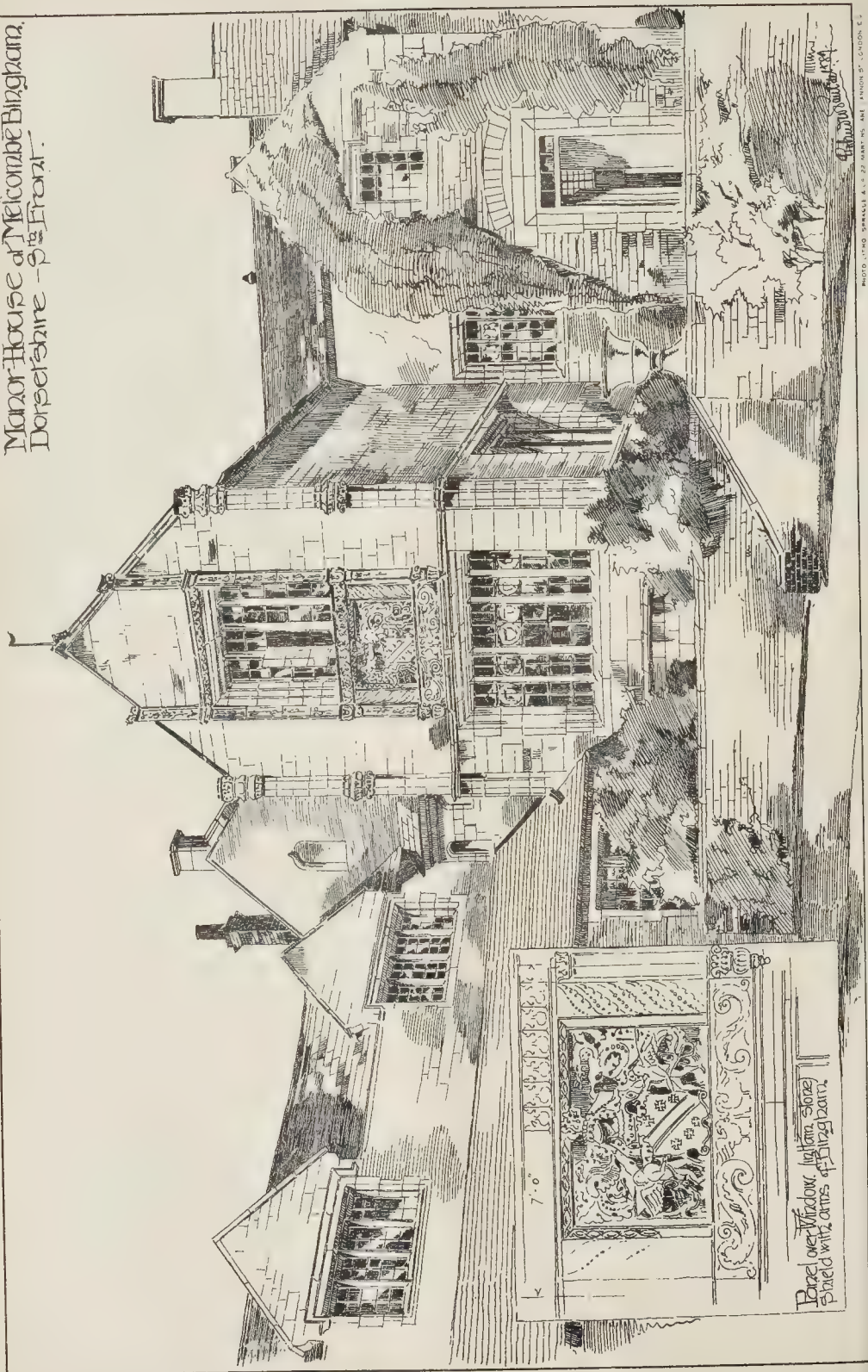


PHOTO. AND SKETCHES BY MR. ROYAL W. PAUL.

THE BUILDER, OCTOBER 5, 1889.

Bay over window, light in stone  
Panel with arms of Bingham.



Ford Abbey: The Porch.  
Built by Thos. Chard 1528.

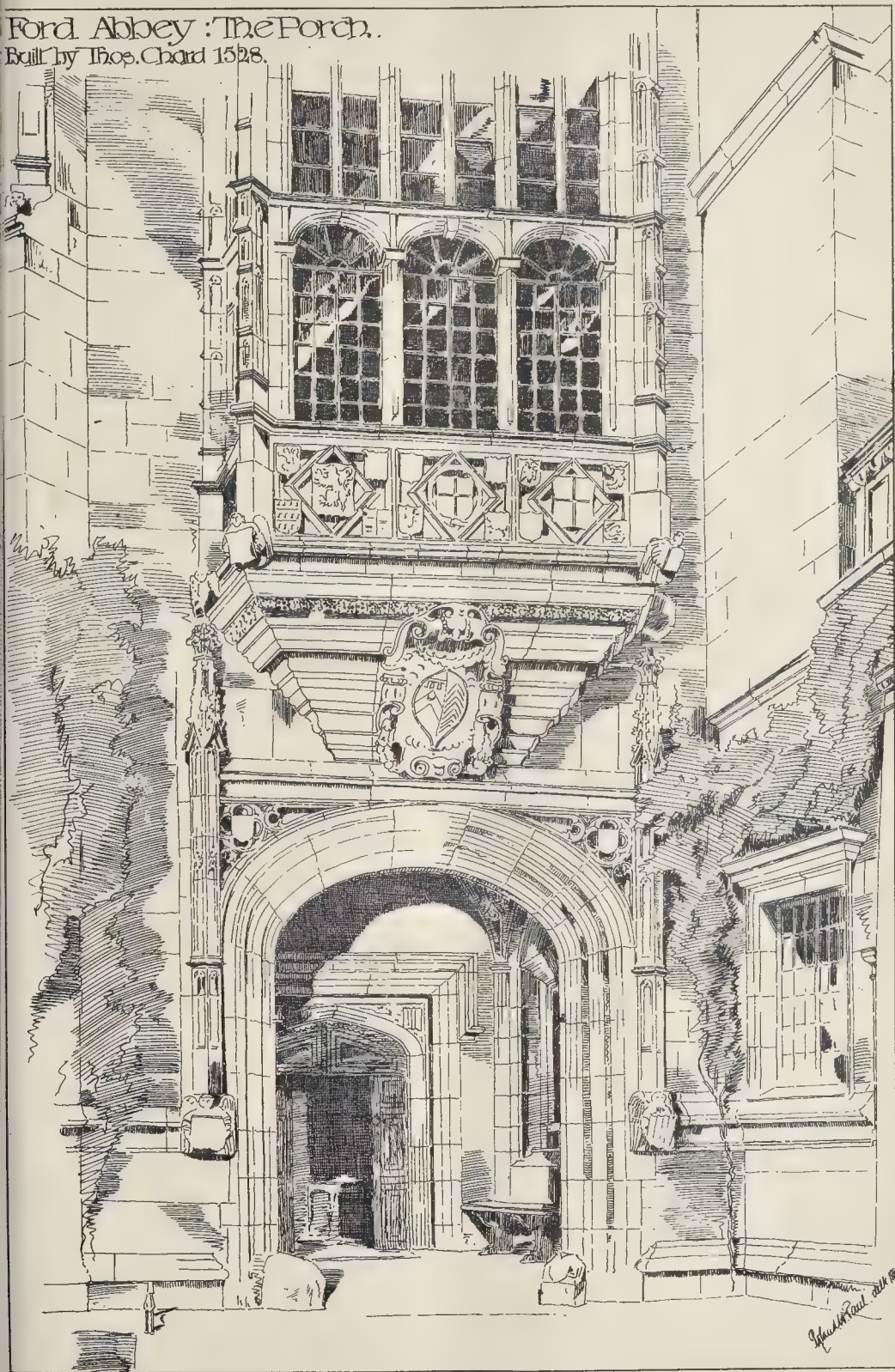


PHOTO LITHO. SPRADLE & CO. 22 MARTIN LANE, LONDON E.C.



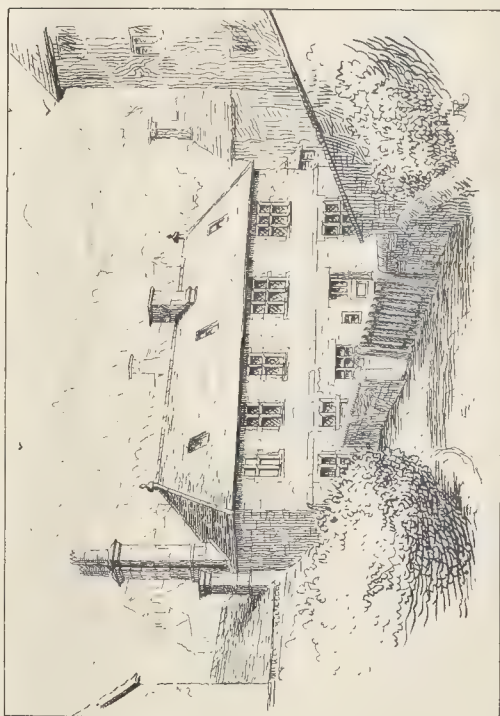




AT HAVER



THE F. IDEM ARMS, HAVER



A. HALL, 4

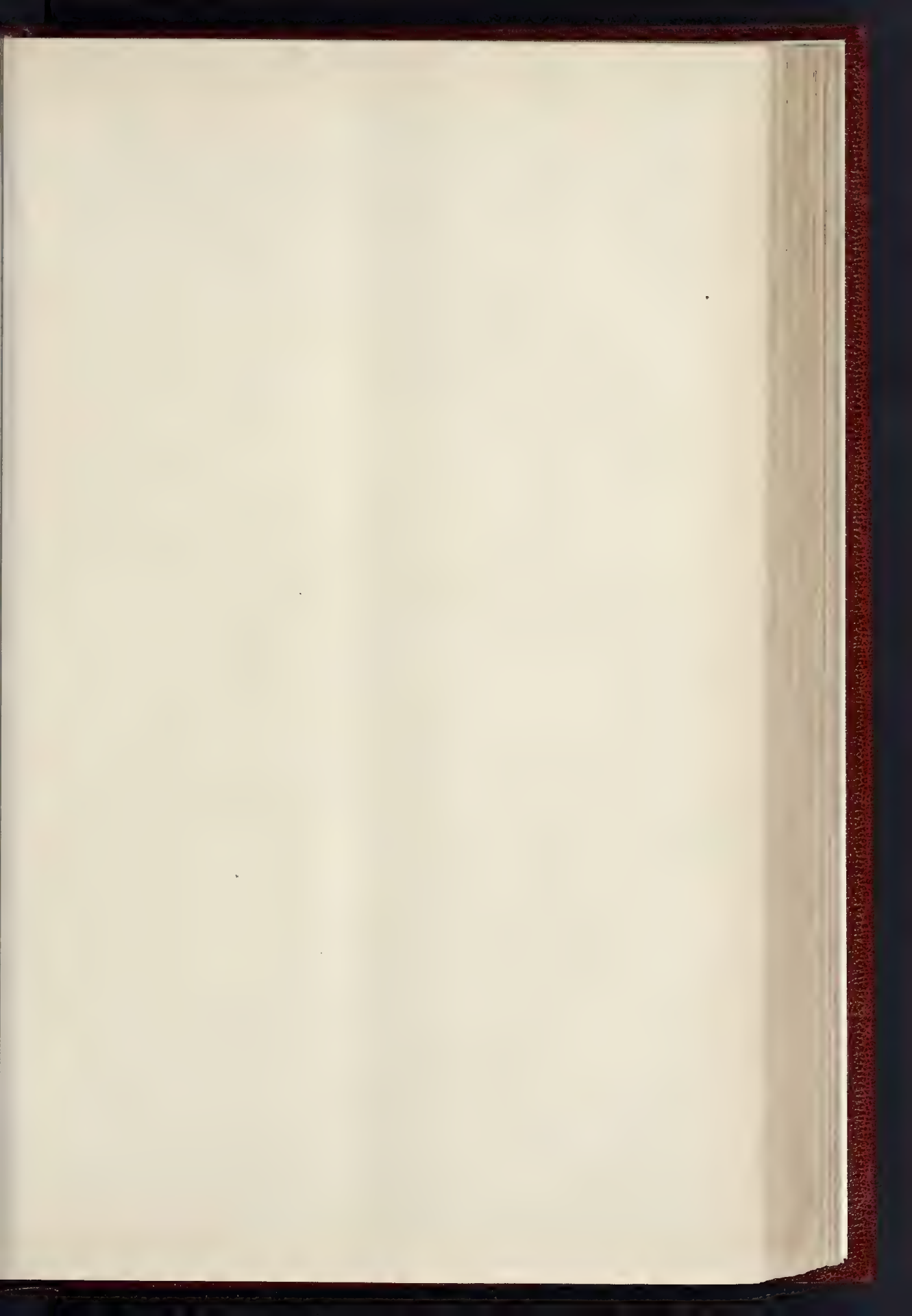


A. HALL, 5

SKETCHES ABOUT THE GOLDEN VALLEY, GLOSTERSHIRE. BY MR. RALPH NIVILL, F.S.A.





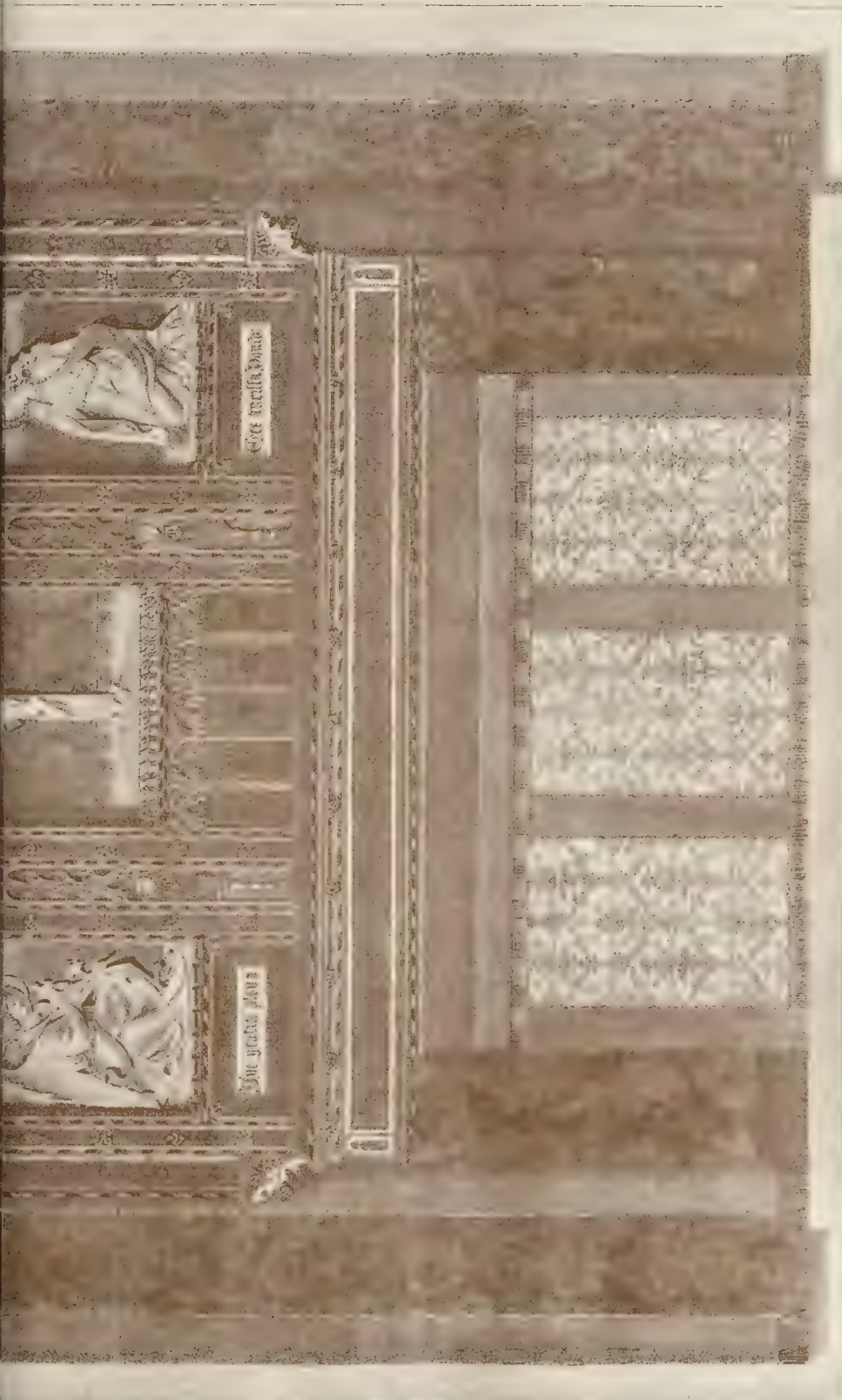


THE BUILDER OCTOBER 5, 1889

PEREPOS ERECTED IN  
ELVETHAM CHANTRE







REREDOS ERECTED IN ELVETHAM CHURCH, HANTS. MR. A. H. SKIPWORTH, ARCHITECT.





## THE ARCHITECTURAL ASSOCIATION.

The following is a syllabus of the meetings arranged by the Architectural Association for the Session 1889-90, so far as at present completed:—

- Oct. 4, 1889.—Opening Conversazione.  
Oct. 18.—Annual General Meeting. Address by the President (Mr. Leonard Stokes).  
Nov. 1.—"The Treatment of Angles and Enclosing Lines," by Mr. F. T. Baggallay.  
Nov. 15.—"The Paris Exhibition," by Mr. Banister F. Fletcher (Cates' Student).  
Nov. 29.—"The Decoration of Churches," by Mr. E. Priham Warren.  
Dec. 13.—"Drawing," by Mr. Reginald T. Blomfield, M.A.  
Jan. 3, 1890.—"Spires, Towers, and Domes," by Mr. Sydney B. Beale.  
Jan. 17.—Discussion on the Progressive Examinations of the R.I.B.A., opened by Mr. Arthur Cates.  
Jan. 31.—"Free Libraries," by Mr. E. W. Mountford.  
Feb. 14.—"An Account of some Typical Greek Buildings," by Mr. R. Elsey Smith.  
Feb. 28.—"Architecture in Oxfordshire," by Mr. W. A. Pite.  
Mar. 14.—"Modernism in Art," by Mr. Henry Hoare.  
Mar. 28.—"Hospitals," by Mr. Keith D. Young.  
April 18.—Members' *Soirée*. Assembles at 8 p.m.  
May 2.—Lecture by Mr. Alfred Gilbert, A.R.A. (Subject to be announced); Nomination of Officers.  
May 18.—"The Travelling-Student's Notes," by Mr. A. E. Bartlett; Election of Officers.

## PARIS EXHIBITION AWARDS.

The following list of awards to exhibitors at the Paris Exhibition is a selection from the general list, including, as far as we have been able to ascertain, all the awards for excellence in those departments of work in which our readers are specially interested.

The capital letters denote the degrees of distinction, as follows:—

G. P. = Grand Prize.

G. = Gold Medal.

S. = Silver Medal.

B. = Bronze Medal.

H. M. = Honourable Mention.

We give the awards in the Fine Arts Section in their entirety:—

Awards.		
Alma-Tadema, L. R.A., R.W.S.	Oil Painting	G.P.
Ammon, J. R.I.	"	B.
Alma-Tadema, Miss A.	Water-colour	B.
Armstrong, Miss A.	"	B.
Ammon, J. R.I.	"	G.
Burns, J. E. F.R.I.B.A.	Architecture	B.
Bartlett, W. H.	Oil Painting	S.
Beadle, J. P.	"	B.
Burgess, J. B. R.A.	"	H. M.
Burns, J. E. F.R.I.B.A.	"	G.
Brewnall, E. F. R.W.S.	Water-colour	B.
Brook, T. A.R.A.	Sculpture	B.
Brown, R. B.	"	B.
Birch, G. H. F.S.A., A.R.I.B.A.	Architecture	B.
Blanc, H. J.	"	B.
Burns, J. E. F.R.I.B.A.	"	B.
Calderon, F. H. R.A.	Oil Painting	B.
Carter, W.	"	H. M.
Charles, J.	"	B.
Charlton, J.	"	B.
Clausen, G.	"	B.
Cole, Vicat, A.R.A.	"	B.
Corbett, M. R.	"	B.
Crofts, E. A.R.A.	"	B.
Clausen, G.	Water-colour	S.
Collier, T. R.I.	"	S.
Crofts, E. A.R.A.	"	S.
Crofts, E. A.R.A.	Drawing	S.
Campbell, Douglas, & Sellers	Architecture	B.
Collett, T. E. F.R.I.B.A.	"	G. P.
Douglas & Fordham	"	G.
East, Alfred, R.I.	Oil Painting	H. M.
East, Alfred, R.I.	Water-colour	G.
Emale, A. E. A.R.W.S.	"	B.
Emerson, W. F.R.I.B.A.	Architecture	S.
Field, Luke R.A.	Oil Painting	S.
Fisher, Mark, R.I.	"	G.
Forbes, Stanhope A.	"	G.
Fulley, J. R.I.	Water-colour	B.
Ford, E. Onslow, A.R.A.	Sculpture	B.
Goodall, F. R.A.	Oil Painting	B.
Goodall, T. E.	"	H. M.
Gow, C. A.R.A., R.I.	"	S.
Gregory, E. J. A.R.A., R.I.	"	S.
Gregory, E. J. A.R.A., R.I.	Water-colour	G.
Gilbert, A. A.R.A.	Sculpture	G. P.
Greenaway, Miss E.	Drawing	B.
Goddard, J., & Paget, A. H.	"	B.
F.R.I.B.A.	Architecture	S.
Hacke, A. R.A.	Oil Painting	B.
Halls, W. K. R.I., A.R.S.A.	"	H. M.
Hemy, C. Napier, R.I.	"	H. M.
Herkimer, R. A.R.I.	"	G.
Hook, J. C. H.A.	"	G.
Hunter, Colin, A.R.A., R.I.	"	G.
Hague, Anderson, R.I.	Water-colour	S.
Hartley, A.	"	B.
Hart, H. G. R.I.	"	S.
Holloway, C. E. R.I.	"	S.
Hobart, P.	Sculpture	B.

Awards.		
Haden, F. Seymour, P. of	Etching	G. P.
R.S.P.E.	"	B.
Johnson, C. E. R.I.	Oil Painting	B.
Jeffrey, Miss Edith Gwyn	Sculpture	H. M.
Kennington, T. B.	Oil Painting	B.
Knight, Joseph, R.I.	"	B.
Knight, J. Borton	"	B.
King, Yeend, R.I.	Water-colour	B.
Keene, Charles	Drawing	G.
Lavery, J.	Oil Painting	B.
Leader, B. W., A.R.A.	"	G.
Leighton, Sir Frederick, Bart.	"	G.
F.R.A.	"	G.
Leslie, G. D., R.A.	"	B.
Langley, Walter, R.I.	Water-colour	G.
Linton, Sir James D., P.R.I.	"	G.
Lee, T. Stirling	Sculpture	B.
Leighton, Sir Frederick, Bart.	"	G. P.
F.R.A.	"	G. P.
Lowenstam, .....	Etching	B.
Macbeth, R. W., A.R.A., R.I.	Oil Painting	B.
Merritt, Mrs. Anna Lee	"	H. M.
Miles, P. D. D.	"	B.
Montague, Miss Clara, A.R.W.S.	"	B.
Moore, Henry, A.R.A., R.W.S.	"	G. P.
Morris, F. R.A.	"	B.
Murray, D. A.R.W.S.	"	B.
Marshall, Herbert, R.W.S.	Water-colour	S.
Mottram, C. S.	"	B.
Maclean, T. Nelson	Sculpture	H. M.
Mullins, E. Roscoe	"	S.
Macbeth, R. W., A.R.A., R.I.	Etching	G.
North, J. W., R.W.S.	Water-colour	S.
Orchardson, W. Q., R.A.	Oil Painting	G.
Parsons, Alfred, R.I.	"	H. M.
Parton, E.	"	H. M.
Prinsep, V. C. A.R.A.	"	B.
Parsons, Alfred, R.I.	Water-colour	G.
Price, Thomas, R.I.	"	B.
Pegram, H.	Sculpture	B.
Rao, Miss Henrietta	Oil Painting	H. M.
Ratnay, Wellwood	"	H. M.
Reid, J. B.	"	B.
Riviere, Briton, R.A.	"	G.
Sant, James, R.A.	"	B.
Shannon, J. J.	"	G.
Smythe, Lionel P., R.I.	"	B.
Solomon, S. J.	"	B.
Starr, Sidney	"	B.
Stokes, Adria	"	B.
Stones, Marcus, R.A.	"	S.
Swan, J. M.	"	S.
Severo, Arthur, R.I.	Water-colour	H. M.
Styler, Lionel P., R.I.	"	H. M.
Sandbourne, Lintley	Drawing	B.
Short, Frank	Engraving	G.
Strang, W.	Etching	S.
Stodd, G. G. S.A., F.R.I.B.A.	Architecture	G. P.
Shaw, E. N. R.A.	"	S.
Stokes, L., A.B.I.B.A.	"	S.
Waterhouse, J. W., A.R.A., R.I.	Oil Painting	S.
Winstler, J. McNeil	"	B.
Wimpers, E. M. R.I.	"	B.
Wollen, W. B., R.I.	"	S.
Wyllie, C. W.	"	B.
Wyllie, W. A.R.A., R.I.	"	B.
Wyllie, W. L. A.R.A., R.I.	Etching	B.
Webb, A. & Bell, J., F.R.I.B.A.	Architecture	G.
Young, W.	"	S.

The remainder of the list is selected from the awards in a number of various sections; the number placed before the capital letter refers to the section. The following are the definitions of the sections we have selected from:—

- Education of Children. Primary Instruction. Instruction of Adults.
15. Instruments of Precision.
17. Cheap and High-class Furniture.
18. Upholstering and Decorators' Work.
19. Crystal Glass and Stained Glass.
20. Pottery.
21. Carpets, Tapestry, and other Stuffs for Furniture.
22. Paperhangings.
23. Bronzes, various Art-castings, Iron-work, and Repousse-work.
27. Apparatus and Processes for Heating; Apparatus and Processes for Lighting other than Electric.
41. Products of Mining and Metallurgy.
42. Products of the Cultivation of Forests and of the Trades appertaining thereto.
48. Apparatus and Processes of the Arts of Mining and Metallurgy.
49. Implements and Processes used in the Cultivation of Fields and Forests.
52. Machines and Apparatus in general.
53. Machine Tools.
57. Apparatus and Processes used in the Manufacture of Furniture and Objects for Dwellings.
58. Machines, Instruments, and Processes used in various Works.
61. Railway Apparatus.
62. Electrical Apparatus and Processes.
63. Apparatus and Processes of Civil Engineering, Public Works, and Architecture.
64. Hygiene and Sanitation.
65. Apparatus for Navigation and Life-saving.

The following are the principal awards in the above-named classes:—

Aemo Electric Works	..	..	62	H. M.
Adderley & Co., W. A.	..	..	20	S.
Addis & Sons, James B.	..	..	41	B.
Aldays & Onions, Limited	..	..	48	S.
Allen & Co., N.B.	..	..	41	B.
Allen & Co., N.B.	..	..	63	B.
Alliance Aluminium Company, Limited	..	..	41	G.
Aluminium Company	..	..	41	G.
Anaglypta Company	..	..	22	H. M.
Anderson & Son, Limited	..	..	63	B.
Anglo-American Tin Stamping Co., Ltd.	..	..	41	S.
Angus & Co., George, Ltd.	..	..	62	S.
Applby Brothers, Ltd.	..	..	63	S.
Armstrong, George Faulkner	..	..	17	G.

Awards.		
Armstrong, Mitchell, & Co., Ltd., Sir	"	W. G.
Automatic Electrical Corporation, Ltd.	"	62
Avelling & Porter	"	63
Avery, W. & T.	"	15
Aylmer, R.	"	62
Banner Sanitation Co.	"	63
Banister & Amnett	"	61
Barford & Perkins	"	49
Bernardo, T. J.	"	64
Berry, Ouliere, & Co. John	"	63
Bartlett & Sons, Wm.	"	41
Blackman Ventilating Co., Ltd.	"	62
Bodley, Edwin J. D.	"	20
Bradford & Co., Thomas	"	61
British Stone and Marble Co.	"	63
Brooke & Sons, Edward	"	61
Brownfield & Sons, William	"	20
Brown-Westhead, Moore, & Co., T. C.	"	20
Bury & Co., Lim.	"	61
Cantrill & Cochrane	"	41
Canry, Miss Lottie	"	18
Chubb & Sons' Lock and Safe Co., Lim.	"	41
Clark, Muirhead & Co., Lim., Lathimer	"	62
Clarke, Samuel	"	27
Clarkson, Alexander	"	15
Clayton (John B.) & Bell (Alfred)	"	19
Cocker Bros., Lim.	"	41
Consett Iron Co., Lim.	"	41
Continental Diamond Rock Boring Co., Lim.	"	41
Continental Oxygen Co., Lim.	"	41
Cooke Brothers	"	41
Copeland & Sons, W. T.	"	20
Corticine Floor Covering Co., Lim.	"	21
Credenda Seamless Steel Tube Co.	"	41
Crompton & Co., Lim.	"	62
Crosley Brothers, Lim.	"	62
Crosley & Sons, Lim., John	"	21
Daniell & Sons, A. B.	"	20
Davies, Farnham & Co.	"	41
Davis & Humphreys, Lim.	"	41
Doulton & Co.	"	20
Drucker Portable House Co., Lim.	"	63
Eastern Telegraph Co., Lim.	"	63
Ebbw Vale Steel, Iron, and Coal Co.	"	41
Edgington, Lim., Benjamin	"	39
Edwards & Roberts	"	17
Electrical Power Storage Co., Lim.	"	61
Elliot Brothers	"	63
Elliott Samuel	"	63
Farmer & Brindley	"	63
Farnhale & Sons, George	"	63
Farnley Iron Co., Lim.	"	41
Fielding & Platt	"	53
Fisher's Patent Wall Hanging Syndicate	"	22
Fletcher & Co., Thomas	"	27
Forester & Sons, Thomas	"	62
Fowler & Co., Lim., John	"	63
Francis & Co., Lim.	"	63
Francis, Son, & Co., C.	"	63
Gale & Sons, George	"	17
Galloway & Sons, Lim., W. & J.	"	63
Gandy Belt Manufacturing Co., Lim.	"	62
Gardner & Co., Starkie	"	25
Garrard & Son, W. H.	"	49
Gibbs, Percy C.	"	49
Giles & Co., Frank	"	17
Giers, Mills, & Co.	"	48
Glanrahan Coal Co., Lim.	"	41
Glanrahan Slate Quarry Co.	"	63
Glanville & Co., George	"	21
Glenboig Union Fire Clay Co., Lim.	"	41
Globe Electrical and Engineering Co.	"	62
Goode & Co., Thomas	"	17
Graham & Biddle	"	17
Greenwood & Batley, Lim.	"	63
Griffiths Bros. & Co.	"	45
Grover & Co., Lim.	"	61
Guarrel, L. & H.	"	41
Gwynn Cas Curwen Colliery Co., Lim.	"	41
Hadley & Co., Lim., Felix	"	63
Hamblitt, Joseph	"	48
Hardy Patent Pick Co., Lim.	"	41
Haslam Fire Extinguisher Co.	"	85
Haynes & Co., George	"	27
Hellwell, T. W.	"	63
Helm & Co., James	"	21
Henley's Telegraph Works Co., Lim.	"	63
Herring Bros.	"	41
Hindley, E. S.	"	62
Hinks & Sons, Lim., James	"	12
Holby, Frederick	"	27
House Sanitation Co.	"	64
Houston & Co., A.	"	63
Hulse & Co.	"	63
Humphreys, James Charlton	"	63
Hunter & English	"	63
Huntman, B.	"	41
Huxham & Brown	"	61
Hydraulic Engineering Co., Lim.	"	63
Incandescent Gas-Light Co., Lim.	"	27
Indian Collective Exhibit of Pottery	"	20
Indian Pavilion	"	49
Isher & Co.	"	18
Jackson & Sons, George	"	18
Jeffrey & Co.	"	18
Jennings, George	"	17
Jessop & Sons, Lim., William	"	41
Joyce Sanitary Compounds Co., Lim.	"	41
Johnson, Matthew, & Co.	"	41
Johnson & Co., John	"	41



	Awards.
Kenrick & Sons, Archibald	41 S.
Kent & Sons, G. B.	29 G.
Kirkaldy, John	52 S.
Knap & Co., Conrad	59 S.
Laycock, W. S.	61 H. M.
Lechertier, Barbe, & Co.	10 B.
Leda Forge Co., Lim.	41 G.
Lenda L. W. Patent Floor Warming	37 B.
Stove Co., Lim.	59 B.
Lewis & Lewis	61 G. P.
London and North-Western Railway	61 G.
London, Brighton, and South Coast Rail-	61 G.
way Co.	65 S.
London, Chatham, & Dover Railway Co.	62 B.
London Water Meter Co., Lim.	63 S.
Londonderry, Marquis of	41 G.
Lovell & Co., J. Grayson	44 S.
Lucigen Light Co.	63 G.
Macintyre & Co., James	20 H. M.
McNeil & Co.	63 B.
Macniven & Cameron	10 S.
Maignen's Filtré Rapide and Anti-Cal-	62 H. M.
caire Co., Lim.	48 S.
Massey, B. & S.	29 G.
Maw & Co., Lim.	61 G. P.
Midland Railway Co.	63 H. M.
Mills, James (Executors of)	41 G.
Milward & Sons, Henry	21 B.
Mitcham Linoleum and Floor Cloth Co.,	17 H. M.
Lim.	19 S.
Model & Co.	41 S.
Moncreiff, John	27 G.
Morgan Gold-mining Co., Lim.	21 S.
Mugrave & Co., Lim.	61 G.
Nairn & Co., Michael	21 H. M.
Neilson & Co.	61 H. M.
Neilson, Shaw, & Macgregor	61 G.
Nicholson, J. O.	61 H. M.
North London Railway Co.	61 G.
Oakley Slate Quarries Co., Lim.	61 H. M.
O'Brien & Co.	41 B.
Openshaw & Co.	23 B.
Oriental Leather & Leatherette Co., Lim.	41 G.
Palmer's Shipbuilding & Iron Co., Lim.	27 S.
Paris Earthenware, Crystal, and Hard-	63 B.
ware Co., Lim.	64 H. M.
Parkinson, Joseph	53 B.
Patent Nut and Bolt Co., Lim.	61 G.
Paton & Cooper	62 S.
Pen-y-Osred slate Quarry Co., Lim.	41 B.
Peyton & Peyton	17 S.
Philischer, J.	16 G.
Powell, Bishop, & Stonier	20 S.
Procter & Co.	17 B.
Quirk, Barton & Co.	63 S.
Reynolds & Co., F. W.	49 S.
Riddale's Railway Lamp and Lighting	67 B.
Co., Lim.	61 B.
Robins, E. G.	67 B.
Robinson & Son, Lim., Thomas	19 B.
Rose & Dobson	21 B.
Rylands & Sons, Lim.	6 G. P.
School Board for Birmingham	63 S.
School Board for London	66 H. M.
Selig, Sonenthal, & Co.	63 S.
Simplex Railway Patents (F) Syndicate	61 H. M.
Skelsley, George H.	63 S.
Society "Sunbeam"	63 S.
South Darwent Colliery	62 H. M.
Sparton & Co., Henry	63 B.
South-Eastern Railway Co.	61 G.
Storey Brothers & Co.	61 G.
Stothert & Pitt, Lim.	63 G.
Sugg & Co., Lim., William	37 G.
Thames Sulphur and Copper Co.	41 G. P.
Thomas & Sons, S.	41 H. M.
Thwaites Brothers	49 B.
Timmins, Illus A.	61 S.
Tooth & Co.	20 H. M.
Treloar & Sons	63 G.
Tubular Lock Syndicate, Lim.	63 G.
Turner & Sons, E.	62 H. M.
Unbreakable Pulley Co.	62 B.
United Asbestos Co., Lim.	62 B.
Unwin, Fisher	9 B.
Vacuum Brake Co.	61 G.
Vetty & Bowdell Slate Quarries Co.,	41 S.
Limited	63 S.
Vulcan Fire Brick Co., Lim.	61 B.
Waddell & Sons, John	41 B.
Wadsworth & Son, Henry	63 S.
Wais, Ward, & Co.	41 G.
Webb & Sons, Lim., Thomas	19 G. P.
Wenthouse Brake Co., Lim.	27 S.
Wiggins & Co., Henry	61 G.
Wilson & Sons, Charles	27 S.
Wilson, Lawrence	17 B.
Woodfield & Sons, W.	41 S.
Woodlands & Co., Wm.	22 G.
Wright & Sons, Peter	63 B.
Wylie & Lochhead, Lim.	22 S.
Yates, Haywood, & Co.	27 S.

SOCIAL ECONOMY SECTION.	
City and Guilds of London Institute	G. P.
Commissioners of Sewers of London	G.
Improved Industrial Dwellings Co. (Sir S. Waterlow)	G. P.
Metropolitan Asylum Board	G.
Metropolitan Public Gardens Association	G.
People's Palace	G.
School Board for London	G. P.
Stockport Technical School	S.
Working Men's Club and Institute	G. P.

## THE AMINES PROCESS OF SEWAGE TREATMENT AT WIMBLEDON.

SIR.—In reference to the article in your issue of the 21st ult.,\* we note your acknowledgment that the Amines process has good points, and, in reference to those points which you consider doubtful, we submit the following statements of fact, which we think meet all the objections that have been raised:—

1. We do not claim to "utilise the disinfectant properties of a mixture of trimethylamine and lime," but that by the action of the latter on the former a disinfectant of extraordinary power is evolved.

2. Seventy grains of lime and three of brine is not the amount required for every gallon of sewage. These quantities are the maxima used in a first treatment. By using the first sludge as precipitant (with a slight addition of fresh reagent), and by making a third and a fourth quantities actually required at Wimbledon were found to be about forty-seven grains of lime and three of brine. The variation of quantities for sewage containing manufacturing refuse would be inconsiderable, as experiments elsewhere have shown.

3. As to the odour of the effluent, Dr. Bell (of Somerset House) called it "briny," and Dr. W. R. Smith "saltish," and no analyst has ever yet compared it to anything offensive.

4. The tests to which the sludge were subjected, so far from being imperfect because limited, were, in point of fact, conclusive, because the severest possible. A thousand tons would not act differently from ten tons, and the conditions of temperature could not be more favourable to putrefaction for the next six months than they were between August 7 and September 18 (the period of the test).

5. The alkalinity of the effluent (as shown by analysis) is actually below that allowed by the Rivers Pollution Bill (1885). This disposes of the apprehensions as to its effect on fish life. As for crops, we claim beneficial effects, and the present operations at Wimbledon will, we are confident, settle that point very shortly.

6. The brine supply can be shown to be abundant for all practical purposes, unless, indeed, all the 500 sewered towns of England should adopt the process before the next fishing season—a contingency our past experience hardly warrants us in expecting. Nor can trimethylamine be obtained from herring-brine only, as a look at Watts's dictionary will show.

7. No other effluent contains an appreciable less proportion of nitrogenous organic matter than the Amines, and other effluents are not sterile.

8. The effluent has proved itself safe under prolonged air-exposure and varying temperature, not only in the severest laboratory tests, made with sewages of widely different kinds, but by prolonged exposure in the tanks. The very dilution of a sterile effluent renders it an unfertile soil for organisms from the river; but, besides being sterile, the Amines effluent enters the river charged with a powerful antiseptic, which is only diluted *pari passu* with the organic matter.

E. H. ELLICE CLARK,  
HUGO WOLLHEIM.

101, Leadenhall-street, E.C.  
September 30, 1889.

## CONCRETE FLOORS.

SIR.—I am, I fear, as far as ever from acknowledging the truth of Mr. Caws's formula that "the strength of slabs is inverse to their breadth or diameter, and is as the square of their thickness." I still maintain that the rule ought to be "the strength of square slabs per square foot is as the square of their thickness, and inversely as their area." Mr. Caws does not in any way attempt to disprove the correctness of Professor Unwin's rule, but merely argues that it errs on the side of too much strength, if it be applied to iron structures. This can easily be remedied by employing a greater factor of safety, or a suitable constant based on actual experiment, as, in fact, was done by Mr. Caws when he applied the formula to concrete slabs. If, by using this constant, he found that the strength of slabs was underestimated, I venture to suggest that it was the constant that ought to have been altered, and not the rule. I notice that he is somewhat loth to declare the absolute inaccuracy of the rule,

but considers it to be "probably at fault." What is necessary for Mr. Caws to show is, that the formula gives unequal results, that it allows too much strength to small slabs and too little to large ones, or *vice-versa*. This, however, he does not attempt.

In my letter, published on the 7th instant, I showed that the two examples adopted by Mr. Caws as of equal strength, are, according to Professor Unwin, unequal; but as Mr. Caws declines to pin his faith to the Professor, I must try to prove my contention some other way. Let us take again the same examples, and test them by a method derived from the last letter of Mr. Caws (the first paragraph on page 211), namely, "the attacking stress-causing force" on a square slab is (I merely substitute general terms for the particular example there given)

$$\frac{\text{weight}}{\text{length}} \times \frac{\text{length}}{6} = \frac{400 \times 1}{6} = 66.6 \text{ lb.}$$

$$\text{In (2) it is } \frac{4,000 \times 10}{6} = 6,666.6 \text{ lb.}$$

Here I must anticipate something, of which I hope to speak more fully hereafter. In (1) the force of 16.6 lb. acts on the side of a square 1 ft. in length, and is, therefore, 16.6 lb. per lineal ft. of support; in (2) the force acts on the side of a square 10 ft. in length, and is, therefore, 166.6 lb. per lineal ft. of support. If

you take a slab 100 ft. square, the strain per lineal ft. of support will appear to be 1666.6 lb.; and so on, in increasing error. And yet Mr. Caws maintains that all these slabs are equally safe.

Now test by this method also the rule which is, in my opinion, the correct one,—that the strength of slabs is inversely as their area, &c. We found (p. 178) from this rule that "all square slabs, of whatever area, if of the same thickness, will carry the same distributed load." We have, then, two examples: (A) 1 ft. by 1 ft. carrying 400 lbs., and (B) 10 ft. by 10 ft. carrying 4 lbs. per square foot,—that is, a total load likewise of 400 lbs.

$$\text{In (A) "the attacking stress-causing force" is } \frac{400 \times 1}{6} = 66.6.$$

$$\text{In (B) it is } \frac{400 \times 10}{6} = 666.6.$$

Then in (A) the strain per lineal foot of support is 16.6 lbs., and in (B)  $\frac{1666}{10} = 166.6$ . A slab

100 ft. square, carrying 400 lbs., will give the same result. And so on, the strain on the slab being in all cases equal.

To me this is a convincing proof, founded, too, on Mr. Caws's own statements, that his original formula is erroneous, and that the Professor is, after all, quite right.

Mr. Caws invites me (p. 210) to test his theory of slabs for myself, and if I find any flaw in it, to correct him. I am really sorry that I must again declare myself at issue with him. This time it is on the question of the strength of square and rectangular slabs. This reasoning leads him to his startling conclusion—made more conspicuous by the italics in which he prints it—"the more nearly square the slabs, the stronger they are." This is said, of course, of slabs of the same area. One sees at a glance that the statement is wrong, but intuition is not enough; we must have proof.

Take a square slab 10 ft. by 10 ft., and a rectangular slab 20 ft. by 5 ft., each, therefore, containing 100 square feet. According to Mr. Caws the former ought to be considerably stronger than the latter. We differ. To find the "stress-causing" force on the square slab, Mr. Caws would divide the square by diagonals into four equal triangles, compound the forces on each into one resultant force, acting through its centre of gravity, and multiply this by the distance of the centre of gravity from the support; the product would be the actual strain on the edge of the slab. Here we become cognisant of an omission, which Mr. Caws perhaps thought unimportant in the consideration of square slabs, but which, omitted in considering rectangular slabs, is one chief reason of his arrival at the startling conclusion quoted above. He has compounded the vertical downward forces into one resultant; he forgets to resolve the product of the resultant and leverage into the



resisting forces along the whole length of the supported edges.

For my own part I prefer to look at the matter in a slightly different light. In fig. 1,

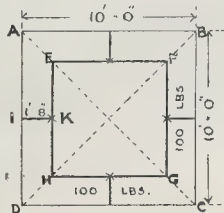


FIG. 1.

through the centres of gravity of the four triangles describe a square, EFGH. Instead of considering the weight as compounded into forces acting through the four centres of gravity, consider it as acting with equal force along the whole length of the lines forming this inner square. We do not then for a moment lose sight of the fact that the slab bears a distributed load and is equally supported around its whole margin. Multiply the total weight by the length of leverage, 1 K, and divide by the length of support, and the result is the strain per unit of length. Thus we shall have  $\frac{400 \text{ lbs.} \times 1 \frac{1}{2} \text{ ft.}}{40} = 16.6 \text{ lbs. strain per lineal ft.}$

This, however, is merely another way of looking at the same thing and obtaining the same result.

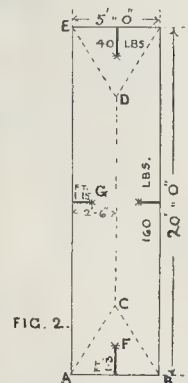


FIG. 2.

Let us pass on now to the rectangular slab (Fig. 2), of which, for our present purpose, I will treat in the manner recommended by Mr. Caws. According to him, this slab will not be nearly as strong as the square slab of the same area. The latter is safe to carry 400 lbs. Suppose that we consider the load on the rectangular slab to be the same. Then each end will have to carry 40 lbs., and each side 160 lbs., and the load on one end will be represented by the triangle AOB, having a perpendicular 4 ft. long, and the load on one side by the trapezium ACDE. The centre of gravity of AOB will be at the point F, 1.3 ft. from the end AB, and that of ACDE will be at the point G, 1.15 ft. from the side AE. "The attacking stress-causing force" on AB will be  $40 \times 1.3 = 52.3 \text{ lbs.}$ , and on AE  $160 \times 1.15 = 184 \text{ lbs.}$  But AB is 5 ft. long, and the strain on the end of the slab per lineal foot will therefore be  $\frac{52.3}{5} = 10.46 \text{ lbs.}$ ; and AE is 20 ft. long, and the strain per lineal foot will be  $\frac{184}{20} = 9.2 \text{ lbs.}$  We found, however, that

the strain on the edges of the square slab was 16.6 lbs. per lineal foot, considerably more, in fact, than the strain on either the side or end of the rectangular one, the weight on each slab being the same. It follows that the oblong slab is the stronger of the two, and, instead of its being true that "the more nearly square the slabs, the stronger they are," the direct opposite is the truth, namely, "the more nearly square the slabs the weaker they are."

Mr. Caws's haste has evidently led him into

two errors—the first, as I have already explained, being his omission to divide the total strain by the length of the side upon which it is exerted (it will be wise here to remember that of all rectangular figures of the same area the square has the shortest enclosing lines); and the second error is that he forgets that the longer the rectangle in proportion to its breadth the narrower becomes the trapezium, and, consequently, the shorter the arm, or leverage, by which the load is transmitted to its support.

The last paragraph on page 210 shows clearly the steps by which Mr. Caws descended to his erroneous conclusion. "The centre of the trapezoidal area occurs farther from the supporting edge than the centre of a triangular area of equal perpendicular." That is perfectly correct, but the truth of it rests on the three last words, which I have italicised. And yet in the very next sentence Mr. Caws forgets this, and, applying the statement to a trapezium and a triangle of unequal perpendiculars, says:—"And thus the leverage, as well as the load of trapezoidal area, is greater, making the stress of the trapezoidal portion of rectangular slab more or less greater than that of the triangular area of same slab, as the rectangle departs more or less from square." If he had carefully examined his own figure (the middle one on page 211) he would have seen his mistake. The triangle there has a perpendicular of 12 ft., its centre of gravity being, therefore, 4 ft. from the support, whereas the trapezium has a perpendicular of only 10 ft., with a distance from centre to support of 5 ft. 7 in. In my diagram (fig. 2) the difference is proportionally greater, the measurements being—for the triangle, 4 ft. and 1.3 ft.; and for the trapezium, 2 ft. 6 in. and 1.15 ft. only.

I thank Mr. Caws very much for his answer to my question about central and distributed loads, and regret that I have not yet had an opportunity of examining his letter in the *Builder* of April 3, 1886.

GEORGE L. SUTCLIFFE.

Sept. 23, 1889.

SIR,—In confirmation of Mr. Irwin's statement (p. 229 *ante*) I may mention that a few years ago, I witnessed the overthrow of a concrete retaining wall, whose base was of insufficient width to resist the back pressure which overthrew it.

The wall, when standing, was of the section shown by dotted lines on accompanying sketch, and was cast in the successive courses indicated by the letters a, b, c, d, e. When overthrown the respective courses occupied, approximately, the positions shown by A, B, C, D, E, on sketch.



If the wall had had to sustain simply vertical pressure, the fact of its being bedded in five courses would not have reduced its strength or stability. But when horizontal back pressure (due to water lodged behind wall) came into play, the level beds facilitated the disintegration *en bloc* which occurred.

Concrete floors and beams have to sustain vertical loads; and, therefore, horizontal lamination does not diminish their strength.

The analogue of the level bed in wall subject to horizontal pressure is not a level bed, but a vertical joint, in slabs or beams which are subject to vertical pressure. This fact has the following practical bearing:—

Workmen are liable to leave the casting of a large slab unfinished overnight, and to make a continuation with a vertical or oblique joint next day. This is a bad practice, though such is the enormous excess of strength in most slabs, that no ill results have followed instances of this bad practice which have come to my knowledge.

Nearly all natural stones are horizontally laminated; and, so long as they are set on their natural bed, their strength is not lessened by the lamination.

It is all very well to advocate "single dump," but you cannot make it answer practically for

floors, any more than for walls. Specify "single dump" if you like, but no sensible contractor will obey you, or, if he does, he will spoil your floors.

You may, if you are silly enough, order your heavy plate girders with top and bottom flanges 2 in. thick in "single dump" of iron, but your iron-merchant or girder-builder will not, if he can help it, supply you with such an article.

Mr. Irwin speaks of walls in which—as he and we all know—"single dump" is impracticable: there must be courses; but he makes no reference to floors, in which he appears to have had no special experience. I have tried the "single dump" principle, and found it impracticable to get a decent surface by it. You cannot finish a "single dump" floor without lumps, bumps, and roughness.

Experience has convinced me that if you want a good floor you must coat your centres with plaster; then grout with pure cement over the plaster; then cast and ram (moderately) five-sixths (or thereabouts) of your floor thickness in single dump; and finally—as soon after as convenient—finish with one-sixth (or thereabouts) fine stuff top layer.

I have not the least interest in recommending one way more than another. But I say this is most decidedly the best method of all I have tried, and if you strain too hard at the grout of "single-dump," you must swallow the camel of a lumpy bad surface.

Mr. Irwin's idea that a corbel needs thickness at its outer extremity is very crude, and very misleading. It will not bear scientific analysis; as probably the author himself, on further reflection, will be the first to recognise: for the idea, cantilever, or corbel, of equal strength throughout, has no depth at its outer extremity.

Mr. Irwin is undoubtedly right in saying that too much pummelling damages the concrete. He is also right in recommending casting large lintels on voussoir joints, if they cannot be cast in one span. I am actually engaged at the present time in casting a large semi-vault or cove; and I am casting it sectionally with voussoir joint simply because it is not practicable to do such an enormous mass all at one go. The earth's crust, the floor on which we all in common tread, is largely built in horizontal laminations, of slabs infinitely thin and numerous. This great floor bears us all fairly well; and I shall go on, as I have begun, bearing this great pattern in mind.

FRANK CAWS.

SIR,—I am grateful for the correspondence relative to this subject which has appeared in the *Builder* for the last few weeks. More would have been welcome, but, as I foreshadowed in the number for Aug. 24, this information is not very readily parted with. Mr. Caws's experience differs from mine in several points. For instance, with regard to concrete when not overloaded with water for mixing purposes parting with that portion not wanted for hydration, Mr. Caws says:—"In passing to and fro under centering dripping from the concrete being cast above, I have enjoyed (!) too much experience in the shape of damage to bats and coats to accept without reserve the 'perfectly colourless' theory of Mr. Potter," &c., &c. My reply to this is that, whether Mr. Caws accepts my statement (of fact, not of theory) or not, it is nevertheless true, and common knowledge to workers in concrete. I well remember, about twenty years ago, a Government Inspector examining some new buildings in progress, and standing in the basement beneath a concrete floor which had just then been completed, noticing water dripping perfectly colourless on a clean-planned board, and expressing his surprise, when it was explained to him that water passed so freely away from cement.

If too much water has been used in making the concrete, it carries away with it sufficient cement to cause discolouration, and this possibly has been Mr. Caws's experience.

Then, as to a floor 100 ft. in length not expanding sufficient to disturb the mortar joints of the brick walls upon which it rested, Mr. Caws remarks that this is due to a certain amount of elasticity which brick walls possess; but the same thing has been done for 120 ft. in length where the walls were built of concrete, and in which the slightest cracks would have been visible, but where nothing of the kind has occurred. Mr. Caws instances a case where the expansion of a concrete floor dislocated the joints of a heavy stone cornice, subsequently contracting again; this is just what might be anticipated from the use of unseasoned cement, and has been my own experience, teaching me a lesson in the use of that material.

\* We presume our correspondent has satisfied himself that there is nothing but empty space under the earth's crust; otherwise the comparison is hardly to the point.—Ed.



Mr. Caws says that, to prove Portland cement expands, some should be put in a bottle, when it will be found, on setting, to break it. My reply to this is that, so far from that being the case, Portland cement alone will not do so,—and I speak advisedly,—if of the proper fineness and proper age for use; and, obviously, there is far more reason to fear the result when the bottle is entirely filled with the material said to produce expansion than with a fixed proportion only mixed with a non-expansive material; the qualification that the cement must be hot is an unfair one, because, as is well known, cement will expand when in that state, and is unfit for any purpose whatever.

Dealing with the three-layer system of making concrete floors, Mr. Caws said that my assertion that the top and bottom layers would have but little connexion or bond to the middle layer is wrong, as they are practically homogeneous; but no correspondent who has followed him has endorsed this theory, while Mr. Irwin, in the *Builder* for Sept. 23, in giving the result of his experience with concrete, says:—"I have found in many instances that, no matter what care has been taken in breaking up the surface of the complete layer, the second one will not form with it a homogeneous mass." The gentle impingement admitted to be necessary after depositing a layer of concrete produces a comparatively smooth surface, and practically no bond can, therefore, take place between the materials forming the aggregate, and no homogeneity, as I understand the meaning of that word, can ensue. Mr. Caws admits this when he says the homogeneity results "by virtue of the great tenacity of the cement" (*Builder*, Sept. 7), and which I read as meaning the strength of the cement as a jointing material between the smooth under bed and the coarse upper bed of the succeeding layer. If a concrete wall has to be pulled down, workmen acquainted with the habits of the material will drive iron wedges in where the layers have been roughly levelled off to the top of the enclosing panels, for they learn that it is easier to part it there than in the actual monolithic portions.

I am in accord with Mr. Caws in regard to concrete floors being constructed with far less iron in combination than is usually the case. Lieut.-Col. Seddon proved this years ago when cement was only about one-half the strength it can be obtained now: a slab of concrete 14 ft. 6 in. by 13 ft. 6 in. and 6 in. thick, clear of all supports, and with 18 in. bearing on all four sides, was tested twenty-one days after being made; the slab was composed of one part of cement and four parts of broken brick ballast, screened or gauged to 1 in. mesh, well beaten when deposited in place, and ultimately covered with water. Eighty men marched on to it, marked time at quick and double, then jumped; it was afterwards loaded with bricks piled over its unsupported area.

There was no result from the jumping, but it broke suddenly and without any warning when 104 tons weight had been evenly distributed over the unsupported area. Another experiment upon a similar slab was to drop a weight of 4 cwt. from a height of 4 ft. over the centre, the result being that the weight broke a hole clean through the floor, without making any radiating cracks. Not only do these experiments go to prove that but little or no iron is needed for floors of ordinary dimensions, but that they are able to withstand sudden impact, a qualification which, as Mr. Fawcett states, they are not, as a rule, credited with. I made an upper floor of a cottage of concrete about eight years since of a slab of concrete 4 in. thick and 12 ft. each way between bearings, which were only on three sides, no iron being employed. The tenant complained for a year or two of an uneasy feeling when sitting in his room below, but he eventually got resigned to the situation.

Mr. Fawcett, in the *Builder* for August 17, says that the result of his experiments with slabs of concrete subjected to a severe fire was that they broke with very slight impact, and that "no concrete having Portland cement as a matrix would retain its strength after a severe fire." Mr. Hyatt, in his book, page 20, states that a slab 6 ft. long, 2 ft. wide, and 7½ in. thick, with iron embedded therein, and loaded with 300 lb. per square foot, resisted an intense heat for ten hours, and remained sound and strong after water had been pumped upon it. My object in bringing forward these statements of the opposite results of experiments and of actual practice in the use of the very same material, is to point out the necessity of exhaustive trials being made of cement concrete as a floor material in a common way, and which, if successful, could be accepted as reliable data for the construction of fire-proof floors for ordinary dwellings, as well as more pretentious buildings. The R.I.B.A., or some other Society, might,—as I pointed out years ago, on the scores of healthfulness and of the diminution of danger from fire which would result therefrom,—take up the subject and confer an immense public benefit. My remarks in the *Builder* of August 24 with regard to patentees and specialists were not intended as a reproach; indeed, just the reverse, for with subjects like concrete fire-proof construction the reward is often quite inadequate to the money and time spent in experimenting thereon, and bringing an invention well before the public. The late Mr. W. H. Lascelles

once told me he had spent thousands of pounds in concrete experiments, extending over many years, and that by the time his patents would expire he should probably be just commencing to reap the benefit therefrom, but the lapse of his patent-rights would let in other people to make use of the knowledge acquired by the expenditure of so much time and money, to their gain and his loss.

THOMAS POTTER.

SIR,—Mr. Frank Caws (p. 229, *ante*) again mistakes me in saying that I regard "simple slabs of concrete as fit only for the houses of the very poor." I do not regard them as fit until the concrete is finished on the top in some way (preferably with wood blocks) and the ceiling at least set. "Good linoleum or carpet" is not often found in the houses of the very poor, especially in London; the boards are generally bare and very often walked upon with bare feet, and a wood floor is preferred and used more on account of its warmth than anything else. I understand that Mr. Caws is not a practising architect in London, otherwise he would know that in buildings of a "superior class" here a wood floor is considered absolutely necessary in living-rooms for warmth and comfort. I cannot say that I employed my own floor myself during the short time I was in practice, but I can say that my floor has been praised by many who have known it, and has been employed by them, and this, to my mind, is of far more importance, as it tends to clearly show that the profession are in favour of it, and want something better than an ordinary concrete slab, or concrete and iron joist floor.

I should have had a word to say about Mr. Caws' theory as to the strength of concrete slabs, but I notice that others have taken it already.

Oct. 2, 1889.

MARK FAWCETT.

## The Student's Column.

### WATER-SUPPLY.—XIV.

#### FILTRATION (continued).

**T**HE purifying properties possessed by certain forms of iron have been known and taken advantage of for many years, but that mineral being extensively employed, not only in domestic, but in water-works filters on a large scale; and the success attending the different processes involved, are of sufficient practical importance to warrant our entering into the subject in some detail.

About thirty years ago, Dr. Medlock, in conjunction with Mr. Joseph Quick, M.Inst.C.E., made a number of experiments on the purification of Thames-water by metallic iron. The water of the river at Battersea was left in contact with iron wire and plates, in a large tank, for twenty-four hours, and the improvement in quality was very marked. The process was also tried experimentally at other places, and its beneficial results fully recognised. Sir Frederick Abel, F.R.S., had also at this period had considerable experience in the use of iron for purifying purposes.

Spencer's magnetic carbide of iron has long been known as a powerful filtering medium. It has been employed on a large scale, notably at Wakefield. This town has for many years been supplied from the river Calder, the impurity in which was so great that the Rivers Pollution Commissioners, to emphasise the circumstance, published a letter written with it. Yet this water was rendered wholesome by filtering it through Spencer's material, and the death-rate of the place, from zymotic and general causes, compares very favourably with many large towns in its vicinity.

Of recent years Professor Bischof's spongy-iron has claimed much attention. This material is extensively employed for domestic filters, and possesses the advantage of not only materially reducing the hardness of water, but is a powerful destroyer of organic matter in solution and micro-organisms. Its use is not, however, confined to small filters. Mr. William Anderson, M.Inst.C.E., in his description of the Antwerp Waterworks,\* has shown how it may be applied on a large scale. It was proposed to supply Antwerp from the river Nethe, eleven miles from that city, but the quality of the water was such, that it would have been absurd to utilise it before compelling it to undergo extensive purification. Many experiments were carried out, with a view of finding the best method of doing this, and eventually it was agreed to use Bischof's spongy-iron. It was determined, in the first instance, to provide for twelve hours' subsidence of the river water, to allow the grosser particles of sus-

pended matter to settle; next, the water was to be decanted from the surface on to a layer of ordinary filter-sand, underneath which would be a bed of spongy-iron and gravel, mixed. The water was then to be exposed as much as possible to the air, in order to oxidise any iron it might have dissolved; and finally, it was to be passed through an ordinary sand-filter, in which the red iron oxide would be separated. This method of filtration having proved satisfactory, Mr. Anderson constructed the filter-beds accordingly, the spongy-iron filters being filled in the following manner:—"On the top is a depth of 2 ft. of Meuse sand, then a layer 3 in. thick of fine gravel, and, finally, 3 ft. of spongy-iron and gravel mixed. . . . in the proportion of one part of iron by measure to three parts of gravel. The filtering material rests on a close layer of brick on flat covering channels of brick on edge, all laid dry." This was believed to be capable of filtering at the rate of about 140 gallons per square foot per day. The sand-filters showed in descending order a 2 ft. 6 in. layer of Meuse sand, 3 in. of fine gravel, and, finally, a bed of coarse gravel 1 ft. in thickness. This was thought to be able to filter at the rate of 117 gallons per square foot per day.

We are not now concerned with the other details of the construction of these filter-beds, nor of the various additional methods adopted in dealing with the water, before it is finally delivered to the public. The question we have before us, is whether spongy-iron has any advantage over other filtering media, in regard to its rendering water purer from a hygienic point of view; and if so, whether its practical use on a large scale is successful. It is admitted, as will have been observed in our remarks on the quality of water, that the material is capable of producing wonderful results, in removing both organic and organised matter from water. In reference to the latter, Dr. Percy Frankland's experiments show that after one month's action, the water passing through an iron-sponge filter, at the rate of 0.45 gallon per square foot per hour, produced a reduction in the number of organisms present after filtration, of 99.8 per cent. less than before filtration. The capability of spongy-iron in removing organic matter in solution from water is said to be about equal to that of animal-charcoal, but that it differs from this latter substance in its action, inasmuch as it is so much more effectual in destroying micro-organisms. The purification by spongy-iron is probably brought about almost entirely by chemical agency.

We have referred to the fact that filtration through this substance materially diminishes the hardness of water, and we have seen that that hardness is almost entirely due to the presence of salts of lime and magnesia, so it is natural to suppose that, by their elimination, in softening, the filters in time would be clogged up by the accumulation of these and other products; and such has proved to be the case, but the filters may be brought into working order again by breaking up the crust formed.

In order to answer the second part of the question before us, namely, whether the use of spongy-iron on a large scale is successful, let us now return to the results obtained at Antwerp. In a subsequent communication to the Institution of Civil Engineers, Mr. Anderson says\* that "the operation of the process as far as the effect upon the water was concerned, left nothing to be desired: uninterrupted work for nearly four years, did not appear to have materially enfeebled the power of the filtering medium, nor to have sensibly diminished its quantity." The waters of the Nethe proved to be so impure, however, that the filters were not able to deal with more than half the quantity expected; whilst the upper part of the gravel and spongy-iron bed, became hard (largely due to the softening process) and filled up with slimy matter. It was necessary therefore, periodically, to remove the layers of sand and grit in the upper part of the filters, to break up the crust and wash away the matter that had accumulated. Increasing demand for the water in Antwerp then caused Mr. Anderson, in conjunction with Mr. G. H. Ogston, Assoc. Inst. C.E., to set to work to devise some other means of utilising the properties of iron, whereby the supply could be kept up at less sacrifice of capital and space. Eventually, acting on a suggestion of Sir Frederick Abel, the problem was solved. It consisted in simply agitating a comparatively small quantity of

\* Min. Proc. Inst. C.E., vol. lxxii, (1889), p. 24.

\* Min. Proc. Inst. C.E., vol. lxxii, (1889), p. 279.



iron with the water to be treated, by passing the latter through slowly revolving cylinders, which were furnished, interiorly, with curved ledges, for scooping up the particles of iron and showering them down through the water, in turning. By continually rubbing against each other and the inner surface of the cylinders, and by falling through the water, the surfaces of the pieces of iron were kept clean and in active condition. It was found that iron in almost any divided form was suitable for the purpose, but that some kinds were more rapid in purifying than others. Cast-iron borings and turnings were preferred, being found to be the most active, then, in order of merit, spongy-iron, granulated cast-iron, and wrought-iron and steel turnings.

We cannot go into the whole process, but suffice it to say that by means of these "revolvers," subsequent aeration, sand-filtration, and minor contrivances, the water was very rapidly and effectively purified. Contrasting the original spongy-iron filters at Antwerp with the effects produced by the more recent method, M. Ad. Kemna, a well-known Belgian authority, says, "Que l'eau de la Nèthe est peu chargée de calcaire; après épurée elle marque 9 degrés hydrométriques. Il a été remarqué qu'avec l'ancien filtre à fer proprement dit, la dureté diminuait en proportion considérable; mais l'action des revolvers ne semble pas avoir beaucoup d'effet sur l'abaissement du degré hydrométrique."

Antwerp is not the only place where spongy-iron has been employed in purification. It has been used in the Stamford Waterworks and elsewhere, but we thought it useful to take a single instance of its employment, and to follow out and briefly chronicle the main practical results obtained.

With respect to the general question of the purification on a large scale, we think it may be admitted that when the water is of fairly good quality it may usually be rendered perfectly wholesome by the ordinary methods of sand filtration, or sufficiently so, to satisfy the requirements of all but the most fastidious persons; but when inferior water is to be dealt with, there can be no doubt that it may be more effectively purified by the additional employment of spongy-iron, or some such method as Mr. Anderson's Revolving Iron Purifier.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

13,167, Bakers' Ovens. W. Jago.  
By means of this invention, in order to equalise the heat of the ovens, air-chambers are arranged, and suitable flues and dampers are used. A "travelling-plate," a device known to bakers, but covered with tiles, is used, and also a small sliding door to be put into use when only the peel is used for firing the oven. On the tiles of the travelling-plate are suitable marks which make impressions on the bread.

15,510, Fastenings for Doors. J. Turner.  
This invention consists of an improved combination of door-bolt, and bar and door-chain. The chain is attached to a loop, or ear, in a staple fixed to the door-post, the length of the chain being just sufficient to allow the sliding-piece to be withdrawn from its bearings when the door is shut close. When the chain and bolt are not in use the bolt is inserted in a supplementary loop, which is a more simply and compact position.

15,564, Paint for Ships' Bottoms. J. Baynes and others.  
By means of this invention, in which carbonate of copper and arsenic are necessary ingredients, are rolled and mixed by special mills; and the paint is designed to be used over a priming composition, to prevent actual contact between the iron of the ship's hull and the copper in the paint.

15,613, Water Waste-preventing Cisterns. T. Panario.

According to this patent the cisterns are fitted with appliances so that the bonds of the siphons with which they are generally fitted, and by which they are emptied, may always be above the upper edges of the sides of the cisterns, so as to render it impossible that any waste of water can be created by a continuous flow through the siphons.

10,518, Whitewash Brushes. C. H. Hobbs.  
According to this invention, in order to prevent the separating or "forking" of the bristles or fibres, a small piece is inserted so that the bunches of bristles or fibres have a smaller thickness at the ends than they have in the central part, and the root-ends of the bristles are covered by a band, which is firmly nailed to this piece, the object of

which is to support the bristles or fibres and give protection thereto.

11,658, Plastering Walls and Ceilings. G. Bastuchchi.

According to this patent, a pasty mass of cement and magnesia, with which the desired colouring has been mixed, is plastered on to the walls or ceiling with an ordinary plastering-trowel; it is then faced-up, smoothed, and decorated, and glazed or polished with a hot iron. A marbled appearance can be obtained by a clouded colouring of the mass. The advantages of using the hot iron are many: a higher glaze is produced, greater durability, and the surface may be washed over with water. The walls are not liable to be affected by disease germs, and the plastering is especially suitable for use in schools and hospitals.

### NEW APPLICATIONS FOR PATENTS.

Sept. 16.—14,567, C. Thomerson, Fixing Head and other Pipes against Walls, &c.—14,590, H. Groves and J. Stewart, Electric Bells.

Sept. 17.—14,643, H. Torrance, jun., Portland Cement.—14,648, G. Bailey, Bakers' Ovens.—14,653, A. Clay, Glazed Bricks and Tiles.—14,664, A. Rockwell, Door-bell Mechanism.

Sept. 18.—14,667, H. Sanderson and C. Ehlers, Revolving Windows.—14,702, J. Bradshaw, Chimney-pot or Top.—14,706, J. Morris, Ventilator.—14,723, F. Faise, Decorative Tiles, &c.—14,733, D. Nicoll, Waterproof Slabs and Blocks.—14,739, J. Sim, Fittings for Doors and Windows.

Sept. 19.—14,766, W. Snelgrove and W. Avery, Door-checking Brackets and Fittings.—W. Snelgrove and W. Avery, Fastenings and Guards for Doors.—14,773, J. Macmillan, Coping Bricks.—14,772, A. Houghton, Gates, Doors, &c.—14,787, A. Mitchell, Joint for Drain-pipes, &c.—14,803, A. Black, Lead Water-pipes.—14,797, R. Barton, Paints, &c.

Sept. 20.—14,883, A. Tattersall, Jointed Brace for Boring Holes in Corners.—14,853, A. Dunbar, Splitting, Dressing, or Planing Wood.—14,863, A. Planier and L. Hakeman, Dimping Colouring.—14,877, H. James, Girders for Bridges.

Sept. 21.—14,889, A. French and J. Gordon, White Lead.—14,899, A. Morrison and M. Ingram, Water-closet.—14,915, T. Harris, Stoves or Fire-places.—14,936, S. Ainge, Carpenter's Cramp.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

6,266, A. Brown and H. Bruce, Pivots and Fittings for Swing Windows or Sashes.—9,662, J. Morrell, House Sinks and Drains.—12,942, J. Howie, Syphon Flushing Cisterns.—12,949, J. Armstrong, Cisterns, &c.—13,046, W. Bramwell, Chimney-tops.—13,153, F. Barnett, Ventilating and Purifying Sewers, Drains, &c.—13,380, G. Zaehmann, Door-lock.—13,767, F. Lane, Horizontal Sawing Machinery.—13,915, T. Kershaw, Door-knobs or Door Furniture.—13,961, A. Brooke-Hunt, Door-knobs.

### COMPLETE SPECIFICATIONS ACCEPTED.

#### Open to Opposition for Two Months.

15,223, S. Russell, Window-fastenings.—15,469, G. Beck and E. Hancock, Scaffolding, &c.—15,668, W. Smith, Wood Planing-machines.—15,722, W. Taylor, Step-ladders.—14,645, C. Allen and Others, Glazing.—17,257, W. Gussans, Imitation Marble Mosaics.—2,827, W. Williams, Wood Faving.—5,942, J. Oldroyd, Window-fasteners.—5,959, R. Home, Fastening for Sash-windows.—11,970, A. Martin, Machines for Moulding or Impressing Wood, &c.

### RECENT SALES OF PROPERTY:

#### ESTATE EXCHANGE REPORT.

SEPT. 23.—By HUMBERT, SON, & FINE.  
Busher, Herts.—Enclosure of f. building land, containing 9a. 3r. £1,710  
F. villa residence in Park-rd. 350  
A plot of f. building land 187  
SEPT. 24.—By RUTLEY, SON, & VINE.  
Somerset—12, Stibington-st., u.t. 81 yrs., g.r. 616, r. 272. 16s. p.a. 300  
Halloway—Queen's-gate, u.t. 63 yrs., g.r. 24. 4s. r. 234. 1s. p.a. 150

SEPT. 25.—By FRANK JOLLY & CO.  
Forest-gate—63, Dames-rd., u.t. 80 yrs., g.r. 27, r. 238 p.a. 250  
Upton Park, Boleyn-rd.—Two plots of f. building land 676  
Wapping—1 to 10, Mary-st., u.t. 84 yrs., g.r. 250, r. 2158. 8s. p.a. 300

SEPT. 26.—By J. BAKER & SONS.  
Killing—5, Craven-gdns., u.t. 96 yrs., g.r. 28. 6s., r. 263 p.a. 725

SEPT. 27.—By J. JACOBS & SONS.  
Brompton—22, Michaels-grove, u.t. 38 yrs., g.r. 210, r. 2160 p.a. 1,000  
27, Michaels-grove, u.t. 38 yrs., g.r. 24. 4s., r. 2100 p.a. 1,050

SEPT. 28.—By J. JACOBS & SONS.  
13, Montpelier-sq., u.t. 36 yrs., g.r. 215, r. 290 p.a. 850  
3, Alfred-st., u.t. 36 yrs., g.r. 212, r. 270 p.a. 350

SEPT. 29.—By J. JACOBS & SONS.  
12, Montpelier-st., u.t. 104 yrs., g.r. 221. 6s., r. 2100 p.a. 650  
8 and 7, North-st., u.t. 17 yrs., g.r. 218. 12s., r. 2150 p.a. 910

SEPT. 30.—By BATTIE, PAYNE, & LEPPE.  
Bickley, Kent—South Lane and 2a, f. 4,000  
Bromley, London-rd.—A plot of f. land 1,330  
Westfield Cottage, f. r. 275 p.a. 810

SEPT. 31.—By C. R. CROSS.  
North Kensington, Swinbrook-rd.—A rental of 230 p.a., u.t. 77 yrs. 670

By J. JACOBS & SONS.  
Brompton—7, South-st., u.t. 17 yrs., g.r. 210, r. 230 p.a. 2400  
14, Pelham-st., u.t. 34 yrs., g.r. 23, r. 240 p.a. 250  
1, Neville-st., u.t. 65 yrs., g.r. 23. 8s., r. 205 p.a. 780  
33 and 45, Beauchamp-pl., u.t. 34 yrs., g.r. 217. 12s., r. 2123 p.a. 1,230  
Knightsbridge—The "Falcon Head," u.t. 54 yrs., g.r. 2100, r. 220 p.a. 400

By E. KESTLEY & CO.  
Leytonstone—8 to 10, Arthur-ter., u.t. 75 yrs., g.r. 211. 12s., r. 238 p.a. 695  
SEPT. 28.—By NEWSON & HARDING.  
Clerkenwell—12, Albemarle-st., f. r. 245 p.a. 940  
Canbury—12 and 13, Northampton-grove, f. r. 250 p.a. 705  
Stoke Newington—160 & 162, Albion-rd., f. r. 250 p.a. 1,010  
Hackney—f. r. of £14 p.a., reversion in 71 yrs., 359  
Balls Pond—90, Balls Pond-rd., u.t. 73 yrs., g.r. 24. 8s., r. 245 p.a. 800  
Highbury—No. 84, Highbury New-pk., u.t. 60 yrs., g.r. 215, r. 2150 p.a. 300  
New Southgate—7, Southgate-villas, f. r. 250 p.a. 800

By E. STRASSER.  
Kennington—3 to 21 (odd), Thomas-st., u.t. 76 yrs., g.r. 255, r. 2351 p.a. 2,100  
Old Kent-road—1 to 4, Hyndman-st., u.t. 55 yrs., g.r. 216, r. 238. 3s. p.a. 435  
11 to 19, Aldred-st., u.t. 21 yrs., g.r. 230. 16s., r. 2163. 16s. p.a. 400  
29, New Cross-rd., u.t. 35 yrs., g.r. 28. 10s., o.r. 429  
Forest Hill—43 to 51 (odd), Stamford-rd., f. r. 2130 p.a. 1,120  
Strand—16 & 17, Maiden-lane, and 8, Bullin-ct., u.t. 71 yrs., g.r. 2170, r. 2271 p.a. 260

By K. HOLSWORTH.  
Stratford—37 and 39, Norfolk-ter., u.t. 92 yrs., g.r. 27, r. 248. 16s. p.a. 190  
67 and 69, Norfolk-ter., u.t. 92 yrs., g.r. 27, r. 248. 16s. p.a. 140

By FARMER, BROTHERS, KELLS, CLARK, & CO.  
Southgate—4 to 8, Broomfield-villas, f. r. 2140 p.a. 1,830  
10, 11, and 12, Broomfield-villas, f. r. 2102 p.a. 1,350  
5, Fairview-ter., f. r. 225 p.a. 300

SEPT. 27.—By PORTERSON & MORRIS.  
St. John's Hall—33, Queen's-rd., u.t. 47 yrs., g.r. 212. 10s. 850

By C. & H. WHITES.  
Bermondsey—83, St. James's-rd., u.t. 51 yrs., g.r. 23, r. 233. 10s. 310  
[Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; o.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; a. for acre; r. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

### MONDAY, OCTOBER 7.

Society of Engineers.—Mr. J. H. Cunningham on "Pin-connected or Rivetted Bridges." 7.30 p.m.  
Liverpool Architectural Society.—Opening Address by the President (Mr. T. M. M. M. M.) 1 p.m.  
Clerks of Works Association (Carpenters' Hall).—Monthly Meeting. 8 p.m.

### FRIDAY, OCTOBER 11.

The Junior Engineering Society (Westminster Palace Hotel).—Professor John Perry, F.R.S. (President Elect), on "Mechanical Engineering in Electrical Industries." 8 p.m.

## Miscellaneous.

**Guildhall Improvements.**—At a cost approaching 2,000l., improvements of a structural character are now being effected at the Guildhall, under the superintendence of the architect, Mr. A. M. Peebles. The object of the alterations is chiefly to make a worthy approach to the magnificent council chamber designed by the late City Architect, Sir Horace Jones. When the works are completed, members will no longer be compelled to elbow their way sideways up some narrow side steps, with the prospect of a complete block at the other end. The brass entrance-gates, with their griffins and other ornamental designs, will no longer be obscured from view. There will be a wide lobby, through which members will pass to the Court of Aldermen and Court of Common Council, and the latter will be approached by a handsome flight of steps. The additional space needed in consequence of these desirable improvements is to be obtained by the removal of certain offices that have hitherto immediately faced the entrance of the chamber.—*City Press.*

**The Canal between the Rivers Obi and Janisey.**—According to advice from St. Petersburg, the works on the canal system for connecting the Obi and the Janisey are being vigorously prosecuted, and it is hoped that they may be completed by next spring. This canal will be of great importance to Southern Siberia. The Government has decided upon constructing a railway,—280 versts in length,—uniting the Obi and the Volga, and has further under consideration a plan for its ultimate extension to the River Kama, a distance of 75 versts.



**The New York Streets.**—The report of Mr. Coleman, Street Commissioner of New York, for the years 1887 and 1888, which has just been published, contains some interesting items of information, and perhaps none more so than the following, which shows how the pavements of the city suffer from continual disturbance. During the period covered by the report, 98 miles of gas-mains were laid, 28.58 miles of trench opened for subways, 37.9 miles of salt-water pipes laid, 10,500 lineal feet of double tramway track laid, 17,973 excavations made for house-connections, 15.42 miles of water-pipe laid, and 7.12 miles of sewers constructed, while the excavations for repairs to sewers and water-pipes were almost innumerable. Some interesting figures are also given in the report as to the cost of street-cleaning. Comparing 1888 with 1887, the increase of population was 320,000, or 26 per cent.; that in miles of streets swept 17,818, and in loads of material collected 420,546. The cost of cleaning the streets per mile has been reduced since 1887 from 40 dols. 33 cents to 29 dols. 33 cents, and per load of material collected from 90 dols. 24 cents, to 81 dols. 67 cents. This shows a decrease since 1887 of 11 dols. per mile, or 27 per cent., in street cleaning, and per load of material collected a decrease of 8 dols. 57 cents, or 9½ per cent. The cost of sweeping by day-work above Fourteenth-street was 1 dol. 8 cents per load, or 11 dols. 18 cents per mile in 1887. In 1888, it was 87 cents per load, or 8 dols. 64 cents per mile. To collect and remove a cartload of snow in 1882 cost 93 cents, and in 1888 95 cents. The cost of final disposal of ashes, garbage, and sweepings, not including supervision, was 21 cents per cartload in 1882 and 18 cents in 1888. In 1888, 1,269,469 dols. was granted for cleaning the streets of New York, while the actual amount expended was 1,255,880 dols.

**Chapel at Ruthin.**—The memorial stone of the new Welsh Presbyterian Chapel and Schoolroom, Ruthin, North Wales, was laid on the 29th ult. The building will occupy a site in Well-street. The style is Gothic. The chapel is to seat 450 persons, and the sittings are to be arranged in a circular theatre form, with an isosceles curve from the pulpit, with stepped aisles leading to the body. The seats and other fittings are to be of pitch pine, varnished, together with the pulpit and deacons' pew. The schoolroom, 41 ft. 6 in. long and 24 ft. wide, is placed at the rear of the chapel, with a minister's vestry, 14 ft. by 12 ft., also a lavatory, book-closet, and other conveniences, all in easy proximity to each other, and communicating with the chapel by means of a passage. Below is the cellar, containing boiling-room, heating cellar and coals, provided with sinks, boiler, cooking-range, and other conveniences. The roof of the chapel is to be in one span of 54 ft. (inside measurement), supported by stained pitch-pine hammer-beam principals. The walls are to be built of local stone, with limestone dressings, and are plastered internally, having the jambs and arches of window openings blocked in ashlar courses. The architect is Mr. T. G. Williams, of Liverpool, under whose supervision the work is now being carried out, and whose plans and specifications were accepted in competition. The contractor is Mr. Richard Lloyd, builder, of Corwen. The cost, exclusive of land, will not exceed 2,000l.

**Cardiff.**—On September 24 the old church of St. John's was thrown open to the public, a commemoration-service being held in the morning, at which the Dean of Llandaff preached. The galleries have been cleared away, and two new aisles added, one on the north and the other on the south side. The roof has been thoroughly repaired. The old plastering in the panels has been taken away and wood substituted, but nearly all the old oak principal rafters have been made use of again, as well as the ribs which show in the nave and old aisle roofs. The tower-arch has been opened out. The two new aisles will accommodate about 550. Messrs. Shepton & Sons were the builders. The tile floors were supplied by Messrs. Godwin & Sons, Wiltington. Messrs. Kempson & Fowler, of Llandaff, are the architects.

**Seizure of an Obelisk for Debt.**—A curious case of seizing an obelisk for debt has occurred in Austria, a firm of carriers at Bozen having seized the cases containing the obelisk which was to be erected upon the summit of the Ortler mountain, 3,900 metres in height, on the frontier between the Tyrol and Italy, upon a claim for transport.

**Plumbers' Company.**—At the Quarterly Court, held at the Guildhall on Monday last, Mr. W. H. Bishop was re-elected Master, Mr. Chas. Hudson was re-elected Warden, and Mr. Philip Wilkinson, architect, was elected Renter Warden, for the current year. Sir Algernon Borthwick, Bart., M.P., and Mr. A. Ainslie Common, F.R.S., were elected Stewards. A requisition, signed by the Mayor of Cardiff, the Medical Officer of Health, and the Principal of the University College for South Wales and Monmouth, and a large number of architects and leading citizens, was presented, desiring that Cardiff should be created a centre for the examination and registration of plumbers, in accordance with the Company's general system. The Court resolved to comply with the requisition. It was also resolved to award prizes to successful students in the plumbing classes in thirteen provincial towns. Communications were reported from fifty-five boards of guardians and sanitary authorities expressing approval of the registration system, and stating that, in accordance with the suggestion of the President of the Local Government Board, they had resolved to employ registered plumbers in the buildings under their control.

**The English Iron Trade.**—While business in the English iron market has been somewhat checked by the high prices, and the practice of withholding important contracts immediately before the quarterly meetings, the upward movement of values continues. This is especially noticeable in Scotch maker's irons, which have gone up again this week, to the extent of from 1s. 6d. to 2s. 6d. a ton, accompanied by a further rise in the warrant market. Middlebrough pig has advanced 6d. a ton, and west coast Bessemer iron, 1s. Late rates are fully maintained in Lancashire and the Midland districts. Manufactured iron remains fairly active, and stiff in price. Another 2s. 6d. advance is reported from the north, and Welsh bars have been put up 6s. a ton. Tinplates are more animated, and 3d. per box dearer. Trade in steel is slightly more limited than it has recently been, but prices are hardening notwithstanding, which, seeing the advancing tendency in pig-iron, is not to be wondered at. A fairly large amount of new work is offering to shipbuilders. Engineers have nothing to complain of, and go on working briskly.—*Iron.*

**A Water-Logged Country.**—It is a somewhat startling proposition to put forward that the network of railway embankments and roads which British enterprise has spread over the face of India has conducted in some measure to spread disease and death among the native population. There can be doubt, however, that if the matter be thoroughly investigated, the fact will be found to be as stated. The question has been brought prominently to the front in the annual report of the Sanitary Commissioner for Bengal, Dr. Gregg, who, struck by the terrible mortality from malarial fever in his province, and by the steadily increasing number of deaths from this cause year by year, sought to grapple with the problem. His conclusion practically amounts to this, that the roads, bunds, and embankments that form a network over Bengal, are simply water-logging an already imperfectly drained country. The point is well worthy the attention of the Public Works Department and of those responsible for railway construction in India.—*Indian Engineer.*

**Amsterdam.**—The Municipality of Amsterdam appears to be actively engaged in competing with its rival ports, Rotterdam and Antwerp. The works on the new canal that is to connect this port with the Rhine are being pushed actively forward, and they are to be completed seven years earlier than calculated. Work is also carried on with the locks at the end of the North Sea Canal at Ymuiden, the completion of which would no doubt greatly improve Dutch trade.

**Salters' Hall.**—The principal rooms of the Hall belonging to the Worshipful Company of Salters, in St. Swithin's-lane, E.C., including the large banquetting-hall, are now undergoing entire redecoration. The work is being executed by Messrs. Johnstone, Norman, & Co., under the direction of Mr. H. Dawson, Surveyor to the Company.

**New Railway Station at Kiel.**—A new large railway station is to be built at Kiel, the traffic having increased in the old station very heavily of late years. However, the old plans have not yet been adopted. Most probably the building will be raised upon the old site.

**A Canal through Italy.**—The Italian engineer, Signor Vittorio Bocca, has submitted a plan to the Italian Government for a canal through Italy, from the Tyrrhenian Sea to the Adriatic. The canal is to start from Montalto di Castro, in the province of Rome, passing through the peninsula in a north-easterly direction, and ending on the east coast at Fano. The canal is to have a length of 200 kilometres, a breadth of 80 metres, and a depth of 12 metres, so that it would be passable by the largest ships. By this canal the great important provinces of Rome, Grosseto, Siena, Arezzo, Perugia, Pesaro, and Ancona will become directly connected with the sea. Moreover, the swampy parts of the country through which the canal runs are to be laid dry and even for agriculture, including the lakes Bolsena, Chiusi, and Montepulciano, whereby an area of 450 square miles of land are to be reclaimed. The time for carrying out this project is estimated at six years, and the cost at 25,000,000l.

**Projected Canal in Sweden.**—A project is under consideration in Sweden for the purpose of constructing a canal from the large lake Venen, in Central Sweden, to the Categar. The canal would connect the two towns of Uddevalla and Wenersborg, and be important to the wood and iron export trade in Central Sweden. Its length is estimated at 25 kilometres, with 8 kilometres of lakes. The depth is to be 7 metres, allowing of the passage of vessels of 3,000 tons. There are to be locks 116 metres in length and 15 in width.

## PRICES CURRENT OF MATERIALS.

TIMBER.			
	2.	s.	d.
Greenheart, B.G.	ton	7	15 0
Teak, E.I.	load	12	0 14 0
Sequoia, U.S.	foot cube	0	2 3 0
Ash, Canada.	load	3	10 0
Birch	load	3	10 0
Elm	load	4	0 5 0
Fir, Danisic, &c.	load	2	0 3 0
Oak	load	3	10 0
Canada	load	5	0 7 0
Pine, Canada red	load	3	0 4 0
" yellow	load	3	0 5 0
Lath, Danisic	fathom	4	0 5 0
St. Petersburg	load	5	0 10 0
Waincoat, Riga, &c.	log	2	16 0 4 0
Deals, Finland, 2nd and 1st.	std. 100	9	0 11 0
Riga	4th and 3rd.	7	0 9 0
St. Petersburg, 1st yellow	load	11	0 15 0
" 2nd	load	11	0 11 0
" white	load	7	0 10 0
Swedish	load	8	0 16 0
White Sea	load	9	0 17 0
Canada, Pine, 1st	load	8	0 10 0
" 2nd	load	11	0 17 0
" 3rd, &c.	load	8	0 10 0
" Spruce, 1st	load	9	0 11 0
" 2nd and 3rd	load	7	0 9 0
No Brunswick, &c.	load	6	10 0 8 0
Battens, all kinds	load	6	0 18 0
Flooring Boards, 2½, 1 in., pre-			
pared, First	0	11	0 0 14 0
Second	0	8	0 0 10 0
Other qualities	0	6	0 0 7 0
Other Cubes	0	0	0 0 5 0
Honduras	0	0	0 0 4 0
Mahogany, Cuba	0	0	0 0 0 0
St. Domingo, cargo average	0	0	0 0 0 0
Mexican	0	0	0 0 0 0
Tobacco	0	0	0 0 0 0
Honduras	0	0	0 0 0 0
Box, Turkey	0	0	0 13 0
Rose, Rio	0	0	0 20 0
Bahia	0	0	0 16 0
Batin, St. Domingo	0	0	0 0 1 0
Porto Rico	0	0	0 0 1 0
Walnut, Italian	0	0	0 4 0 0

## METALS.

Iron—Pig, in Scotland	ton	0	0	0	0
Bar, Welsh, in London	0	0	0	0	0
" Staffordshire, in London	0	0	0	0	0
Copper—					
British, cake and ingot	ton	47	10	0	0
Best selected	48	10	0	0	0
Sheets, strong	68	0	0	0	0
Chili, bars	43	0	0	0	0
Yellow Mary	0	0	0	0	0
Lead—Pig, Spanish	ton	12	11	0	0
English, com. brands	13	12	0	0	0
Sheet, English	14	0	0	0	0
Tin—Strait	50	5	0	0	0
Australian	90	10	0	0	0
English ingots	94	0	0	0	0
Bars	85	0	0	0	0
Refined	95	0	0	0	0
Zinc—English sheet	ton	24	0	0	24 1 0

## OILS.

Linseed	ton	21	12	6	21 17 6
Cocoonat, Cochin	27	10	0	0	0
Ceylon	24	0	0	24 10 0	0
Palm, Lagos	28	0	0	0	0
Rapeseed, English	31	10	0	0	0
" brown	30	0	0	0	0
Cottonseed, refined	25	10	0	27 0 0	0
Tallow and Oleine	28	0	0	0	0
Lubricating, U.S.	5	0	0	6 0 0	0
refined	7	0	0	12 0 0	0
Tar—Stockholm	barrel	1	6	0	1 6 0
Archangel	0	15	0	1 6 0	0



## CONTRACTS.

Epitome of Advertisements in this Number.

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Brick and Pipe Sewers, &c.	St. Mary Abbott's (Ken- sington) Vestry	Official	Oct. 8th	ii.
Broken Guernsey Granite	Willodon Local Board	O. Claude Hobson	do.	ii.
New Sewers and Street Works.	W. Barnett	J. M. Knight	Oct. 8th	xii.
Annual W.C.'s, &c., Homerton Infirmary	Chippendale R.S.A.	C. Dowell	do.	xii.
Main Water-pipes, Hydrants, &c.	Lynton Local Bd.	J. Lemon	Oct. 12th	xii.
New Cemetery	Homsey Local Board	T. de Courcy Meade	do.	xii.
Small Cottages	Chelmsford Union	F. Chancellor	Oct. 15th	ii.
Billiard Room, &c., Worthing	East Barnet Valley Local Board	G. W. Brunell	do.	ii.
Fire Mains and Hydrants	East Ham Local Board	H. H. Savage	do.	xii.
Broken Granite and Gravel.	Lambeth Guardians	T. W. Aldenoble	Oct. 16th	ii.
Sewage Works	Enfield Local Board	Official	do.	xii.
Padded Rooms at Infirmary	Greenwich Bd. of Wks.	do.	do.	xii.
Broken Granite	Battersea Public Libra- ries Commissioners	do.	Oct. 17th	ii.
York Paving Stones	St. Mary (Islington) Guardians	Wm. Smith	do.	xii.
Branch Library	School Bd. for London	Official	Oct. 21st	xii.
Building Works	West Ham Council	Lewis Angell	Oct. 22nd	xii.
Bakehouse and Oven.	Dover Town Council	Official	do.	xii.
Purchase and Pulling-down Building Materials	G. W. R. Co.	do.	Oct. 23rd	xii.
Main Drainage Extension	Comm. of H.M. Works	do.	Oct. 24th	xii.
Railway Footbridges	Gravesend U.R.A.	do.	Nov. 5th	xii.
Relief Line, Bristol	Gloucester Gaslight Co.	W. B. Wood	Not stated	xii.
Foundations, &c., Admiralty Buildings	Salvation Army	Official	do.	xii.
Broken Granite	War Department	Official	do.	xii.
New Offices				
Buildings at Chatham Arsenal				
Four Brick-built Huts, &c., Shorecliffe				

## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 Noon on Thursdays.]

**BECKENHAM.**—For the formation of new roads at South Beckenham, estimate for Mr. W. E. Foster, and estimate B. for Mr. Theo. Price. Messrs. Beeston & Burnmaster, architects and surveyors, 30, Lincoln's Inn-fields, W.C. Quantities by Mr. D. J. Brown, 81, Lincoln's Inn-fields, W.C. — Estimate A. Estimate B.

Collinsback	£1,700 0 0	£700 0 0
James & Smith's	1,200 0 0	600 0 0
Novell & Roberts	1,240 0 0	600 0 0
A. Marshall	1,220 0 0	638 12 2
W. & J. Woodham	1,173 7 4	698 10 6
Thames Valley	1,134 15 0	£32 17 8
R. Maxwell	984 0 0	665 0 0
Paill & Sons	900 0 0	480 0 0
Mid Kent Building Works	930 0 0	425 0 0
late	1,203 0 0	503 0 0

\* Accepted.

**DOVERCOURT.**—For building a house on the Leas-road for Mr. T. B. Daniell. Mr. J. W. Start, architect, Cape-chamber, Colchester:—

Grinwood & Son, Sudbury	£450 0 0
Saunders & Son, Dedham	340 0 0
Mead & Willsher, Dovercourt	376 0 0
C. K. Orifur, Colchester	347 0 0
F. Dupont (accepted)	347 0 0

**FENNY STRATFORD.**—For the erection of new schools for the School Board for Fenny Stratford. Mr. W. Marriott, High Barnet, Northampton:—

Marriott, High Barnet	£2,240 0 0
Rollaston, Eastbourne	3,427 0 0
Orchard & Son, Banbury	3,496 0 0
Yerrell, Leighton Buzzard	3,379 0 0
Grist, Bicester	3,376 0 0
J. S. Kimberley, Banbury	3,317 0 0
Hickinbotham, Northampton	3,300 0 0
Heath, Worcester	3,260 0 0
Martins & Bloxham, Banbury	3,147 0 0
J. T. Wingrove, Northampton	3,143 0 0
H. W. Welsh, Fenny Stratford	3,075 0 0
Elwood & Son, Sandy	2,984 0 0
Willmott & Son, Cambridge	2,987 0 0
S. Hipwell, Wisbech	2,979 0 0
R. Finnigan, Northampton	2,960 0 0
H. Martin, Northampton	2,860 0 0

**GRAVESSEND.**—For the erection of new offices and paying cellars, at the Wellington Brewery, for Mrs. E. Walker. Arthur Kinder, architect, Laurence Pointney-hill, London, E.C. Quantities by Mr. Alexander H. Kinder, 34, Clements-lane, E.C. —

Multon & Wallis, Gravesend	£279 0 0
J. Wallis & Sons, Maidstone	297 0 0
R. Knight, Northfleet	845 0 0
Gates, Frindsbury	844 10 0
Archer, Gravesend	833 0 0
E. & W. Wallis, Gravesend (accepted)	825 0 0

**LISKEARD (Cornwall).**—For the erection and completion of Salvation Army "Fortress," for General Booth, in Liskeard. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, E.C. —

Reed, Plymouth	£274 0 0
Thorne, Liskeard	636 0 0
Leithbridge & Son, Plymouth	619 0 0
Rosehill, Gunislake	607 7 7
Madams, Liskeard	659 0 0

**LONDON.**—For rebuilding premises in Cable-street, Shadwell, E. for Dr. F. E. Turner. Mr. H. Dow White, surveyor, 15, New Broad-street, E.C. —

Patman & Fotheringham	£3,173 0 0
Grover & Son	2,668 0 0
Mayo & Sons	2,490 0 0
Spencer & Co.	2,448 0 0
Porter	2,425 0 0
Mollitt (accepted)	2,395 0 0
Haywood	2,376 0 0
	2,194 0 0

**LONDON.**—For the erection of shop and offices in Bell-alley, Londonwall, E.C. for Messrs. John Morgan & Sons. Mr. E. Bennett, architect, 1, Lawrence-lane, E.C. —

Drew & Cadman	£2,019 0 0
G. P. F. F. F.	1,976 0 0
Dove Bros.	1,975 0 0
J. Chappell	1,977 0 0
J. & J. Greenwood	1,680 0 0
Langley & Co.	1,663 0 0
Brass Bros.	1,497 0 0
Harris & Wardrop	1,480 0 0
Ashby Bros.	1,472 0 0
E. Lawrence & Sons	1,472 0 0
Patman & Fotheringham (accepted)	1,439 0 0
Scott	1,327 0 0

**LONDON.**—For the erection and completion of Salvation Army "Citadel" buildings, for General Booth, in Wood-green. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, E.C. —

Stimonds, Reading	£1,553 0 0
Brown & Swatland, New Southgate	1,457 0 0
Martin & Barclay, Battersea	1,470 0 0
Brown & Harris, Bloomsbury	1,445 0 0
Bardle, Glogal-road, S.E.	1,428 0 0
Whitehead & Co., Clapham-road	1,396 0 0
Corhead, Leytonstone	1,395 0 0
Robson, Lewisham	1,381 0 0
Doubliday, King'sland	1,350 0 0
Lobb & Oliver, New Southgate	1,299 0 0
Bacon, Croydon	1,230 0 0
Jarvis, Banbury	1,150 0 0
Ellwood & Son, Sandy (accepted)	1,150 0 0

**LONDON.**—For new stables, &c., Sydenham, for Mr. Sydney Smith. Mr. A. H. Hennell, architect. Quantities by Mr. J. J. R. Vining:—

Black & Son	£1,098 0 0
Faulkner	945 0 0
Kilby & Gayford	931 0 0
R. Scott	898 0 0
Waddington & Co.	708 0 0

**LONDON.**—For repairs, &c., to No. 3, Chitty-street, Charlotte-street, W.C., for Mr. Howlett. Mr. Walter J. Ebbetts, architect, Savoy House, 115, Strand, W.C. —

C. F. Kearley	£213 0 0
W. D. Way	223 0 0
H. Baylis	154 15 0

**LONDON.**—For the erection of workshop and general repairs to No. 80, Greenfield-street, E., for Mr. M. Cohen. Mr. John Hudson, architect, 80, Leman-street, E. —

Pritchard	£205 10 0
Calnan & Co.	278 0 0
Cousell Bros.	247 0 0
Gladding	238 0 0

**LONDON.**—For alterations, &c., to Norland Chapel, Uxbridge-road, in order to convert the same into a Salvation Army "Fortress." Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, E.C. —

Manning, Adam-street, W.C.	£244 10 0
Doubliday, King'sland	740 10 0
Corhead, Leytonstone	700 10 0
Martin & Barclay, Battersea	450 0 0

\* Accepted.

**LONDON.**—For alterations and additions to shops at Clapham Junction, for Messrs. Arding & Hobbs. Messrs. Tolley & Son, Architects:—

C. Jewell	£276 10 0
Waddington & Co., Limited	385 0 0
Capel	308 13 6
Marriage (accepted)	285 0 0

**LONDON.**—For new shops and premises at 390 and 392, Holloway-road, for Messrs. Sheffield & Powell. Mr. R. Bennett, architect, 1, Lawrence-lane, E.C. —

G. Parker	£1,750 0 0
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**LONDON.**—For new shop and premises at 87, Newington-causeway, for Mr. William Shotter. Mr. E. Bennett, architect, 1, Lawrence-lane, E.C. —

Messrs. F. Sage & Co.	£215 0 0
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**LONDON.**—For taking down and rebuilding three warehouses in Beech-street, Barbican, for Mr. C. B. Ingram. Messrs. Beeston & Burnmaster, architects, 30, Lincoln's Inn-fields, W.C. Quantities by Mr. D. J. Brown, 81, Lincoln's Inn-fields, W.C. —

H. Dye	£7,259 0 0
T. L. Green	5,438 0 0
Colls & Son	5,380 0 0
Patman & Fotheringham	5,350 0 0
Mark Gentry	5,323 0 0
Turtle & Appleton	5,184 0 0
Simpson & Son	5,160 0 0
Brass & Son	5,073 0 0
J. Anley (accepted)	5,066 0 0

**LONDON.**—For pulling down and rebuilding the "Eagle" tavern, Farringdon-road, W.C., for Mr. J. Saddington. Messrs. Wyllon & Long, architects, 15, King William-street, Strand. Quantities by Messrs. Argent & Woodward, 7, Duke-street, Adelphi:—

Patman & Fotheringham	£3,618 0 0
Oldrey	3,578 0 0
Leslie & Co.	3,562 0 0
T. L. Green	3,547 0 0
J. T. Chappell	3,289 0 0
C. F. Kearley (accepted)	3,245 0 0

**LONDON.**—For alterations and additions to the "Manor House" public-house, Westbourne-terrace North, W., for Mr. C. Bealey. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C. —

F. G. Jelly	£1,641 0 0
R. Perkins	1,376 0 0
A. E. Nightingale	1,368 0 0
Spencer & Co.	1,150 0 0
Turtle & Appleton	1,138 0 0
C. F. Kearley (accepted)	988 0 0

**LONDON.**—For alterations and additions to the "Pitt Head" public-house, Grosvenor-road, E.C., for Mr. J. Jeney. Mr. Joseph G. Needham, architect, 11, Powerscourt road, Lower Clapton:—

S. W. Hawkins	£114 0 0
A. & P. Wilson	110 0 0
W. J. Kellaway	107 0 0
Burgess & Algar (accepted)	87 10 0
Ungar & Co.	30 0 0

**LONDON.**—For alterations to the "Marquis of Granby" public-house, 51 and 52, Chandos-street. Mr. W. Seckham Walsington, architect, 79, Mark-lane, E.C. —

Kuffer & Co.	£207 0 0
Tory	838 0 0
Cutler & Co.	780 0 0
Patman & Fotheringham	778 0 0

**LONDON.**—For alterations and additions to No. 17, Penant-nova, Cromwell-road, S.W., for Mr. R. Smith. Messrs. Beeston & Burnmaster, architects, 30, Lincoln's Inn-fields, W.C. —

Kinnmont & Sons	£550 0 0
T. L. Green	485 0 0
Macfarlane Bros (accepted)	420 0 0

**LONDON.**—For alterations and fittings to No. 4, Billiter-street, E.C., for Messrs. Partridge & Co. Messrs. Beeston & Burnmaster, architects, 30, Lincoln's Inn-fields, W.C. —

T. L. Green	£449 0 0
C. Horton (accepted)	349 0 0

**LONDON.**—For repairs to No. 3, Argyle-road, Baling, for Miss Hird. Messrs. Beeston & Burnmaster, architects, 30, Lincoln's Inn-fields, W.C. —

C. Horton	£128 10 0
T. Nye (accepted)	106 0 0

**LONDON.**—For alterations to 4, Bunimore-gardens, Kensington, exclusive of decorations, for Lord Halsbury. Mr. Charles Bell, architect, 3, Salters' Hall-court, Cannon-street, E.C. —

**LONDON.**—For alterations, &c., at the "Sole Arms," Hampstead-road, for Mr. McCarthy. Messrs. Furniss & Thorpe, architects, Kenilworth-street, E.C. —

Anley	£2,309 0 0
Servener	2,283 0 0
Tomes	2,184 0 0
Gould & Brand	2,174 0 0
Voller (accepted)	2,169 0 0

**LONDON.**—For building two warehouses in Worship-street. Mr. C. Bell, architect:—

Anley	£2,800 0 0
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[No competition.]

**LONDON.**—For building warehouse in the City-road. Mr. C. Bell, architect:—

Anley	£1,050 0 0
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**LONDON.**—For rebuilding the "Golden Eagle" public-house, Marylebone-lane. Messrs. Furness & Thorpe, architects:—

Armstrong & Hodgson	£1,569 0 0
Patman & Fotheringham	1,451 0 0
Voller	1,248 0 0
Servener & Co.	1,239 0 0
Tomes	1,211 0 0
Anley	1,180 0 0

**LONDON.**—For rebuilding the "Brewery Tap," Wenlock-road, City-road:—

Dowds	£288 0 0
Bellington	846 0 0
Anley	794 0 0

**LONDON.**—For additions and alterations at the "Queen's Head" tavern, Thobald's-road. Messrs. Alexander & Gibson, architects, 40, Great James-street:—

Beal	£1,890 0 0
Mattook Bros.	1,880 0 0
Anley	1,840 0 0

**LONDON.**—For new Vestry Hall and Offices for the Parish of St. Martin-in-the-Fields, at St. Martin's-place, Mr. Robert Walker, architect, 33, King-street, W.C.  
Quantities by Messrs. Woodward & Pollard:—

R. Heckley & Son	£28,200 0 0
S. & W. Pattinson	27,971 0 0
T. L. Green	27,935 0 0
Brass & Son	27,583 0 0
G. Stephenson	27,292 0 0
T. Elkington	27,250 0 0
Garlick & Korten	25,990 0 0
Kirk & Randall	26,729 0 0
Allen & Sons	25,619 0 0
Stephens & Bastow	25,675 0 0
B. E. Nightingale	25,600 0 0
Lawrence & Son	25,513 0 0
E. Toms	25,436 0 0
J. T. Chappell	25,342 0 0
D. Charlton	25,300 0 0
Peto Bros.	26,187 0 0
Lobb & Oliver	25,538 0 0
Mowlem & Co.	25,306 0 0

**NORBITON.**—For roads and sewers, &c., on the Norbiton Estate:—

Richard May Limited, Britton	
Alfred Bone, Battersea-park-road	£1,160 0 0
C. Oldridge & Sons, Norbiton	1,126 0 0
road, S.W.	1,100 0 0
G. Neal & Co. (Limited), Wandsworth (accepted)	1,029 0 0

**PORTSMOUTH.**—For additions to the "Derby" Tavern, St. Michael's, Portsmouth, for Mr. William Gibb, Messrs. Rake & Cogswell, architects, Portsea:—

D. W. Lewis	£860 0 0
J. H. Cooke	820 0 0
Harding & Burnett	612 10 0
Jas. Crockerell	595 0 0
T. P. Hall	550 0 0
F. White	550 0 0
George Birch	452 6 4
Scammell & Dowdell (accepted)	450 0 0

**SAFFRON WALDEN.**—For altering and re-seating in pitch-pine the Congregational Chapel, Abbey-lane, Mr. Frederic H. Johnson, Saffron Walden, architect:—

G. Whiffin & Son	£1,637 0 0
B. Dix	990 0 0
Wm. Bell & Son	967 0 0

For Painting, Plumbing, &c.

A. Rogers	£271 13 0
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**SHEFFIELD.**—For alterations and additions to the Methodist New Connexion Chapel, South-street, Sheffield, Mr. A. H. Goodall, architect, Market-street, Nottingham. Quantities by the architect:—

George Longden & Son, Sheffield	£2,010 0 0
Thos. Ashing, Sheffield	1,803 13 0
John Cooper, Nottingham	1,853 0 0
John Chambers & Son, Sheffield	1,810 0 0
E. & W. Orley, Sheffield	1,838 0 0
W. Crooks & Son, Sheffield	1,806 0 0
A. Smith, Sheffield	1,769 0 0
Wheat, Sheffield	1,710 0 0
Dutton & Evans, Sheffield	1,677 0 0
Thos. Cuthbert, Nottingham	1,650 0 0

\* Accepted.

**SOUTHEASE.**—For the erection and completion of Salvation Army "Fort" at Southsea, Mr. J. Williams Dunford, architect, 1, 1/2, Queen Victoria-street, E.C.:—

Pelton, Portsmouth	£328 5 0
Cockrell, Landport	324 0 0
Eiley, Portsea	329 0 0
Biggs, Southsea	318 0 0
Hall, Southsea	302 0 0
Little, Southsea	285 0 0
Learmouth, Portsmouth (accepted)	270 0 0

**SYDENHAM.**—For fitting up bar at the "Fox and Hounds" public-house, High street, Sydenham, for Mr. E. W. White, Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C.:—

J. & W. Taylor	£373 0 0
S. Williamson	308 0 0
Sanders & Son	259 0 0
Buckley & Beach (accepted)	250 0 0

Gasfittings, &c.

McPherson, Jan.	113 7 0
J. Biggs	107 3 6
W. Winn	103 0 0
Ruckley & Beach	93 0 0
W. Heath	93 0 0
Vaughan & Brown (accepted)	89 15 0

**VANGE (Essex).**—For the erection of a cottage, and repairs to farm-buildings at Goulding's Farm, Vange, Essex, for the Trustees of Masbiter's Trust, Mr. John Hudson, architect, 80, Leman-street, E.:—

W. Gladding (accepted)	£230 0 0
------------------------	----------

**WALTHAM CROSS.**—For the erection of a house and shop at Waltham Cross, on the Colvin Estate, Mr. John Hudson, architect, 80, Leman-street, E.:—

J. Bentley (accepted)	£860 0 0
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**WINGHAM (Kent).**—For the erection and completion of Salvation Army "Fort," for General Booth, in Wingham, Kent, Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, E.C.

Sargent & Son, Canterbury	£285 0 0
Lovell, Wingham	227 15 0
Fetherstone, Littlebourne	215 0 0

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#### TO CORRESPONDENTS.

C. A. (thanks: but of no use to us)—B. W. (we cannot continue the correspondence: we have inserted a correction of a statement that was unwarrantable, and backed the correction with our own expression of opinion: and that must suffice)—F. J. B. (ditto)—H. M. (impossible to find space)—C. C. (question too vague: name the particular pavement you refer to)—J. N. & Co.—A. O. H. (we prefer to notice works of that kind after they are complete, not when they are in contemplation)—B. E. & Co. (sent the last)

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the writer, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

**NOTE.**—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond the usual) which have been duplicated for other journals, are NOT desirable.

All communications regarding literary and artistic matters should be addressed to THE EDITOR: all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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# The Builder.

Vol. LVII No. 2428

SATURDAY, 13 FEBRUARY 1899

## ILLUSTRATIONS.

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Design for an Academy of Arts.—By Mr. Richard Willock .....	Double-Page Photo-Litho.

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### The Arts and Crafts Exhibition.



THE second exhibition of the Arts and Crafts Society, opened this week at the New Gallery in Regent-street, is quite as interesting as the first one, and includes a greater variety of work. We should be glad in future exhibitions to see the element of furniture design more developed and rather better illustrated than it can be said to be here, in spite of one or two very good examples; furniture being certainly one of the most important branches of craft to which artistic fancy and invention can be applied, seeing how large a place the objects coming under this category necessarily fill in the surroundings of our daily lives, how much scope they offer for variety and novelty of treatment, and what an interesting link they form between architecture and many minor forms of decorative work. Furniture, in fact, is a kind of minor and lighter form of architecture, equally dependent on constructive soundness of design and execution, and governed by much the same principles as architectural design. In it, as in architecture, decoration must be subordinated to construction; and, as in architecture, simple and harmonious lines of composition are more effective and satisfactory to the judgment than a scrambling outline and a superfluity and bustle of decoration. Excesses and eccentricities are equally out of place in both forms of art. There are two or three pieces of furniture we will name in passing, which admirably illustrate these requirements; but furniture is inadequately illustrated, and on another occasion it might be worth while to try to extend this branch of the exhibition by devoting one room specially and solely to it. On the other hand, decorative sculpture, or rather modelling, is more largely illustrated than last year; we have also the addition of lace, which we do not remember in last year's show, and of some experiments in new methods of decoration; and the display of textile work is very good in quality, though perhaps not better than last year.

There seems here and there to be some uncertainty as to the precise line which should separate the work for the Arts and Crafts

Exhibition from that shown in a fine-art exhibition in the usual sense of the term. Some of the figure designs exhibited here come as near as possible to being merely rather badly painted pictures, and illustrate the remark once made by an eminent painter, that what was called decorative painting appeared to him to mean pictures by people who could not paint. The real distinction would seem to be this, that decorative painting or sculpture is that which is necessarily reduced to a simpler form than exists in the multiplicity of detail of nature, in order to fit it for execution in a special material or to harmonise it with an architectural design. It is a foible of decorative artists, unfortunately, to think that this is a higher form of art than picture-painting. It is better for a given material and position than pictorial work, but it does not follow that it is better in the abstract. Mr. R. T. Blomfield, in one of the essays prefaced to the catalogue (and which are mostly very good reading), makes it a charge against Turner that in his illustration to Rogers' "Italy" he showed no modification of his habitual practice in painting, and that it never entered into Turner's head that "the method which was admirable in a picture, aided by all the resources of colour was beside the mark when applied to the printed page with all the limitations of black and white and the simple line." No; Turner was far too great a poet in landscape-painting to be harnessed in any such shackles. He wanted to make the best picture he could. Mr. Blomfield's essay illustrates the notion very prevalent nowadays, that the primary duty of a book illustration is to harmonize with the page and the printing, to combine to produce a decorative effect. There is a good deal to be said for this, of course; it is a new kind of interest in art; but it is not to be done without reducing the interest of the picture. No better model could be followed, we are told, than Dürer's woodcuts. They are magnificent in their way; but to imitate their style now, as some young architectural draughtsmen like to do, is only a kind of archaeological affectation, like the fashion for grottoes and other antique forms in contemporary musical composition. As we have referred to Mr. Blomfield's essay, we may add that where a general decorative effect of the page is to be aimed at, there is a great deal of point in his remark that the type of the book "establishes a kind of scale of its own" to which a line-drawing should have some relation. Nevertheless, we are

rather disposed to think that this view of the decorative function of type is being somewhat exaggerated. After all, we do not want to look at the type for its own sake, but for the ideas of which the words are the symbols. But drawings are not symbols, and their interest for the eye is of quite a different order.

There could not be a better example of decorative design in the true sense than the cartoon for Mr. Holiday's large circular window for the Theological College of New Jersey, which hangs in the North Gallery (43), and which we illustrated in the *Builder* for September 14th; and the same artist's design in illustration of the verse "Of such is the Kingdom of Heaven" (44), which is in fact a drawing adapted from a design for stained-glass windows for St. Thomas's Church, New York; that is to say, the special details and treatment peculiar to stained glass are omitted, and the design transformed into one for wall decoration. An illustration of this is published in the present number (see lithograph). Both these designs are purely decorative, in idea as well as in drawing; they are not only on one plane in drawing, but on one plane in conception, if one may use the phrase. The whole is ideal; the figures are abstractions, expressing ideals, not concrete characters. Turn from this to Mr. Heywood Sumner's large *sggraffito* design at the top of the room (66). "The sure revolving test of Time," and we see what pitfalls artists fall into when they forget to keep their ideas in one plane, and mingle the real and the ideal. Here is a group of realistic cart-horses, — conventionalised so far as is necessary for execution in *sggraffito*, certainly; that is to say they are drawn in bold simple outline, with the manes finely treated in sweeping black lines, and with only just so much indication of texture and detail as the method of *sggraffito* allows of: all this is very well; they walk round in a circle turning a grinding-machine, on the top of which sits the ideal figure of Time directing them, and behind is a "decorative treatment" of a timber barn. The combination is quite absurd; it only needed to put a cart-whip into the hand of "Time" to make it complete. Last year the same artist produced some *sggraffito* designs in which angels and imaginary beings figured with very fine and suitable effect. But this design is an intellectual absurdity, however clever in drawing.

Mr. Walter Crane's three panels in low



relief, "Thought Reading," "The Dance," and "Tête-à-tête" (86, 90, 92), gesso work on fibrous plaster panels, are interesting experiments in the introduction of figures in modern evening dress into decoration. In "The Dance" women only are engaged, three figures; in the other two one of the figures is a man, whose black suit is just indicated by a grey lacquer tint. These are very clever experiments; whether anyone would ever be brought to regard them seriously as decoration may be doubted. Other bas-reliefs from the same artist, exhibited along with these, are charming; still more so the two designs for stained glass panels for doors leading into a picture gallery; "Speculum Nature" and "Sphæra Imaginatio" (84, 95). In these the graceful undulating lines of the draped figures contrast beautifully with the square lines and style of the borders in which they are half framed.

There are many minor exhibits in the North Gallery of much beauty and interest. Mr. Cobden Sanderson's case of book-bindings is pre-eminent among these. There is really a poetry of its kind, besides beautiful execution, in such bindings as the copies of "Parsifal," "In Memoriam," and "De Imitatione," besides a practical suggestion in binding. This is, that the backs are made concave instead of convex, so that when the book is opened, the leaves radiate naturally from the curve of the back. Every one knows how often, in opening a book with the usual round back, there is a gap left between the actual sewn back of the leaves and the convex back of the cover, and it seems odd that it has not occurred to any one else that it was a fault of construction to make an outwardly convex back for leaves the inner edges of which must necessarily tend to assume a concave form when the book is opened. Mr. Sanderson works in the true spirit of an artist and craftsman, considering design and construction from an unconventional point of view. The various printed crotonnes designed by Mr. Day, and the working drawings for them, in this room, are many of them perfect examples of work of their kind, rich in general effect and admirably drawn in detail. Another set of exhibits that should be noticed are the *repoussé* brass and copper plates executed by members of the Guild and School of Handicraft, especially the fish design one of the couple numbered 64, by Mr. John Pearson, and the same contributor's two plates numbered 45. Mr. Pollen's design of the painted roof in Kilkenny Castle (32), with the pretty fairy-like figures appearing one after another on the line of curved braces seen in perspective, is charming in its way, but the design seems rather to ignore the form and structural conditions of the roof. Mr. Walter Lonsdale exhibits two very pretty little water-colour drawings of the clearstory windows of the Great Hall at Bute House, in which coloured representations of the Signs of the Zodiac career through a field of irregularly-leaded blue glass: the design entirely ignores the windows, and is as if seen through them in the sky; a fanciful pretence which is pleasing in its way, if not quite reasonable. Miss Hooper's design in water-colour for wall-paper (18) is a fine bit of conventional foliage; and very fine is the design for the frieze to the "Peacock Garden" wall-paper (6), made by Mr. Crane for Messrs. Jeffery & Co. Among the absurdities of the room are the frieze in water-colours called "Fowlers" (5) with the wild geese apparently strung on telegraph wires (decorative horizontal lines); the piece of brass with a rude figure of Christ punched on the middle of it (16), and the design of the artist who regards the "Holy Grail" as a kind of Sévres vase (26), which may be paired off with the decorative figure (3) of a saint with a blue china plate behind her head as a nimbus.

Mr. Crane's settle and Mr. Lethaby's altar-table in this room are effective in colour-treatment, but both are poor in constructive design. In this respect the best piece of furniture in the Exhibition is the sideboard in mahogany and gun-metal (174) in the West Gallery, designed by Mr. R. T. Blomfield, and executed by Mr. John Finch. This is a

thoroughly good piece of work, with little of mere ornament, but good in its lines and very solid in style and execution; and although the general appearance is plain and unpretending, a considerable amount of thought has gone to the working out of the details. The mahogany cabinet designed by Mr. T. R. Spence, which is in the corresponding position on the other side of the room, is an instructive comparison with this; there is a too perceptible effort to do something out of the way in the matter of detail, and the brass panels with their raised and curled edges look out of place and would be always catching in something. There is a good and rather unusual bit of work in the semi-oriental-looking hanging cabinet in Italian walnut, designed by Mr. G. Jack (437), as also in Mr. Benson's "Music Cabinet," decorated with incised work (282); and a chimney-piece and grate designed by Mr. J. Jack for Messrs. Longden & Co. deserves notice for its simplicity of design and the broad style of the brass *repoussé* ornament in the angles of the fire-place. The finest things in the West Gallery, however, are the small inlaid drawer fronts of rosewood and ivory, designed by Mr. Stephen Webb (274, 5, 6). This is work that could only be introduced into a cabinet *de luxe*, but it is of exquisite design and workmanship; the designs consist of delicate conventional foliage with little silhouette figures introduced among the foliage; 274, where the figures represent children swinging, is perhaps the most beautiful of all, and is a piece of work which it would be difficult to surpass for grace of design and beauty of execution; the workmanship is by Mr. R. Smith.

There is some brass-work to be seen in this room, among which a large lectern in wrought brass, for St. George's Church, Newcastle-on-Tyne (226) deserves mention; a very sumptuous specimen of brass furniture treated in the thin hammered-out manner which is regarded now by many as the orthodox artistic treatment of all metal; but it may be questioned whether this laminated treatment, specially suitable no doubt to work in the precious metals (gold especially) on a small scale, may not be carried too far in metal-work on a large scale, and whether this, as one may call it, of bristly brass curls and leaves and tendrils, clustered under the desk of the lectern, is altogether what one desires to find in that position. The more solid and sober candle-standard in brass, designed by Mr. Sedding for Messrs. Longden & Co. (256), though it looks a little more commonplace at first sight, appears to us to be a more suitable style of work for heavy and massive brass furniture. Miss Laura Bray is to be complimented on her small bits of *repoussé* brass-work, especially the four flat candlesticks (193) with sockets formed of a spiral twist in a characteristic manner.

Among the surface decoration and textiles in this room are particularly to be mentioned the "Corinthian Scroll" wall-paper (157) designed by Mr. Day, and printed in "blended flocks"; a very fine bold piece of decorative foliage design; and the panel of embroidery in wool designed by Mr. G. Jack and worked by Mrs. Jack (129), a very fine bit of design and workmanship. Mrs. Gerald Davies' bedcover in imitation of an old English design (123), Mrs. Staniland's panel of embroidered muslin (125), and Miss Jenkins' Portière with a design adapted from a plaque in a mosque in Cairo (128) and carried out on a very bold and grand scale, are all fine examples of their class of artistic workmanship. Among some small things in a corner of the room are some decorative panels by Mr. J. Smetham Allen, described as "panel in brass with copper ground"; the figures and other details of the design are in bright brass perfectly flat, but with a slight etching on them, and a roughened ground between. If this is the copper ground, we presume the designs must be cut from a thin film of brass and affixed to the ground. The effect is novel, but there is rather a tawdry air about it as a method of decoration. Another still more novel and still more tawdry piece of work is Miss Amstruther

Thompson's "Wall decoration in appliqué stuffs, high relief," and representing "a film of Moors led by a fanatic," a subject as odd as the method of execution. "Moors" were probably chosen in order to give an excuse for brightly-coloured costumes; and the figure look like so many stuffed dolls treated in bas-relief; they are done with great spirit and the whole shows undoubted talent, but we hope the author will not do it again: it might certainly employ her talent to better purpose. Near this hangs an architectural drawing which certainly seems in place in an exhibition representing the combination of arts and crafts: it represents one bay of the new church in Sloane-street designed by Mr. Sedding, and the general design is his, but the frieze is by Mr. Burne-Jones; the figures of prophets in the spandrels by Mr. Armstead the figures of the Apostles on the piers by Mr. Thornycroft; and the stained glass in the window by Mr. Whall. We give an illustration of the drawing in the present number (see lithograph).

The small room (South Gallery) contains pottery, some designs for sculptural decoration, and a little stained glass shown in a dark room partitioned off, and of which there is not much to be said. The only three bits worth mention are the small panel with a draped head and bust and some fruit (618) by Mr. J. R. Spence, which is a really good bit of colour; Mr. Whall's little panels with children called "Welcome" and "Farewell," for a hall door (621, 622) and Messrs. J. and W. Guthrie's leaded shield design, which is a good piece of work of a simple kind. Among the examples of decorative modelling is a good piece of Anaglypta wall decoration designed by Mr. Voysey, consisting of oak-leaves and acorn in a very low relief. Mr. Mark Rogers's model of a salver illustrating "Reading, Writing, and Arithmetic," is a good and original design; and in connexion with this class of work we ought not to have forgotten to notice, in the North Gallery, Miss France's model for a rose-water vase and bottle, to be executed in *repoussé* silver. An interesting exhibit, though too small and too rough for the design to be appreciated from it, is the sketch model for a frieze to go over Heath's hat shop in Oxford-street, representing the history and manufacture of hats in ancient and modern times. We had looked with some curiosity at the long blank space which has remained for some months over the ground-floor shop windows of Heath's, which was evidently to be filled up with something in time; and it is creditable to the firm that they have thought it worth while to add this bit of sculptural expression to the architecture of their front. The sculptor is Mr. Benjamin Creswick. Messrs. Maw & Co. make a noble display in this room with a kind of screen or erection of lustrous tile-ware, with figure panels by Mr. Walter Crane and a foliage border by Mr. Day; figures and foliage, in a warm red tone on a lighter ground, are admirably designed, and the whole represents the most artistic use of tiles as a wall-covering. Some decorative panels in gesso on wood, that are exhibited in this room, do not go to bear out all that is said touching gesso in one of the introductory essays to the catalogue; there is something rather "putty-ish" about it, though the general effect at a distance is pretty. The wood-carving, like the stained glass, is not much; but there are some very good bits of pottery; among others are some plates and cups designed and executed by Mr. Thackeray Turner, which are so good that they tempt us to forgive him a good many of his official sins as secretary of the "Society for the Protection of Ancient Buildings."

We have only space to specify, among the exhibits in the entrance-hall, a model of the chimney-piece executed at Ashridge for Earl Brownlow, by Mr. Mark Rogers, a piece of work inspired by the recollection of Stevens, with two finely-designed Telamon figures; and a chimney-piece called "A Tangerine fireplace" designed by Madame Cassavetti, in which we presume the Tangerine element is represented only in the architectural details;



the sculpturesque portion of the design consists of a figure in very low relief on each pier of the fireplace, and a group of figures (apparently seated round a fire) in equally low relief on the lintel; this portion of the work is very refined in execution, and the whole thing is of considerable interest and originality.

Among the essays prefixed to the catalogue, to which we have already referred, one of the best is the concluding one by Mr. Day on "Working Drawings," the main object of which is to draw the attention of the public to the difference between drawings made by a designer simply to express his meaning as fully as is necessary, and the kind of show drawing which is made for competition or for exhibition. The essay deserves the attention of the public, who are mostly under great misapprehension on this score, and very prone to mistake drawing for design.

## NOTES.

**W**E are officially informed that the plans of the new street from Southampton-row to the Strand, proposed by the London County Council, are not in a sufficiently advanced stage to be made public; but from the description given of them in the report presented at Tuesday's meeting of the Council we are, so far, of opinion that the Committee are right in their preference of the more western route from Southampton-row to Catherine-street, with a spur street eastward to St. Clement Dances (as described in our report in another column). It is a great deal better that the main new route from north to south should fall into the Strand near Wellington-street, as the approach to Waterloo Bridge, than that it should be brought in behind or close to St. Mary's Church. The latter route is not the most direct, and would still leave excuse for those who want to pull the church down. We publish a plan this week by Mr. Nevill, showing a scheme of his for a street debouching into the Strand at that point; but we cannot recommend it unless on financial grounds. If the scheme recommended by the County Council Committee is adopted, it is proposed that all the property remaining in the triangle between the new main street, the spur street, and the Strand, should be acquired for rebuilding. There would in that case be an opportunity for arranging the laying-out of the ground so as to make the most effective architectural use of the two churches, without their obstructing traffic in any way.

**I**N reference to this question of the new street scheme, we observe that the *Pall Mall Gazette* of Wednesday, in reporting the proceedings of the Council, appends a plan, with the remark, "the following plan will explain the new scheme," the reader being apparently intended to infer that this is the County Council plan, which has been communicated to the *Pall Mall Gazette*. The plan is a reduction of one by Mr. Forster Hayward, which first appeared as a lithographic illustration in the *Builder* on November 18, 1882. It differs materially from the County Council route as described, and any attentive reader would see at once, as the main route comes into the Strand east of St. Mary's, whereas the County Council route is to come in at Catherine-street. But that is all one to an "enterprising journal" nowadays; they have given their readers a plan, and if the reader is stupid enough to be taken in by the stratagem, it is his own fault, of course.

**A** NUMBER of builders and contractors (about seventy, we are informed) have formulated, through a Committee of which Mr. Lawrence Stevens is the Chairman, a memorial to the London School Board, setting forth that they, "as ratepayers and tradesmen carrying on their respective businesses in London," object to the action of the School Board in restricting tenders for new schools and for repairs to a limited number of selected

builders (twelve for new buildings and seven for repairs). They urge that

"Many of your memorialists have been for a number of years working for your Board (they were recommended by honourable members) to carry out at the schools work that could not be tendered for; and being without knowledge of complaint as to their efficiency, consider that after so many years' connexion with your Board in carrying into completion the work entrusted to them, the mere fact of their being now so publicly excluded by you implies a stigma upon their characters."

If it be the case that some of the memorialists have been employed and are now excluded, this complaint is not made without reason. But the statement in another paragraph, that the procedure of the Board "is inimical to their (the memorialists') interests as ratepayers and tradesmen," though doubtless true in fact, is hardly to the point. They are only a small proportion of the ratepayers, and the question for the Board is what is to the interest of the whole body of ratepayers. We presume the course of the Board has been dictated by the belief that it will save risk as to employing inferior builders, or that it will save time and trouble in making inquiries as to builders who may gain a competition contract, but of whose work and status little is known. This is a certain advantage there is no doubt, and means a saving of public time (which is public money); but it may be doubted whether it is not compensated for by the loss of the widest market, and the tendency among favoured competitors to tender higher than they would otherwise do. We should say the question requires consideration, but it must be considered on public grounds, not merely in the interests of a section of the ratepayers who happen to be prejudicially affected by it.

**T**HE architects of Departments in France have for some years been making attempts at a professional organisation; the numbers of the departmental and "regional" architects have considerably increased of late, and a conference is now announced to be held at Bourges on Sunday, organised by M. Chevallier of Nice, for the purpose of considering the best means of carrying out corporate action among the provincial architects of France. Bourges was selected as being about the most central town in France. A committee has been formed and fifteen provincial societies of architects have inscribed themselves in the provisional list of those who desire to join the movement. The representatives of the professional societies whose headquarters are in Paris (the "Société Centrale," "Caisse de Défense Mutuelle," &c.) have been invited to attend the Conference.

**W**E cannot say that the report of the deputation from the London Working Men's Association, sent to inspect the Paris Exhibition, impresses us with the idea that any specially valuable or practical result is to be obtained by sending working men to report on exhibitions of this kind. We have failed to find anything of special interest in the report, in which, we are surprised to find, among other things, the most absurd rhodomontade of French writers about the Eiffel Tower accepted apparently in perfect good faith by the practical working man of England. The following information in regard to the way in which the marble-working trade is carried on, if correct, is of interest: it is from the report of Mr. G. Mitchell:—

"The machinery for working marble is superior to any in England, which is a great saving in labour. Another system is very largely adopted; this is, many live out of town or away from centres as much as from six to ten miles,—the materials are cut to size, and taken round to the various homes at various times to suit all; by this means the masters get it done 10 per cent. cheaper. When work is slack, these people are the first to suffer; but to make up for this, they have a few acres of land on which to go, so that they produce what they want to eat and to spare. This makes them better off than the constant hands in the towns. This also prevents overcrowding in their large centres of industry. This system contributes largely to the happiness of the people, and to the absence of that squalid, poverty so often witnessed in Great Britain."

That such a life is a happier and healthier one for the artisan than working in a crowded factory is unquestionable, and the idea is perhaps one to be considered as a means of breaking through the increasing pressure and crowding of working men into towns to be near their work: but we fail to see how it can be cheaper to get work done in this way, unless the labourer foregoes more than 10 per cent. to compensate for the loss of time and the carriage of material involved. It is gratifying, in the various reports, to read of the courtesy and good feeling with which the delegates were everywhere received by their French brethren in the crafts.

**B**AGINTON HALL, the seat of Mr. W. Bromley-Davenport, M.P., which, together with all its contents, save the valuable library and pictures, and some furniture, was destroyed by fire on last Monday morning, stands upon high ground about three miles distant from Coventry. It is situated in a parish of that name, the Badechitone of Domesday Survey, and since known as Bathkinton, in Knightlow Hundred, upon the left bank of the Sowe, a tributary of the Avon. This mansion, whose walls alone now remain, was built on the site of the former hall, that was burnt in 1706, being the property of Speaker Bromley, whose loss was made good, in part, by a Parliamentary vote. Eight years later Queen Anne planted a cedar tree there. The original residence, Baginton Castle, had been built by Sir William Bagot, circa 1380, whose monument (1400) is in the parish church, once a chapel of Kenilworth Priory. It was in the castle that "Harry of Hereford, Lancaster, and Derby," lodged on the eve of the day he met Thomas Mowbray, Duke of Norfolk, in the lists at Coventry, before King Richard II. In the reign of King James I. the manor belonged to William Bromley, ancestor of Secretary Bromley, from whom it has passed to its present possessor. The castle ruins, consisting only of mounds covered with turf, are situated in the park, nearly a quarter of a mile distant from the hall. They were visited last year by the Royal Archaeological Institute, during their Congress at Leamington, as we reported in our columns on August 25, 1888.

**T**HE organ at St. Barnabas, Pimlico, which has just been rebuilt and largely added to, is arranged on a system patented by Mr. Casson, which is worth the notice of organ-players and organ-builders. The first and more obvious feature of Mr. Casson's system consists in a method of grouping the stops so that the pedal stops necessary to go with each manual are grouped with the stops of that manual, a system which is certainly more logical and (in a large organ) more easy to "read" and manipulate than that of placing all the pedal stops apart as a separate group; but the important point, which is the subject of the patent, is a system of planning the wind-conduits in the interior, so that the wind can be cut off from or admitted to various groups of stops by the mere pressure of a button, without any mechanical movement of the slides or draw-stops. The best point, and which is a really beautiful piece of arrangement, is that whatever combination of stops is drawn on either of the manuals, the pressure on a button puts in gear a suitable selection of pedal stops for that combination. Another contrivance is, that whatever are the stops actually drawn on the three manuals at any moment, a pressure on a single pedal will throw the whole power of the instrument under the control of the player, the wind being admitted to the pipes another way round, so to speak, without any movement of the visible draw-stops. It is of course somewhat the same as the old "ventil" system, only very highly elaborated and treated in a new manner. The one drawback to all systems of this kind is, of course, that the position of the draw-stops does not show what stops are actually "out" or "in," and the player requires to have a clear head and to know his instrument very well; but the gain in quiet-



ness and rapidity in making changes is very great, and the system is far less likely to get out of order than any system for the mechanical movement of slides, draw-stops, and levers, which even the best mechanism will hardly achieve with the perfect freedom from noise which is desirable in organ mechanism.

WE may draw the attention of our readers to the series of lectures which Professor Stuart Poole intends to give at University College this season, on *Medieval Archeology*. The following is the summary of the subjects and dates of the lectures:—

Wednesday, Oct. 16, 5 p.m.—Inaugural Lecture, "The Middle Ages"; the Professor.

Wednesday, Oct. 23, 5 p.m.—"The West in the Middle Ages"; the Professor.

Thursday, Oct. 24, 11.30 a.m.—Demonstration at the British Museum.

Wednesday, Oct. 30, 5 p.m.—"The East in the Middle Ages"; the Professor.

Wednesday, Nov. 6, 5 p.m.—"The East in the Middle Ages" (continued).

Wednesday, Nov. 13, 5 p.m.—"The Mosque"; the Professor.

Thursday, Nov. 14, 5 p.m.—Demonstration at the British Museum, the Professor's House.

Saturday, Nov. 16, 7 p.m.—Demonstration at the South Kensington Museum.

Wednesday, Nov. 20, 5 p.m.—"The Cairene House"; the Professor.

Thursday, Nov. 21, 5 p.m.—Demonstration at the British Museum, the Professor's House.

Saturday, Nov. 23, 7 p.m.—Demonstration at the South Kensington Museum.

Wednesday, November 27, 5 p.m.—"Persian Art," Mr. Cecil Harcourt Smith, of the British Museum.

Thursday, Nov. 28, 5 p.m.—Demonstration at the British Museum, the Professor's House.

Saturday, Nov. 30, 7 p.m.—Demonstration at the South Kensington Museum.

Wednesday, Dec. 4, 5 p.m.—"Oriental Ceramic Art under the Mohammedan Dominion from the Seventh to the Fifteenth Century," Mr. Henry Wallis.

Wednesday, Dec. 11, 5 p.m.—"The Ceramic Art of Spain under Mohammedan Rule, and the Influence of the so-called Arab Art on European Ceramic Art up to the Renaissance," Mr. Henry Wallis.

Saturday, Dec. 14, 11.30 a.m.—Demonstration at the British Museum.

WE learned the other day, on paying a passing visit to Mr. Ruskin's celebrated museum of art conferred on an (apparently) rather ungrateful Sheffield, that the museum is to be removed from its present site to one within the town, experience having proved that the working population will not walk two or three miles out of town, mostly up steep hills, to look at a collection of objects of ancient art. The whole story is an amusing comment on the want of practical common sense which has vitiated so many of Mr. Ruskin's efforts to artistically evangelise the masses. This museum (why bestowed on Sheffield in particular we have never been able to discover) was, it was supposed, specially intended to extend and embellish the perceptions and lives of the men who were condemned to work in Sheffield factories. But as Mr. Ruskin could never do anything like ordinary people, and in a simple and unaffected manner, the collection was planted not among the class of people who were to profit by and enjoy it, but on a site which is a half-crown cab drive from the Midland Station, the neighbourhood most inhabited by factory population. The consequence is that, as the custodian frankly admitted, the working classes never come near it. There is nothing in the collection that is not worth looking at, though it is a curiously odd and illogical assortment of things having no relation to one another; but there is a melancholy deserted look about the small room and its valuable but incoherent collection, and it is to be hoped that the transference to a more central position may bring a little more life to it. The catalogue to the museum, compiled by the hand of "The Master," is a characteristic curiosity in its way; it is full of excellent moral reflections, but it is next to impossible to find the information you want in it, the arrangement being as devoid of system as the collection itself.

#### THE ARCHITECTURAL ASSOCIATION CONVERSAZIONE.

THE Architectural Association commenced another session of its active and energetic existence with the customary conversation on Friday evening last. The entertainment takes place nearly a month earlier than it used to do, a change having been made a few years ago in order that the session, at its close, might encroach less upon the summer months, when the attraction of outdoor amusements is found to interfere seriously with the work of the classes. The meeting was held, as it usually has been of late, in the Westminster Town-hall, and was in every way a success. At the commencement of the evening there was a partial return to old custom by the formal announcement by the President of the names of the prize-winners, to such of whom as were present he presented mysterious envelopes. It is to be regretted that many of the young gentlemen in question had the bad taste to absent themselves, a lack of courtesy to their fellow members which might well be held to justify the withdrawal of their prizes. Two or three had written to say they were unavoidably prevented from presenting themselves, and one, it was announced, had gone to Australia. Such cases are, of course, exceptions, but it is only due to the giver of a prize, whether an individual or a society, that the recipient should take some trouble to appear at the proper time to receive it; and, if he cannot be present in person, he can at least write an apology, or, better still, nominate a representative to appear for him. The great attraction of the evening was the concert, during the performance of which the room was crowded to overflowing by an attentive audience that fully appreciated the efforts of Mr. John Elwin, Miss Ethel Winn, and the other performers to entertain them. Another centre of attraction was one of Mr. Edison's new phonographs, which occupied the end of the large committee-room, and was the subject of frequent experiments during the evening.

The exhibition of drawings and sketches seemed to suffer from the absence of competition for the Architectural Union Company's prize for measured drawings of old work. The ground formerly covered by this competition has been invaded by two new ones for prizes of greater value, and which are awarded at a different period of the session; and, in consequence, there was only one competitor this year, whose drawings, being unfinished, made no great show. The design for a town church, which was awarded the Association Medal, was, however, a first-rate one, and worked out with considerable skill and knowledge of Gothic detail. The sketches made by the travelling student during his tour were laid upon tables, and received an amount of attention which they fully deserve on account of their excellence, as well as of the large quantity of work done. A few sketches done in Mr. Ruskin's style by a former travelling student, Mr. D. J. Blow, and hung among the miscellaneous contributions, call for special notice on account of their delicate handling and true rendering of effect. Among the work of the classes, that exhibited by the elementary colour decoration class was again conspicuous for the painstaking and conscientious nature of the work, small natural objects, such as butterflies, feathers and leaves, as well as simple decorative motives, such as the ornament on Greek vases, having been copied with a care and appreciation which must lead, by a sure road, to some knowledge of colour harmonies and graceful forms. The work of the three water-colour classes, so energetically organised by Mr. W. G. B. Lewis, made a much better show than usual, and it is to be hoped the classes are now established on a firm basis; no better instructors could be found than Mr. Millard for the elementary, and Mr. Weedon for the senior class, and it ought not to be necessary to point out to students the pleasure and profit to be derived from skill in the art; to put it upon the lowest ground, it is a very marketable accomplishment, and one, too, which has certainly helped some prominent architects to attain their present high position in the profession.

**The Upsala Cathedral.**—The new tower and spire on the old Upsala Cathedral have now been completed to their full height, viz., 120 metres, 60 metres being masonry and the remainder iron. All the ironwork has been made at Motala.

#### SANITATION: PAST AND FUTURE.

THE following is the principal portion of the address delivered on Wednesday by Sir Edwin Chadwick, at the opening sessional meeting of the Sanitary Institute:—

"The Mosaic ordinances for the instruction of the priest, who was then the only health-officer, as to the cleansing of the leprous house, which ordinances mark the house and its condition a source of disease, have their analogy for the condition of unwholesome houses in modern times. The measure which we provided, and Lord Shaftesbury got passed, for the regulation of the common lodging-house, might be taken to be a measure for the cleansing of the leprous house in these times, by dealing, as in the Mosaic ordinances, with foul walls, by means of whitewashing, by ventilation, water-supply, and other sanitary particulars, which, when properly executed, were completely successful. The commentators on the Mosaic provision for dealing with the leprous house (Lev. xiv. 33-53) have departed from it, and gone into the theory of the transmission of the disease from the person instead of from the house.

One leprous condition is the dampness of walls; and in England now, the common bricks absorb as much as a pint or pound of water. Supposing the external walls of an ordinary cottage be one brick thick, and to consist of 12,000 bricks, they will be capable when saturated of holding 1,500 gallons, or 6½ tons, of water. An instance occurred to me, whilst living at Richmond, Surrey, of the effect of dampness alone in the production of disease. On expressing to the local Registrar my surprise at the death-rate in that locality as being 24 in 1,000, the then rate in the interior of the metropolis itself, he stated that this excessive death-rate was in a measure to be accounted for by the erection of blocks of buildings for middle-class dwellings; and that every new block brought in the first instance an addition to the death-rate. The fact was that the houses were let immediately, before they were dried, and it was a matter of observation that, within a month after they were occupied, we saw the doctor's cart at the door. The houses of the wage-classes are often left unoccupied, and they are left filthy as well as damp, and the effect of those conditions may be taken as conditions of the leprous house. For the prevention of those evils, I proposed the hollow-brick construction, which ought to be of pot, burned so hard as to be entirely non-absorbent. The Prince Consort adopted the principle, together with another point, that the ends of the hollow-brick should be glazed and the walls made washable. The construction of the damp wall in houses occupied by the wage-classes, in single rooms especially, or of the leprous house, still continues without notice.

Dr. Richardson, in his work 'Diseases of Modern Life,' gives evidence bearing on the evils of damp in our own time, in spite of all our sanitary labours. He says:—'Diseases of the most serious character, such as pulmonary consumption and rheumatism, are induced by air rendered impure by damp; that is to say, by the persistent saturation of air with water in a state of vapour. For this reason, the act of living in new houses that have not been thoroughly dried, and the walls of which fail to hold the paper which is hung upon them, often attended with the most terrible results. I visited a new and pretty row of houses in a London suburb four years ago, to attend a young lady who was suffering from the early stage of tubercular consumption. She had been recently married, and her house, newly furnished, and exhibiting in the drawing-rooms bridal presents, still in their original beauty, looked the very picture of prettiness and comfort. But its walls were reeking from moisture, and the mirrors were obscured with condensed vapour. I pointed out the danger, and suggested the removal of the patient from the house. The suggestion, as soon as it could be, was carried out, but too late to be of any avail, for the young lady succumbed to the malady with which she was stricken, and her husband, who had also become affected in a similar way, and from the same cause, quickly followed her. On inquiry, I found that in the same row of pretty houses, twenty in number, there occurred, during the first two years of their occupation, six other instances of consumption, and fourteen instances of acute rheumatic fever.'

It is not invariably the new house that is rendered dangerous by being damp. There are in



this country many old houses, picturesquely situated, which are not less dangerous. The stranger passing one of these residences is struck by its beauty. There is the ancient moat around it, or the lake in front, with the sailing-boat and swans, the summer-house and splendid trees down to the water's edge. The stranger may well enough be fascinated by the view, but let him inquire, and he will too often find a truly ghastly history of the place. He will be told, probably with some exaggeration of the truth, that the house is unlucky, that no one who has lived in it has reared a healthy child, and that a traditional malediction taints the place. If he enter the house, he finds a basement steaming with water vapour; walls constantly bedewed with moisture, cellars covered with fungus and mould; drawing-rooms and dining-rooms always, except in the very heat of summer, oppressive from moisture; bedrooms, the windows of which are, in winter, often so frosted on their inner surface from condensation of the water in the air of the room that all day they are coated with ice. The malediction on the young nurtured in that mansion may not be so deep as is rumoured, and it is much less obscure than is imagined, but it is there, and its name is 'damp.'

It is to be observed that the Mosaic ordinance that every man was to come clean within the camp, and that he should 'wash himself with water,' would accomplish the great factor for the prevention of disease and economy of force by the provision, which may now be introduced, of washing with tepid water, and also for ventilation with pure and ozone-charged air. It may be contended as a Scriptural ordinance for prevention, that baptism was literal and not figurative. The early Christians had baptistries in their houses, that is to say, baths, and not merely places to dip the finger in, as lazy and wicked heretics have pretended. I was once asked by an English proselyte to write some sanitary expositions, which I was promised should be read from the cathedral pulpit, but I did not feel myself fitted for that task, and was otherwise fully occupied.

I may mention, in the way of sanitary progress, that the High Order of the Bath, which Her Majesty has been most graciously pleased to confer upon me, is, in fact, an order of the washed. In early times, some of the Knights took to washing themselves, and then kept themselves apart from those nasty, stinking Knights—the unwashed. Some others, having washed themselves, were admitted as Companions. The purification led to its being made a religious Order in the reign of Henry IV. As late as George I., vigils were kept, and the Knights met together in baths. The conditions of insatiation prevalent after the Conquest may be seen by sanitary inspectors in the castles they provided as strongholds. They surrounded them with stagnant moats, the atmosphere from which would of itself aggravate the death-rate of the inmates. Then their rooms were small and ill-ventilated. They appear to have had no means of bringing in fresh water to every room, and no means of removing the fouled water. Their insatiation condition must have been like that of a slum, and they must have had a double death-rate equal to that of the worst of slums, and that double death-rate must, in most of these castles, have cleared away the castellans more than the arrows of the Saxons. Our new power of washing with tepid water for a tenth of a penny, soap included, and of adding one-fifth more of flesh to the children with the same amount of food that may now be given, is a sanitary advance for which blessings may surely be invoked.

It appears in our own history, that when population was exceedingly thin and un-massed, life even in the very highest condition of society was short, even compared with the present defective conditions. The mean age of our kings from William the Conqueror, who died by accident, down to Henry VIII., with all the advantages of their high position, was fifty-five, excluding seven monarchs who were slain. From that time to the time of Queen Anne, the mean age was not more than fifty. Edward VI. died at sixteen, which lowered the average. Time-honoured Lancaster, marked as at an extreme age, was fifty-five when he died. Coming down later, the mean age of Lord John Russell's Cabinet, that is, of the then directing experiences of the Government, was sixty years. Mr. Balfour and three other young members reduce the mean age of the present Cabinet to fifty-seven.

It appears that the ages of the kings have advanced; the mean age of the Cabinets have advanced to about sixty, excepting the present Cabinet, whose mean age is lowered by three younger members.

At the period of the Conquest, the population of England and Wales was under two millions. At the time of the Domesday Book, the population of Sussex could not have been more than ten thousand, or one-fifth of the population of Hastings at the present time. As population has advanced, production has advanced. Judging from the population of England and Wales, which was not above two millions, according to Professor Thorold Rogers, the average yield of the estates of the University of Oxford was not more than eight bushels an acre. With the advance in population, production increased. In the time of Tull, in Queen Anne's reign, it had reached to fifteen bushels an acre and five-fold, which is just what it is now in all France. In the time of Arthur Young (1741-1820) it had increased to twenty bushels. The farmer's returns are not reliable, and Mark-lane has sent out to the corn-growing counties people to test the crops, and they found that the crops averaged in England thirty-two bushels, whilst in Scotland they average forty bushels, and with liquified-manure culture fifty bushels; and it is now stated on the experience in Essex, of the Scotch farmers who have taken up the farms abandoned by the old English farmers, that the production of the United Kingdom may be more than doubled. The commencement of the sanitary advance of population as well as of animals is by land-drainage, first introduced by Mr. Smith, of Deanston, by which it is proved that, where the subsoil drainage of the sites of towns has been effected, phthisis has been reduced by one half, and that there is a corresponding reduction of the diseases of animals. The rate of wages within the last forty years was three shillings a day; it has now advanced to six, whilst the price of provisions has been largely reduced. The experiences of land-drainage which I have recited are of vast importance for colonisation, for it is proved that, where the emigrants are located upon undrained land, full half their children are in their graves, from the insatiation conditions, soon after their fifth year. Sanitation, then, is necessary for the protection of the resident population as well as of the immigrants. It may be taken that emigration is only at its commencement. In an article on Colonisation by M. Jules Duval, in M. Maurice Block's 'Dictionnaire de la Politique,' the writer states that of the cultivable and habitable portion of the globe, there is in fact only one-sixth in a state of normal colonisation and occupation. The remaining part is but thinly inhabited by tribes which will have to disappear before the advance of the Anglo-Saxon and other European races. The effect of insatiation in depopulating instead of populating was stated to me by Sir Francis Head as the result of his observation while he was Governor of Canada. He said the best means of protection of the Indians was in being at war with them, because there were only thin hostile lines and the Indians were very much kept to themselves, with very little loss; the most destructive thing, however, was being at peace with them, because that brought them within the range of liquor sellers, so that they bought rum or other spirits, and that was far more destructive to them than the condition of war; but the most destructive measure of all was to allow missionaries to go amongst them, un-informed as to the protective power of sanitation. These missionaries went far into their lines, and persuaded the Indians to have regular habitations and to mass themselves within the sound of the church bell; but the missionaries, being generally ignorant of sanitary science, or even of the Mosaic principles of it, these insatiation conditions introduced the sybotic diseases—small-pox especially—as well as others, which were most destructive of the filthy population thus massed together.

Now let me recount the results of examined experiences which appear to me to open up a future, especially for the wage classes of the population. In the first place, every family may, in the future, be taken to be provided with a good sanitary dwelling of at least three rooms, on a well-drained site, the house well warmed, ventilated, and perhaps lighted, with non-absorbent walls supplied with gas apparatus for cooking, maintained by a public authority for a rental, and with means of washing with

tepid water for a man and his family; fresh, soft water carried into every room, and the fouled water of all kinds—kitchen-sinks, as well as others—carried away through self-cleansing house-drains into self-cleansing sewers, and placed on the soil, not in mechanical suspension, but in chemical combination, before putrefaction can commence.

An artisan may now have personal property in security. He may have a watch; such watches are now made in America for half-a-guinea, keeping time to a minute a month. He has the services of a police for the protection of himself and his family, at a cost of a half-penny per head per week,—the cost of the old nightly watch which I contributed to get abolished, and, in provincial districts, the cost of unpaid parish constables. He may have his penny or his halfpenny newspaper, which brings to his knowledge the state of labour and the demand for it all over the world. Plato objects to the time occupied in the perplexing pursuit of a man's own health, but now a few men—highly qualified sanitary officers—save him that time, certainly as respects the great pestilential diseases; and administration will save him life and health and ensure his working ability by sanitary agency under improved local, as well as general administration. When I speak of sanitary administration as an independent aid to every person, I recall how much has been done in this way in times of great peril from epidemic diseases. For example, at a time when Asiatic cholera was raging in this country, we who were then at the head of the Sanitary Department of the Government, provided for house-to-house visitation of the population, and for the detection and treatment of the premonitory symptoms of disease. The results of attention to the general prescriptions provided, were marked by the rise or the fall in the number of attacks and deaths. On comparing the results with those in which no such precautions were taken, it appeared that at least 50,000 lives were saved by them in Great Britain. At St. Petersburg, 20,000 lives were lost by each attack of cholera, until at last they adopted our system of house-to-house inquiry, and dealing with the premonitory symptoms when the attacks and deaths were reduced to three or four in a thousand. The children of the artisan class may all be protected, as they are now protected in the district half-time schools, from all the children's diseases,—from small-pox, from measles, from typhus, from diphtheria, and may receive exercises and drill, which enable them early to obtain earnings, and to contribute to the economical means of the family. They may enjoy a life-rate threefold greater than they now obtain, and aptitude for industrial work and wages amounting to the former earnings of adults in modern times. Their life-rate, and those of the whole of the family may be, as we have experience that they have been under good sanitary administration, increased by nine or ten years, giving them the means of the attainment, at a small proportion of cost, of the products of modern high sanitary power. At sixty the expectation of life is 13½ by the English table (Dr. Farr); that is, bringing the average up to 73½, which is rather old, and beyond the range of the army for retirement. At fifty-five the expectation is 16 68.

As I recast my eye over the discourse I have delivered, I feel that, important as the topics discussed may be, they have assumed a rather too discursive form. Let me, therefore, in conclusion, endeavour to correct this possible error by a short summing up, which shall be more likely to leave a more lasting impression on the mind.

1st. In the first place I have desired to show that sanitation possesses a history as old as the oldest of old religions, and may be looked upon, in itself, as a form originally of religious observance. The lesson I derive from this fact is that you may look upon it also in this light, and I am quite sure that teachers of religion will in time be obliged to look upon it in the same light and become co-workers and companions with you in your work.

2nd. In the second place, turning from the first days of sanitation to one or two of the modern essentials of the art, I dwell on the importance of the study of dampness of air as a cause of disease. I might perhaps have entered into a very wide field. I might have tried to indicate the manner in which damp affects the human body. Whether it acts as the bearer of morbid particles, living or dead, or whether it exerts its influence in a more direct manner by simple interference with vital activities



essential to health. I must be content to state the main factor, damp, as the grand traitor, leaving it to other teachers, in these walls, to find out and expound all the details. They will, doubtless, instruct you most efficiently on these matters, and I should like to sit with you as a learner. But after all they will not be able to convey to you more than the one practical lesson that if damp be kept out disease will be kept out of the land, the town, and the dwelling-house.

3rd. In the third place I have striven to urge the necessity of instant, continuous, and automatic self-cleansing of every house, town, and city. I explained that, in primitive times, and amongst nomadic people, the old Mosaic method was a good one, and I left it open that, under some conditions, this method, somewhat modified, was still, to a limited extent, applicable. The great principle, however, which I wish emphatically to fix in your minds, is that of *circulation versus stagnation*: the only true and vital sanitary plan of drawing away at every moment, by an unceasing mechanical central engine power, all the dead human and other animal excreta of communities, and casting such excreta upon the lands undecomposed, so that they may, through the intermediate work of plants, break out into life again, and give sustenance to man and animal. Let nothing move you from this lesson of sanitation. It is the foundation of the best sanitary work, by the side of which all else of the kind is a mere compromise, and often nothing less than an aggravation of the mischiefs intended to be rectified.

4th. In the fourth place, passing from the community to the individual, I tried to inculcate on modern scientific principles the force of the old motto, 'wash and be clean.' It was my special desire in enforcing this lesson to make it applicable to the young, so that personal cleanliness may not only become a habit of life, but a habit that is felt as a necessity. In his address delivered before this Institute at Newcastle, our colleague, Dr. Richardson, said, 'If by some magic spell England could wake up tomorrow clean, she would wake up pure also in spirit and godly in the comprehensiveness of goodness. Cleanliness covers the whole field of sanitary labour. It is the beginning and the end. Practised in its entirety it would banish all disease from the world.' With that view I entirely agree.

5th. Lastly, it was my wish to convey hope and confidence for the future by what we have learned from the past; and particularly to open up a vista of a new future for the wage classes of the population. I held out the modest expectation that, under sanitation, every family may, in a happier day, be provided with a dwelling well drained, well warmed, well ventilated, well lighted, well supplied with water, and well supplied with all comforts for preparation of food, and for wholesome repose. I might have suggested more had I gone in for luxury, but my long experience has shown to me so much cross danger from luxury, that I am quite content to leave the recommendation I have offered where it is, convinced that luxury will of itself follow comfort fast enough to be compatible with safety, without any urgent pressure from you or from me."

**Registration of Plumbers.**—At a meeting held in Edinburgh on the 7th inst., in connexion with the movement for the National Registration of Plumbers, Dr. Littlejohn, Medical Officer of Health for the City, moved a resolution commending the movement for the technical education and national registration of qualified plumbers as worthy of the sympathy and support of the public. Speaking of the attention which had been given to the subject during late years, he said he was proud to think that bad plumbing would be rather difficult to get in Edinburgh now-a-days. Plumbers must, however, by careful education in the technicalities of their trade, and by registration, fully vindicate and assert themselves. Professor Crum Brown, in moving a resolution, said that while the workshop was the place in which the actual training of the craftsman was to be obtained, it required to be supplemented by classes in which the principles of the work would be fully explained, and the reasons defined for the various modes of work. Mr. W. R. E. Coles, of the Worshipful Company of Plumbers, London, stated that there were now 5,000 members enrolled in the Society, and he had applications from all parts of the colonies for duly qualified and registered workmen.

#### STREET IMPROVEMENTS IN THE DRURY-LANE NEIGHBOURHOOD.

LAST April you published a scheme of mine for opening Drury-lane into the Strand.\* For fear of complicating the question, I then abstained from more than hinting at the further point of providing a due-north road to Holborn, and from considering the larger and governing question of providing improved access to the northern railway stations. With your permission, I propose now to offer a contribution to the solution of this question.

The Drury-lane route would be perfect as a north-westerly connexion, and would supply a northerly route in conjunction with Great Queen-street, but this could hardly be considered altogether sufficient. Some years ago Mr. C. F. Hayward proposed a scheme for a street in continuation of Little Queen-street along the back of Lincoln's Inn-fields. This might advantageously have been done at the time, but the erection of the large Electric Light Station, and of the new Casual Ward on the site of Bear-yard, effectually stops this. On the other hand, the opening of a road through the west side of Lincoln's Inn-fields is so simple as to appear inevitable.

If the tenants can stand the Electric Light Works at the back they can surely stand the noise of traffic in front, kept off from them as it would be by their ample front yards, and softened by passing over asphalt. As there are boards "To Let" in front of nearly every house they might be benefited by the change.

In my former letter I pointed out the easy gradient from Newcastle-street into the Strand provided by my plan. A great part of the traffic from Waterloo Bridge, instead of crossing the Strand directly, would come along it and pass up Newcastle-street at a very wide part. On account of this difference of level I assume that this Newcastle-street entrance is the only suitable entry for a good thoroughfare. Passing along Houghton-street, the south of which contains good buildings, the route would pass over the empty site of Clare-market into Lincoln's Inn-fields, the trumpy buildings at the corner being cleared away.

By taking a little of the yard of Powys House, at the north-west angle of the Fields, a road could be taken into Holborn without touching any very valuable property.

This part is so simple that it requires little advocacy. The difficult problem remains, to show how this route can be utilised in connexion with an approach to the railway stations.

With regard to this, there are certain general principles worth stating. In the first place, the traffic to the three large stations should, if possible, be encouraged to take different lines. Secondly, where a strong line of traffic crosses an important thoroughfare, it is better that it should not go straight across, but pass a little way along the main thoroughfare before resuming its direction; at the points of junction some extra width should, if possible, be given to the main road.

Any new road work undertaken should, if possible, pass through poor property, so as to involve as little purchase as possible, and open up and improve the district.

It has sometimes been put forward that the opening of the gates at Woburn-place would provide the necessary access to the railway stations. This is true of Euston, the only access to which is through the Squares. We may, therefore, dismiss it from consideration, merely noting that it is a distinct advantage that its traffic should be separated from that of the Midland and the Great Northern. A reference to the map and to the facts of traffic will show at once that the natural route to these latter is not down Woburn-place, but down Hunter-street and Judd-street.

It should be carefully borne in mind also that the creation of a road through "the Squares" would involve considerable expense in the way of compensation to start with, and serious depreciation in ratable value to follow. The widening of Little Queen-street and of the upper part of Southampton-row are also involved without any chance of recoupment or improved rating or accommodation.

Now, to the east of Southampton-row lies what may be called a depreciated property, most of which is ripe for reconstruction. It is obvious that, if a way can be found for a new thoroughfare through this, it is a line that would offer great advantages.

To get through to what I may call the Judd-street line there are three ways, two of which, I fear, present insuperable difficulties. I will, therefore, only briefly mention them in order to clear the ground.

The difficulties occur in getting into Guildford-street. The first route would pass down an enlarged Devonshire-street, along the east side of Queen-square.

What I may call the grand scheme would be to sweep away the whole blocks of buildings between the "crosses" on my plan, and open a boulevard to St. Pancras. This may seem startling, and could certainly only be done in conjunction with the landowner, at a time when the leases fell in; in fact, the area of two roads would be given up in exchange for the area of the buildings. The question would be, how far the diminished frontage would be balanced by the increased value of the new line and the greater space for building.

The buildings taken down would be for the most part of little value, and would probably in any case be swept away on the granting of new leases. The part about Marchmont-street is certainly anything but an improving property. Such a scheme would probably be at once carried out on the Cadogan or Westminster estates, and I mention it here that an eye may be kept on any rebuilding that may prejudice its ultimate adoption.

In the meantime it will be well to seek another solution of the existing block.

In studying the neighbourhood, the first thing that strikes one is the immense difficulty caused by recent erections. Thus the natural route from my street debouching into Holborn would have been across the west side of Red Lion-square, but a large new block of buildings at the north-west corner effectually stops egress this way.

For a reason I have mentioned above, it would, however, be better that a turn should be made in Holborn, and the line resumed at a widened Dean-street. The breadth of Holborn at this point is a great advantage. It may be noted here, that Day & Martin's factory is now for sale, and as it is hardly likely that the property will be continued in its present form, it might be feasible and profitable to open a road through, as shown on my plan. Dean-street has no buildings of value. The road must now be taken across the middle of Red Lion-square, down the North-streets, which might profitably be reconstructed. The direct line would then pass through Ormond-mews, the "Home of the Hansom." Arrived in Ormond-street, it has but to pass down Powys-place, and break through to join Hunter-street. Alas! the newly-erected Children's Hospital stops the way completely. Imperative reasons of sentiment, as well as expense, forbid the idea of interfering with this, and I will only say that if, by chance, the authorities could arrange to allow the road to pass here, the public would not grudge to so excellent a charity any amount of compensation that would reconcile them to the interference, and enable them to extend their usefulness. I suppose, if the hospital liked to be bought out at a good price, the buildings might be utilised for some other purpose.

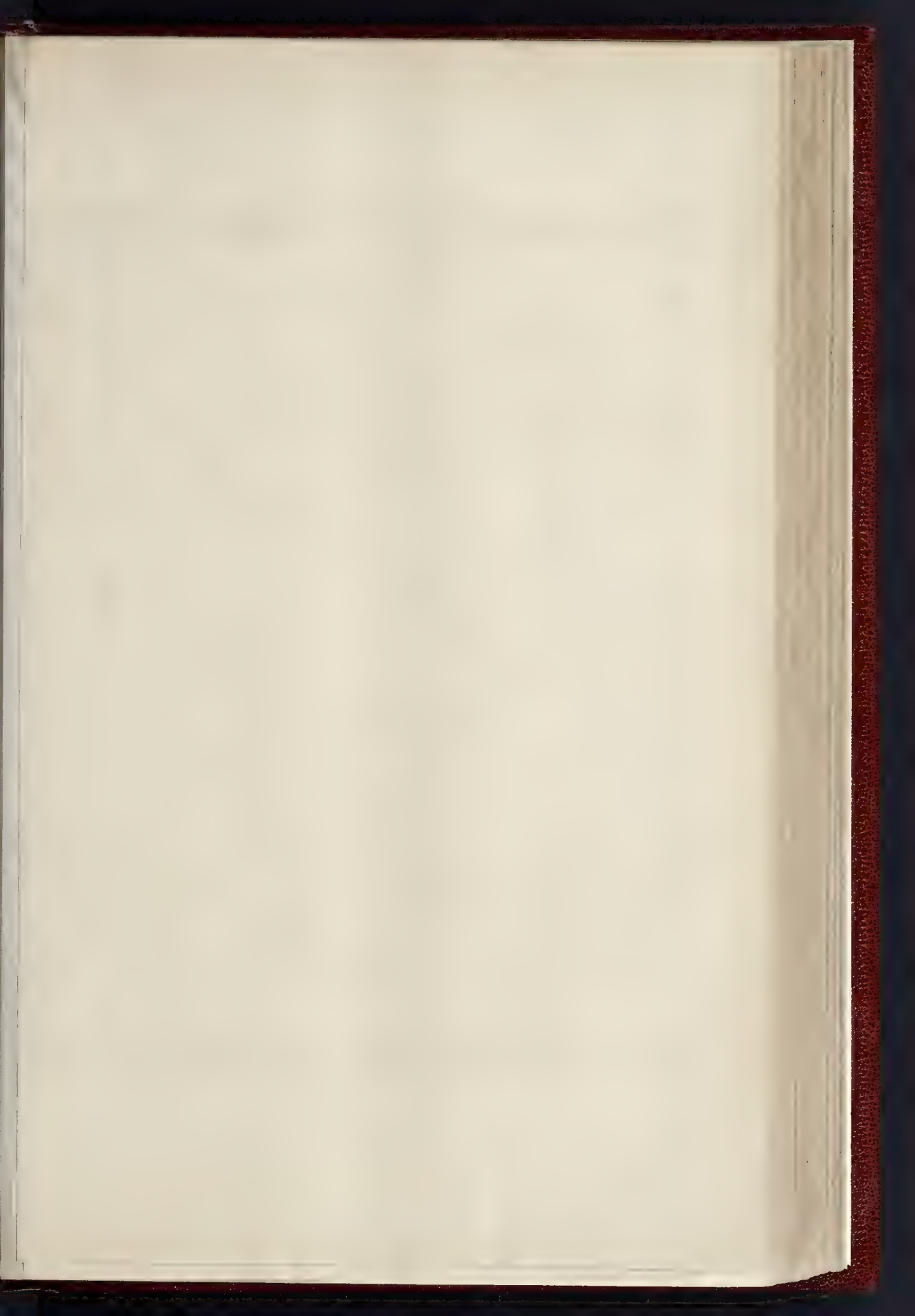
There is, however, an alternative to this that will probably prove more possible. This is to take a road at a sweep through the mews, and, missing the three fine old houses in Ormond-street, through more mews to Landsdown-place.

It is as well to note that Little Ormond-yard has ceased to exist and been replaced by Orde Hall-street, whose sordid vulgarity is a standing damage to the district and shame to those responsible for its erection.

Landsdown-place might be widened by placing one footpath among the trees in the strip along the Foundling wall. The *detour* round Brunswick-square into Hunter-street is not very serious, but a better, if a more serious, plan would be to continue the road along the east side of Brunswick-square into Wakefield-street. The abstraction of much noisy traffic from under their windows should partly reconcile the inhabitants to the loss of a fringe of their square. It would be a satisfaction that the main part of the compensation along the road would go to the Foundling Hospital, and the Bedford Grammar School. The old graveyard of St. George, that would be opened to view, is probably by far the prettiest spot of the kind in London, and is well worth a visit. Wakefield-street itself need not be widened till the leases fell in. The continuation of this street would be very welcome to a curiously

\* Street Improvements in connexion with the Strand (with plan); *Builder*, April 20, 1889.









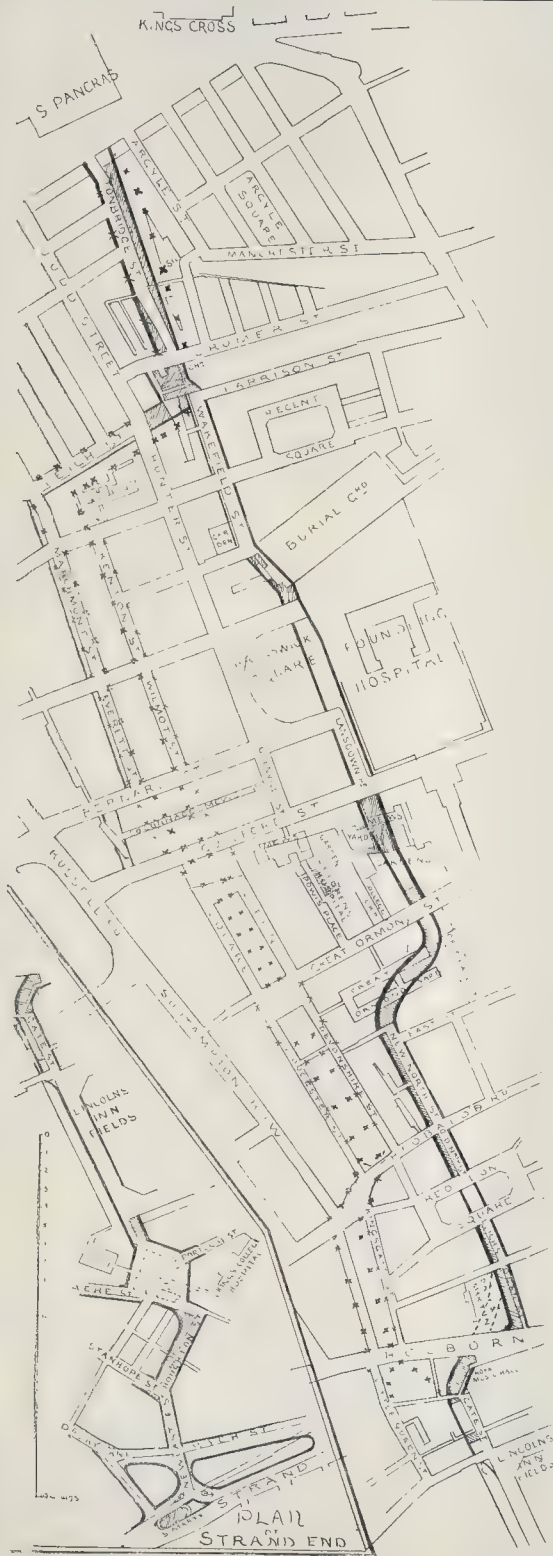


OF SUCH IS THE KINGDOM OF HEAVEN."—DESIGN FOR DECORATION: BY MR. HENRY HOLIDAY.

*Exhibited in the "Arts and Crafts" Exhibition.*







blocked neighbourhood; a slight bend would be required to avoid a new church. The district here is very squalid and poor, and it seems difficult to suppose that a part rendered by tramways so suited for working men's homes, should long remain in such a state.

A continuation of the road down Tottenham-street would destroy nothing but worthless buildings, and make room for large blocks of workmen's dwellings.

It would be desirable to continue Leigh-street into the new road, as the King's Cross traffic would then be diverted from Judd-street, which is not wide enough for the two stations. This part of the scheme should be carried out irrespective of the new road through Brunswick-square.

In default of the larger scheme first alluded to, a cut from Guildford-street through the quaint Colonnade Mews and a widening of Everett, Marchmont, and Leigh-streets would further greatly ease the traffic of Hunter-street.

With regard to the rest of my scheme, I think it will be found that it involves no serious outlay, as it requires the demolition of no valuable buildings; and, as it will bring some considerably increased value of frontage, it would really be hardly more expensive than the re-construction of Little Queen-street and Southampton-row, and the injury to the squares.

Of this scheme I may say, as of the last, that it has been prepared after diligent study of the neighbourhood; a map study alone is valueless and deceptive. No buildings of any importance are touched, but the authorities would, perhaps, be more bold in this matter than I have cared to be.

I am sometimes told that the ratepayers will not stand any schemes involving expense. Of course, we all grumble at having to pay anything, but I venture to prophesy that the ratepayers will be still more indignant if some real work is not done that can be visible as a fulfilment of the expectations raised. I cannot believe that with proved financiers, such as Sir John Lubbock and Mr. Harben to direct, with such magnificent credit, and, above all, with honest administration, a much better financial result may not be achieved from well-considered schemes.

RALPH NEVILL, F.S.A.

*Rolls-chambers, Chancery-lane.*

#### COMPETITIONS.

**Hertford Post Office.**—The result of the competition for the new Hertford Post-office has just been made known. The first prize of 25*l.* has been awarded to Mr. J. Johnson, A.R.I.B.A., of 9, Queen Victoria-street, London, and the second prize has been awarded to Mr. R. Clamp, A.R.I.B.A., of Woking, Surrey.

**Broughton.**—The Salford Council have confirmed a resolution of the Baths Committee in selecting the plans of Messrs. Mangnall & Littlewoods, of Brown-street, Manchester, for the new baths for Broughton. Seven sets of designs were sent in, each under a special motto, and to those marked "Leander," by Messrs. Mangnall & Littlewoods, have been awarded the first position, and are to be carried out. The second premium of 30*l.* was given to Messrs. Darbyshire & Smith, whose motto was "Greater Salford," and the third premium of 20*l.* goes to Messrs. Booth & Chadwick, who adopted the motto of "Simplex."

**Beckenham-lane School.**—In regard to the Beckenham-lane School competition for the Bromley School Board, in which the Board set aside the award of Mr. Robson under circumstances previously referred to in our pages, Mr. Norman Shaw has been requested to adjudicate, and has selected the design signed "Bromley," by Messrs. Sydney Vacher & Evelyn Hellicar.

**Bristol Society of Architects.**—This Society held the first ordinary meeting of the session 1889-90, at its rooms, at the Fine Arts Academy, Queen's-road, Bristol, on Monday last. There was a large attendance of members. The President, Mr. Henry Crisp, F.R.I.B.A., delivered an address on the position and prospects of the Society, and the useful work done during the past year. A unanimous vote of thanks was accorded to the President for his address. The Bristol Society of Architects is one of the nine non-metropolitan architectural societies in alliance with the Royal Institute of British Architects.

## Illustrations.

## DESIGN FOR DECORATION: "OF SUCH IS THE KINGDOM OF HEAVEN."

**T**HIS drawing, by Mr. Henry Holiday, was exhibited in the Royal Academy Exhibition of this year, and we described it in commenting on the contents of the Architectural Room. It at present occupies a prominent position in the Arts and Crafts Exhibition, referred to in another column in the present number.

## BAY OF NAVE ARCADE; NEW CHURCH, SLOANE-STREET.

THIS drawing, now in the "Arts and Crafts" Exhibition, was also exhibited at the Royal Academy in the present year, under the name of Mr. J. D. Sedding, the architect of the church. The names of the other artists who contributed various details are given in the title-panel on the drawing, and also in our article on the "Arts and Crafts" Exhibition. We commented on the drawing at the time of its exhibition at the Royal Academy.

## DESIGN FOR AN ACADEMY OF ARTS.

THIS design, by Mr. R. Wilcock, was exhibited at the Royal Academy this year. It represents an effective and dignified composition compiled from the stereotyped *matériel* of Renaissance architecture; and as a student's drawing, which we believe it is, is highly creditable to its author, though we should have preferred to have seen it in combination with a plan, a matter too much overlooked in drawings made for the Academy Architectural Room.

## NOTES FROM ABERDEEN.

TENDERS have been recently lodged for the works in connexion with the new prison to replace the existing one in Lodge-walk, which does not meet modern requirements. It was expected that a decision would be given, and operations commenced soon. The plans have been prepared in Edinburgh under the supervision of Major McHardy, H.M.'s Inspector of Prisons for Scotland. The site is on the south or Kincardineshire side of the river Dee, on an eminence commencing about 300 yards from the Wellington Suspension Bridge, and measures about 520 ft. in length, parallel with the Stonehaven road to the west, and has an average width of 330 ft. New streets will be formed along the north and east boundaries. The entrance will be from the north side, along which a dwarf granite ashlar wall, with dressed copstones, surmounted by an iron railing, will be erected. In the outer portion of the ground, adjoining the entrance, there will be on the one side the warders' quarters, and on the other the governor's house and garden. The inner portion, or prison proper, will be surrounded by a wall measuring from 18 ft. to 20 ft. high from the ground level. The principal features of the prison are briefly as follow:—There is to be a four-story block, 60 ft. high to the apex, for male prisoners, the number of ordinary cells being eighty, and the cubic contents of each cell being 820 ft., or 20 ft. above the regulation space. Connected by a corridor is the block, three stories in height, for female prisoners, containing thirty cells. The space to the rear will be utilised as airing-grounds. The accommodation includes a neat prison chapel, a roomy hospital, large prison kitchen, reception rooms, examination rooms, visitors' rooms, gate-keeper's apartments, chaplain's room, medical officer's room, governor's official room, clerk's office, matron's room, male and female officers' room, washhouse, baths, lavatories, and other offices and stores. The arrangements for ventilation and regulating the temperature have received particular attention. The whole of the prison buildings (except certain parts, such as the chapel facings, &c., which will be of dressed stone) will be erected in grey granite of rock-faced ashlar work, the pattern to be followed being the facing on the Palace Hotel, Aberdeen, in so far as below the level of Union-street. The total cost, exclusive of the price of the site, is variously estimated at from 30,000*l.* to 40,000*l.*, and the work was to be entirely finished within eighteen months from the date of acceptance of offers, and not later than March 1, 1891.

It has now been found, however, that all the

estimates received for the erection of the new prison were too high, and, consequently, none have been accepted. The course to be pursued by the Prison Commissioners is not known definitely, but it is probable some of the officers will lodge amended tenders.

Dr. R. Rowand Anderson has recommended the execution of internal works, at a cost of 3,000*l.*, for the restoration and improvement of King's College Chapel, University-buildings, Old Aberdeen, and an appeal to the public for the necessary funds will be issued forthwith. The above sum is exclusive of the cost of an organ to accompany the chapel services, for which purpose 400*l.*, previously collected, is in hand. A meeting of those interested in the proposed restoration of King's College Chapel, Old Aberdeen, was held on September 26 in Marischal College Buildings, Aberdeen. The Duke of Richmond and Gordon, Chancellor of the University of Aberdeen, presided. Speeches were delivered by the chairman, and by Principal Geddes, Aberdeen University; Mr. George Reid, R.S.A.; Mr. William Henderson, Lord Provost of Aberdeen; and Professor Alexander Stewart, D.D., Aberdeen University. Resolutions were adopted commending the scheme to public support, and appointing a committee to proceed with the work according to the plans prepared by Dr. B. Rowand Anderson, Edinburgh. It was intimated that of the sum of 3,000*l.* required to carry out the improvements 160*l.* had already been subscribed.

## THE LONDON COUNTY COUNCIL.

THE London County Council held its usual weekly meeting at the Guildhall on Tuesday, Lord Rosebery in the chair.

*The Appointment of a Valuer.*—The report of the Standing Committee was brought up, which stated that on July 9 the Council resolved to appoint a Valuer at a salary of 1,000*l.* a year. Advertisements were issued accordingly, and twenty-one applications had been received. Since then, however, Mr. Saunders had given notice: "That so much of the resolution of July 9 as refers to the appointment of a Valuer at a salary of 1,000*l.* a year be, and the same is hereby, rescinded. That Mr. E. J. Harper be appointed Valuer to the County Council, and Chief Clerk of the Improvements, Compensation, and Estate Branch of the Architect's Department, at a salary of 500*l.* per annum, subject in other respects to the conditions specified in the report of the Standing Committee, approved by the Council on July 9, 1889." This gave rise to a long discussion, but ultimately Mr. Saunders asked leave to withdraw, and the Committee's recommendation that Mr. Harper's candidature be considered on the same lines with those of other applicants for the post was adopted.

*Strand Improvements.*—The Improvements Committee reported that they had considered the resolution of the Council of May 7, which had reference to the necessity of constructing a new street from Holborn to the Strand. The Committee had given minute and careful consideration to the subject comprised in the reference, and they had unanimously arrived at the conclusion that a want did exist for a good thoroughfare between Holborn and the Strand, west of Temple Bar. Having arrived at this conclusion, they had considered as to the best line to adopt for the new street. They had examined numerous plans and suggestions, and had received reports from the officers on the subject, with the result that there remained but two schemes which commended themselves to their favourable consideration. The first was to form the new street from Southampton-row to Lincoln's-inn-fields, utilising the west side of the Fields, and cutting through Clement's-inn-gardens to St. Clement Dances Church in the Strand. The second was a more westerly scheme, for a road running from Southampton-row (which formed the southern end of a long line of street extending to the Euston-road, and giving access to the three northern railway stations) in almost a direct line to Catherine-street and the Strand. At a point about 500 ft. from the Strand a spur street would leave the new street and run eastward to St. Clement Dances Church, thus meeting the demands of traffic going both across Waterloo Bridge and eastwards to the City. Waterloo Bridge approach would also have to be improved by removing a portion of the buildings at both corners of the junction of this approach with the Strand. Such was the second

scheme, and it was that which the Committee had felt bound to adopt, seeing that it would afford excellent communication north and south just at the points where most needed. This scheme, too, would cut through and destroy a considerable area of poor and dilapidated property, and would not in any way prejudice, but on the contrary, would facilitate, the construction of any future projected street running parallel with the Strand. The Committee were of opinion that the new street should be 90 ft. wide throughout, and that provision should be made for the planting of trees on each side of it. They were also strongly of opinion that, in the event of the scheme being adopted, the whole of the property within the triangle, which would be bounded on the south by Holywell street and the Strand, on the north-east by the new street, and on the west by Newcastle street, should be acquired by the Council. The Committee, therefore, having carefully considered the whole subject, being unanimously of opinion that the necessity for increased communication north and south, and for better accommodation for the enormous and increasing traffic in the vicinity of the Strand warranted immediate action on the part of the Council, had to submit the following recommendations:—

"That the Council do apply in the next Session of Parliament for the following powers:—

- (a) To construct a new street from Holborn to the Strand, as shown on the plan submitted with the report.
- (b) To construct a spur street from a point on the new street near Drury-lane to St. Clement Dances Church.
- (c) To form such new streets 90 ft. in width.
- (d) To widen the approach to Waterloo-bridge on both sides of its junction with the Strand.
- (e) To purchase the whole of the property comprised in Block A.
- (f) To construct a subway under the new streets.

With reference to this report, the Chairman said that he did not think it right that proposals of such vast importance should be decided in twenty-four hours, and he thought the matter ought to be adjourned for a week.

Mr. Henry Clarke (the Chairman of the Committee) said that the estimate for the construction of the various roads was 59,000*l.* The architect's estimate for the purchase of the property, after deducting recomputations, was 1,414,000*l.*, the two together making 1,473,000*l.* This included, however, a considerable sum for the improvement of the approaches to Waterloo Bridge, which had not been originally contemplated, and which would cost about a quarter of a million of money. They had not originally contemplated such a large expenditure for this particular improvement, but he thought the work might be undertaken for less than the sum quoted. There would be a large area upon which to build dwellings capable of accommodating 1,000 persons. There would also be good opportunities for the local authorities to erect baths and washhouses.

In reply to questions put by members of the Council, Mr. Clarke said the cost of the proposed new spur street would be 345,000*l.*, and the cost of the new street from Holborn to the Strand would be 806,000*l.* What was called the Lincoln's Inn Fields scheme would, without doubt, be the least costly, but it would be quite impossible to make a good street in that direction.

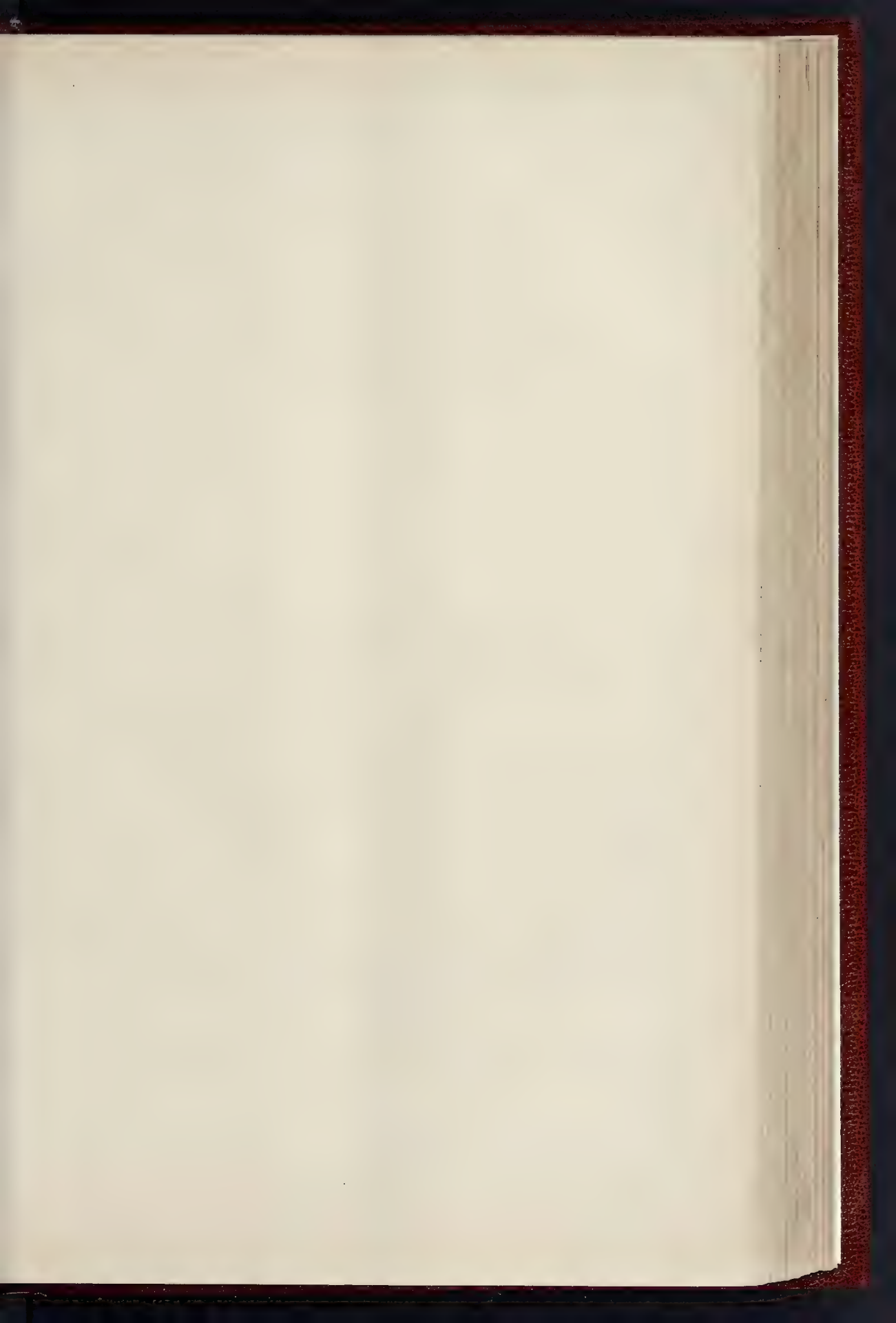
After some further discussion, the consideration of the report was deferred until the next meeting of the Council.

*Cost of Past Improvements.*—The following motion by Mr. Westacott was agreed to:—

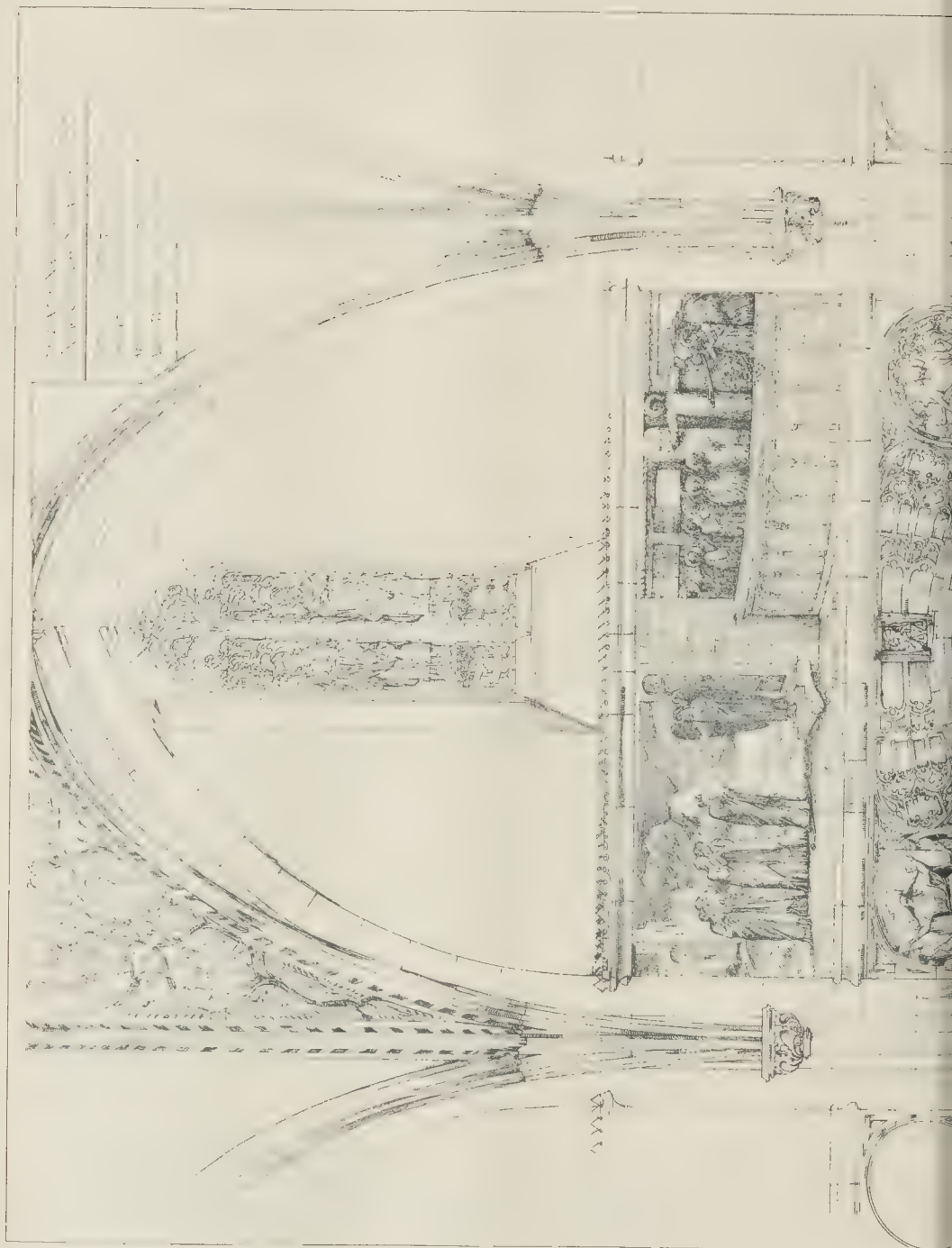
"That a return be prepared and sent to each member of the Council, showing in detail the amounts expended by the late Metropolitan Board of Works on metropolitan improvements, including the Thames embankments and improvement schemes under the Artisans' Dwellings Improvement Act, and that such return do specify the parishes and districts."

*The New Municipal Buildings at Glasgow.*—Sir James King, the Lord Provost of Glasgow, formally opened the new municipal buildings at Glasgow on Monday last. The foundation-stone was laid six years ago by George-square. Mr. William Young, of London, was the architect selected from 125 competitors. The building has cost 540,000*l.* We illustrated Mr. Young's design in the *Builder* for Nov. 11, 1882.

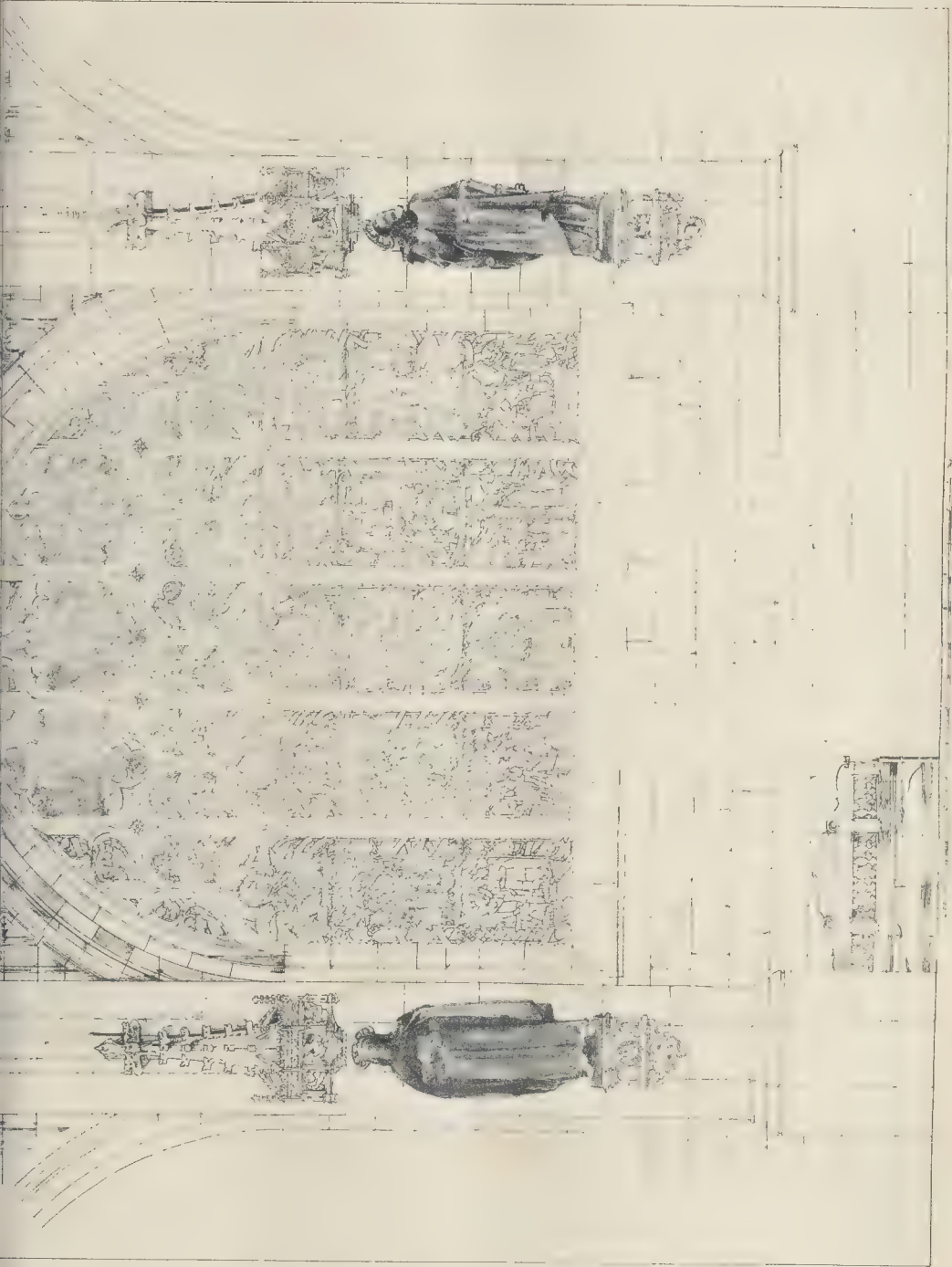




THE BULDER, OCTOBER 12, 1889



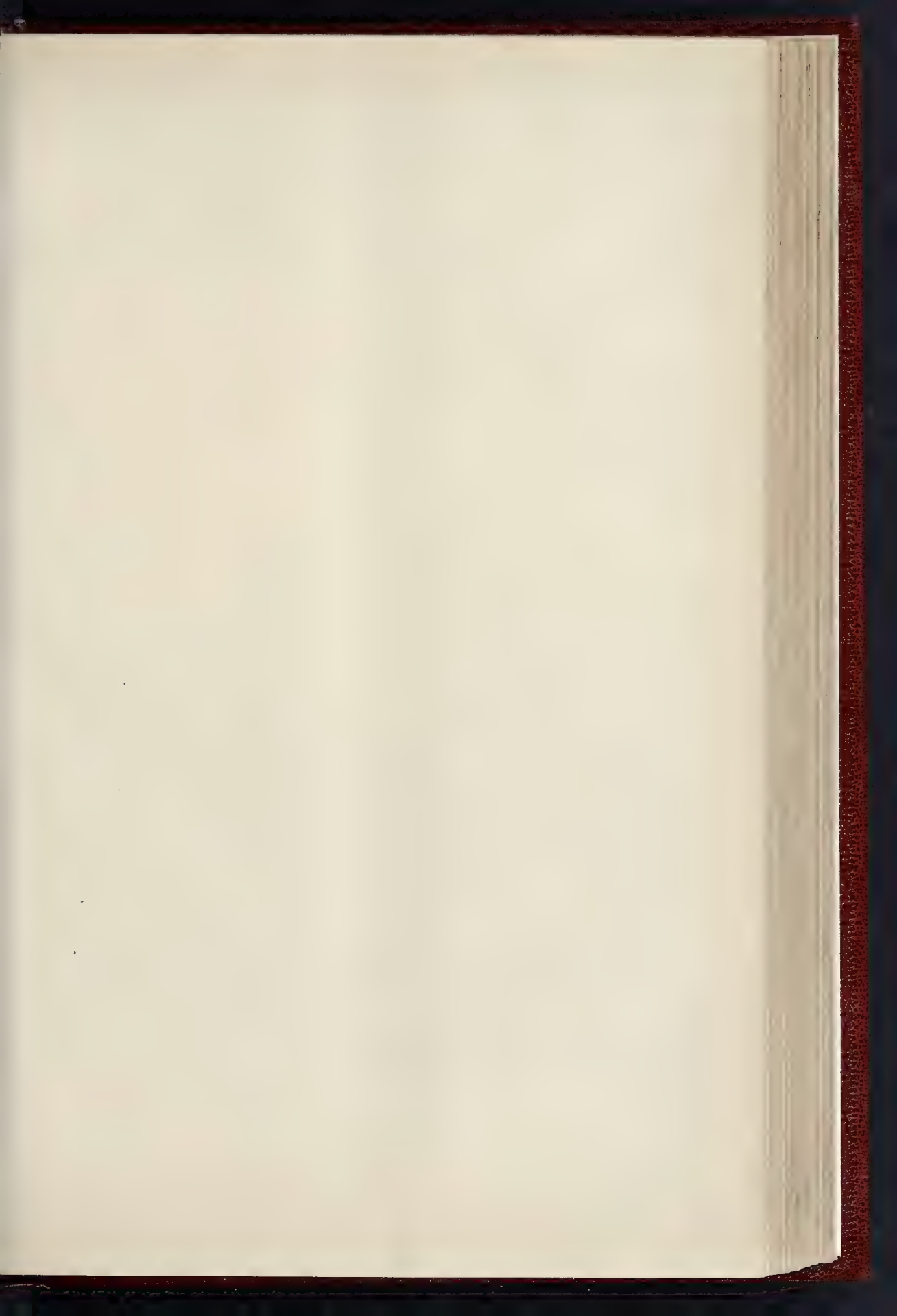




BAY OF NAVE ARCADE, NEW CHURCH, SLOANE STREET.—MR. J. D. SEDDING, F.R.I.B.A., ARCHT. CL.



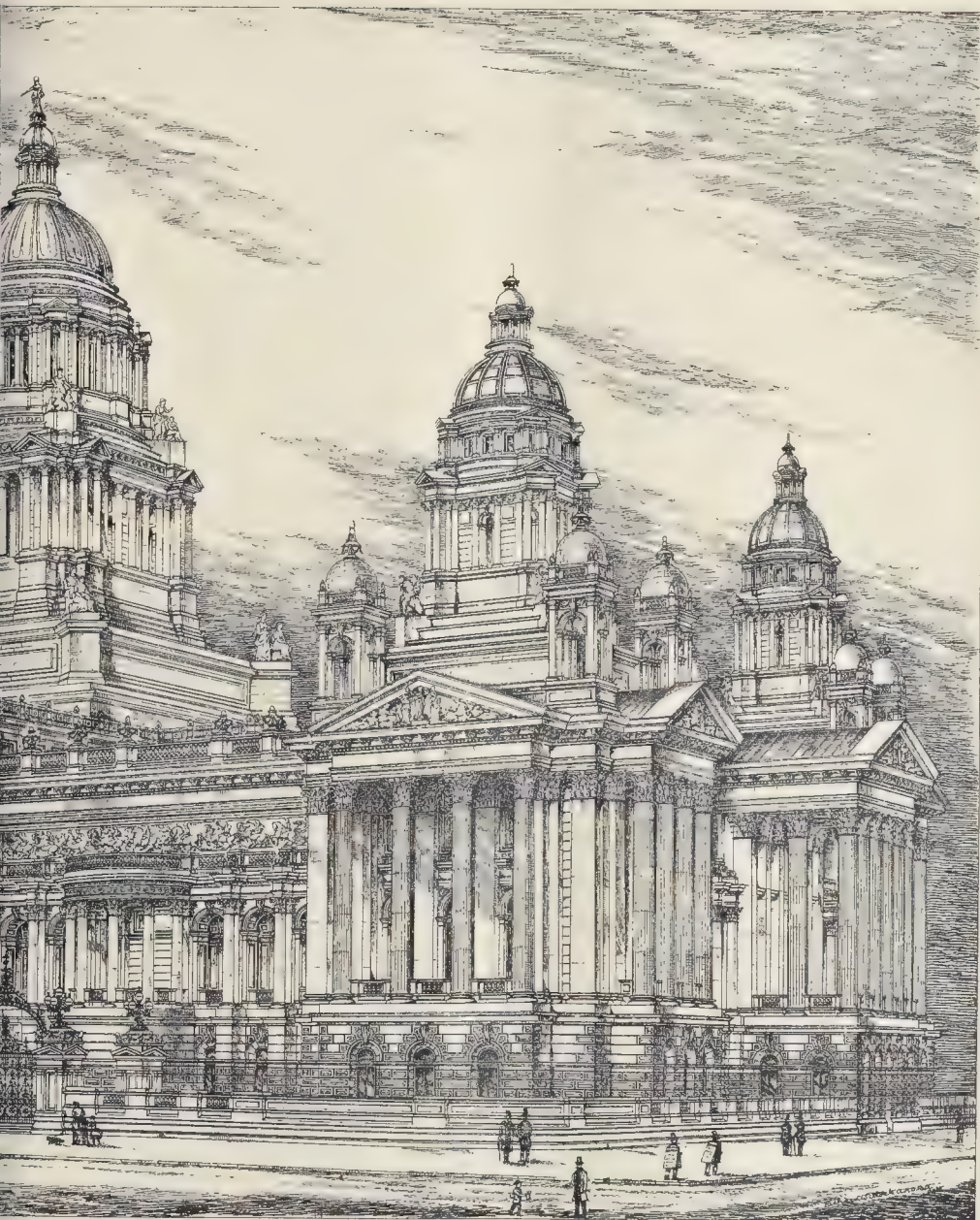






DESIGN FOR AN ACADEMY





PHOTOGRAPH BY MR. MARTIN LANE, ARCHT. ST. LUCAS, E.C.

—By MR. RICHARD WILLOCK





## BATHS FOR THE PEOPLE.\*

"GREAT and praiseworthy as the progress has been within the last thirty or forty years of the means of cleanliness by baths of various kinds, it is not too much to say that the great mass of the labouring classes are still without these advantages. The term, "The Great Unwashed," though in a somewhat modified degree, may still be the description of the labouring classes, not only of our own country, but that of every country in Europe. In populous towns, public baths (consisting as they do of the Turkish bath, the various descriptions of shower, needle, douche, and other kinds) are for those parts of the community who are not what is termed "the labouring class."

The ordinary warm bath and the public swimming bath are usually within the scope of the artisan, the youth, and the unmarried men of the labouring class; but it will be found on investigation that the married labourers and their families make little use of them; the reason being that the price charged, though so low, is too much for their means. The 2d. or less for the swimming-bath is still too much, and this bath has the disadvantage of only being used in summer, whereas, for sanitary purposes, people must be cleansed as perfectly in winter as in summer.

Now, when we consider the circumstances of the labouring class, we find that while they are children the mother can wash them at home, but as they grow up to young men and women this is not possible to be continued by themselves, on account of decency; so that except the young men get a bath in a canal, stream, or other piece of water, they generally go uncleaned from year to year, until cold water over their bodies is a repulsion.

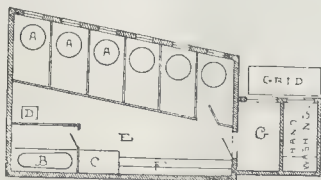
It is quite impossible to lower the prices ordinarily charged for the warm bath and the swimming-bath without considerable loss. It may be stated generally that public baths often do not pay their expenses. What with the interest on cost of construction and the expenses of maintaining them, they seldom "pay." In Birmingham, for example, the interest on cost of construction and expenses in working amount over receipts to about a 3d. in the pound on the rates; and in many other large towns a similar condition of things exists. Valuable as are the results for this addition to the rates, it is not to be expected that the ratepayers will bear a further increase, to make up the loss from a further lowering of prices to meet the wants of the labouring class.

Now, while this is the case with our large and populous towns and cities, it is much worse in smaller towns and semi-populous districts all over the land, which form a much larger population in the aggregate than those towns and cities. The cost in the first instance of building baths is so great that it can rarely be undertaken, and if done on the receipts is so much, that when it is taken into consideration it prevents the establishment of public baths for any class whatever, so that unless a much cheaper construction of baths and less expense of maintenance be found, it seems quite unlikely that such populations will ever have the conveniences of larger towns.

The writer often had these thoughts weigh on his mind while being associated with somewhat large ironworks in a semi-populous district at Donnington, near Newport, Shropshire; but saw no chance of mending matters until the latter part of last summer, when the idea occurred to him to provide baths for his work-people, upon the plan now before the section. But as people do not take kindly to baths in the winter, the construction was deferred to June 1. It must be remembered that the ordinary warm, or slipper bath, however good, is not the mode of cleansing that the labouring classes best understand, or will be persuaded to generally use; and if periodical cleansing is to be aimed at, the warm bath is not the most suitable.

Without further preface, the baths before the section will now be described. A special point was made that everything should be done in the most complete and comfortable manner, with a minimum cost, for it is quite impossible that limited populations, without rates to draw on, can have palatial buildings. What was aimed at was completeness and efficiency, with strict economy in construction and working.

The annexed figure shows the plan. The space of ground most suitable was of irregular form—hence the peculiar shape of the plan of the building. This is only apparent on the drawing, for to the ordinary eye it is neither seen outside or inside. It is 25 ft. long, the width being 18 ft. 6 in. at one end, 13 ft. at the other, 10 ft. 3 in. high to the wall-plate, and 17 ft. 9 in. to the ridge. The roof is of galvanized corrugated iron, ceiled with deal, painted bluish white, lined with hair felt. The space is amply sufficient for six ordinary baths, as they will be styled in this paper, one warm bath, a drying-closet of seven horses for towels, a washing-machine, and all the apparatus for working the baths, and has a very clean, neat, and comfortable appearance. The



six ordinary baths, A, are arranged on one side in compartments, with doors in front. The warm bath is at B, the drying-closet is at C. The washing-machine is kept at D, and when in use is drawn out to the area E. A seat, F, is placed for persons waiting for baths, and has a board on the floor to place their feet on in case they wish to finish their dressing outside after the bath, to save time. There is a porch G, with door to prevent draught; and as many workmen and labourers come in dirty from their work, it was found that their dirty hands soiled all they touched, so an addition has since been made to the porch, with a washing vessel and towels to wash their hands before entering the bathhouse; and as their boots are often loaded with dirt, an iron grating is placed outside, level with the ground, to rub their boots on as they walk, and this, with mats inside, keeps all clean.

Each bath chamber is 8 ft. long, 4 feet wide, and 7 ft. 6 in. high, which gives ample room. The partitions are galvanized, corrugated iron, stiffened at the bottom with angle-iron, the hollow spaces of corrugations between which are filled with cement to prevent accumulations of soapy dirt. The ceiling is of varnished deal, and forms the floor above, on which the tanks and pipes are placed that work the baths; and as this has a considerable weight to support, substantial wood posts are fixed, each with an iron shoe at the bottom, to prevent decay; and as decay is so common in bathhouses, no wood is allowed to come in contact with the quarried floor, which is flushed with a hose daily, the floor having a slight inclination to the channel-drain at the side, and soon dries.

Each ordinary bath is of cast-iron, 2 ft. 6 in. in diameter by 8½ in. deep; the top is rounded off smooth, so that it can be sat upon; and they are set 5 in. above the floor, being found more convenient for either sitting in, or for cleaning the feet while sitting on the stool. There is a wood grating on the floor for the bare feet. These baths have twelve coats of white paint on the inside. Enamelled iron would have been preferred, but it was found too expensive. Each compartment has hooks for clothes; and to prevent the common custom of throwing the towels on the floor, a hook is placed for them marked "Towels." And that the floor may not be made dirty by the boots being thrown anywhere, a place in a corner is marked "Boots." There is a dish for soap, and a box with two flesh-brushes and flannel. Each bath door is numbered. There is a rough glass light at the end, with sliding pane for ventilation, and a gas jet. Over the centre of each bath is a rose above, with two chains, marked "Warm" and "Cold," for the spray. This rose has fine holes, not so large as is used for showers, for as we have to accustom the labouring class to the use of cold water, a shower from a large-holed rose is absolute horror, they cannot bear it. But with the fine spray it is absolute enjoyment, and all speak in the highest terms of how they like it. It is no small matter to teach the labouring class to love cold water. Each bath has two cocks with handles from the hot and cold water mains, being severally marked "Hot" and "Cold." As the bathers supply themselves with water, a black line is painted

on the side of the bath 3½ in. from the bottom, to show the height to fill the water. This is found to be quite enough, as the water from the spray falls into the bath. Proper directions are in the bath-room how to use the bath.

As white glazed bricks are so expensive, the walls have three coats of white paint to prevent absorption.

The bottom of the bath has a plug of 2 in. diameter. At the bottom of the recess in which it fits, a grating is fixed to prevent pieces of soap getting into the 4-in. iron main drain-pipe to which it is bolted, all joints being "faced." This pipe goes through the building, and is sealed outside; there is no smell whatever from it.

The warm or slipper bath is full-sized, of the usual kind, of enamelled tinned iron with Shanks's best fittings. The room has a chair, with wood grating and carpet. It has also a warm and cold spray.

On the floor over the baths is a hot cistern, 4 ft. 6 in. by 3 ft. 6 in., by 3 ft. deep, with tubes through it heated by steam; it is covered with wood. This cistern supplies hot water to the baths, the cold-water supply being from the main. The warm spray is supplied from a cistern, 4 ft. by 2 ft., by 2 ft. deep, and covered with wood. Both these cisterns are encased in wood lined with dry hair felt ½ in. thick, and it is found that they do not lose more than four or five degrees of heat during the day. The cold-spray cistern is 3 ft. 3 in. by 2 ft. 3 in., by 2 ft. deep, and is supplied by a pipe from the main with a ball-cock. All the warm water pipes for the spray are covered with felt. As there is a w.c. in an adjoining building, there has been no necessity to provide one. The total cost of the whole complete has been £200.

The steam used to heat the water for the baths is the waste steam from the works adjoining, which, after having heated the boiler and cooking apparatus of the workmen's dining-hall for 400 men, and heating the hall, makes the water 180 deg. This is in use for about eight months of the year, but during the height of summer the waste steam is turned off, as it makes the buildings too warm, and the steam direct from the boilers is then used. For these eight months the cost of heating the water is nothing, and for the remaining four months the cost of the fresh steam is but small. If the baths did not have this steam to draw upon, a separate boiler would be required; but so small a boiler would be sufficient, that an addition of 15s. would cover the expense. Two hundred large bath towels are necessary for these baths, and a stock of flesh brushes, flannels, and sundries will cost 10s. So that a bath establishment, complete in itself, of this size, with washing and drying apparatus, costs £245, to £250.

I have tried to form an estimate of what population such baths would be sufficient for. These six are capable, without difficulty, of furnishing eighteen ordinary baths per hour. They have supplied twenty-four baths per hour, but this was found to give pressure. It will probably be found in a town, that an extra warm bath would be desirable, each bath supplying two per hour in addition to the above eighteen. I think such a bathing establishment would supply the needs of a town of 12,000 inhabitants with ease. As all the apparatus is ample size, if more ordinary baths were wanted the addition of a few more baths of this character would be a moderate expense, as their cost is less than half of the warm or slipper bath.

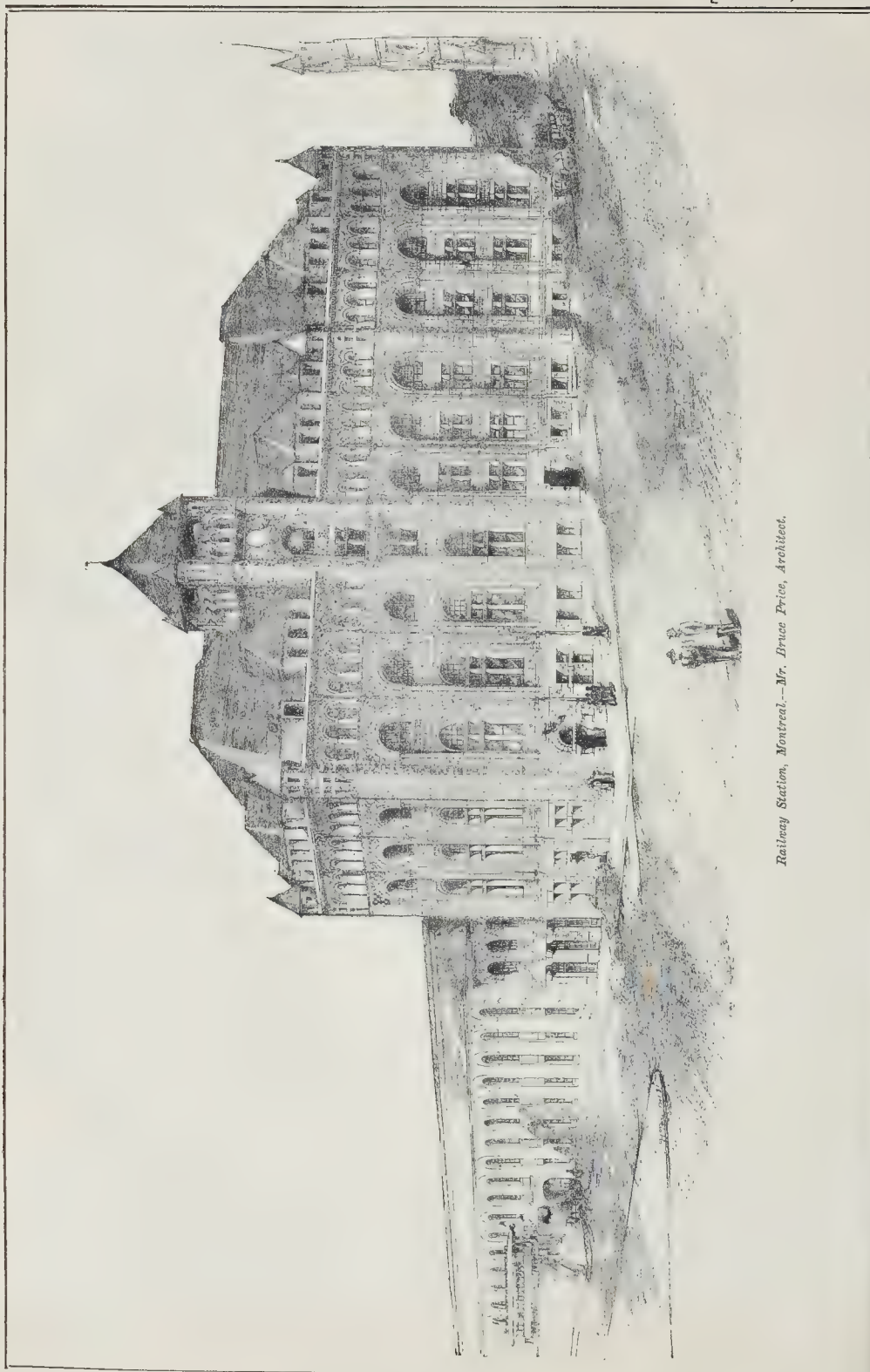
After the baths were used for a month by the persons engaged at the works adjoining, and being found to be so much appreciated and enjoyed, the public were admitted on the following terms:—

Ordinary bath with one large bath towel, use of flannel and two flesh brushes .....	1d.
Warm bath and two towels .....	4d.
Extra towel .....	½d.
Soap tablets .....	1d.

It was thought better for each person either to bring his own soap, or buy it.

The experience in the working of the baths is that five ordinary baths are used for one warm bath. The time that the ordinary bath takes is found to be twenty minutes, while half an hour is necessary for the warm bath. The next important fact is that on an average the ordinary bath consumes eight to nine gallons of water, while about forty gallons are necessary for the warm bath. So thoroughly are the bathers cleansed in the ordinary bath, that although they come very dirty from their work,

\* A paper read by Mr. Charles Clement Walker, F.R.A.S., at the recent Congress of the Sanitary Institute at Worcester.



*Railway Station, Montreal.—Mr. Bruce Price, Architect.*



the towels used for drying themselves are returned scarcely soiled.

The directions given for the use of the ordinary bath are that the bather is to fill his bath with hot and cold water, to his own liking, to the line painted on the side of the bath, and if he likes to wash his feet first, he can sit on the stool with his feet in the bath. After which he is to stand upright, pull the warm spray to wet his body all over, and use plenty of soap with the flannel, rubbing himself well, particularly the head and feet. Then use the flesh brushes well, back and front, washing all off with the warm spray, repeating it if he likes. Then when finally cleaned all over, to pull the warm spray and wash all the soap off, and always ending with the cold spray, so as to obtain a good reaction, after which he dries himself with the towel, washing the flannel and brushes, and pulls the plug in the bath, rinsing it out clean for the next comer while dressing. Thus the baths work themselves. It is found that everyone uses the cold spray, and speak of the enjoyment of it in the highest praise.

#### Eagerness of Working.

This is a matter which has been carefully considered. If these baths are in a large town, it will be found economical to have a much larger number of them, so as to make it worth while to employ a man constantly, or what is better, a man and wife as bath-keepers, the wife doing the washing and attending to the women's baths. But for a town of say 12,000 inhabitants or less, it should be arranged that the bath-keeper have some other occupation, which is his main dependence, and be paid for attending to the baths. The set of baths now described are kept by a labouring man, whose chief occupation is the charge of the workmen's dining-hall referred to; and in the time he has to spare in the morning, he fills the cisterns and heats them, which keep their heat the whole day. This does not take more than a quarter of an hour. He then washes the towels; he gives out the tickets for the money received for baths as required; and prepares a warm bath when asked for. It is found that so few come after 6.30 p.m. in the semi-populous district where they are situated, that the baths are then closed, when the attendant flushes out the whole place with a hose, and cleans up for the next day, which occupies him thirty or forty minutes. For this he is paid 4s. per week. This sum, with the soap required for washing towels, the cost of heating the water, wear and tear of towels and brushes, is the cost of working the baths. There is a profit on the soap sold and extra towels. So moderate is the cost of construction and the expense of working, that if a person brought his own towel and soap, one halfpenny may be charged for the bath. I see no reason why these baths should not return a moderate interest on their cost, instead of being a loss, as public baths generally are. They have now been in operation nearly four months without the least hitch. Everything is so substantial and well made that very little repairs will be required. Once a year the ordinary baths will want two or three coats of enamel paint, and these are all the current expenses.

At present the baths are used only by men and boys. If women are admitted, it must be at set times when a woman will be in attendance; but for this size establishment it will not pay to have a separate set of baths for women.

#### RAILWAY-STATION, MONTREAL.

THE railway-station front, of which a view is given in this number, was completed last year from the designs of Mr. Bruce Price, architect, of New York.

The main building is described as a "Scotch rubble" facing, with "rock-face belt-course." The interior of the building is finished with Vancouver cedar. The floors are all of a fire-proof construction.

The train-shed, of which a part is seen in the drawing, is about 500 ft. in length.

**New Workhouse at Hastings.**—The Board of Guardians, at their last meeting, adopted the report of the Building Committee, together with the plans prepared by their architect, Mr. Philip H. Tree, for the building of a new workhouse, at a cost of about 40,000l. It was resolved that the plans be at once forwarded to the Local Government Board for approval, and permission asked to borrow a loan of 25,000l. to commence the work.

#### CASES UNDER THE METROPOLITAN BUILDING ACT.

##### SEPARATE TENEMENTS.

MR. G. A. CHERRY, L.S.A., of 120, Plumstead-road, appeared at the Woolwich Police-court on Tuesday, the 1st inst., to an adjourned summons taken out by Mr. Thomas Batterbury, the District Surveyor of Plumstead and Eltham, for an infringement of the Metropolitan Building Act, at 120, Plumstead-road, under section 27, sub-sec. 3, which enacts that, "If any building in one occupation is divided into two or more tenements, each having a separate entrance and staircase, or a separate entrance from without, every such tenement shall be deemed to be a separate building for the purposes of this Act." Mr. Fenwick, the magistrate, made an order for the requisitions of the District Surveyor to be complied with within twenty-eight days, by building a party-wall between the tenements and carrying out other sundry works. The defendant was ordered to pay costs of summons and the District Surveyor's fee for attending.

##### A QUESTION OF FEES.

This was a case heard before Mr. Bridge, at Bow-street Police-court, on October 4, in which the District Surveyor of St. Giles-in-the-Fields and Bloomsbury sued Messrs. Sandon Brothers for recovery of fees under Section xxvii., Rules 2 and 3. Mr. Morten appeared for the defendants.

It appeared that the defendants had erected residential chambers and shops on the site of five houses in Hart-street and Museum-street, consisting of four shops with separate entrances fronting in Hart-street, and a set of chambers with entry in Museum-street, and a similar set of chambers next St. George's Church, Bloomsbury. The chambers of main building consist of ten separate sets of chambers entered from Hart-street, with one staircase to the different floors, and the area of the building exceeded 3,600 ft. The fees claimed were on each separate set of chambers or rooms, amounting to 56l. 5s.

The defendants claimed that under Section xlix. only one fee should be charged, there being but one building, although divided by fireproof divisions, and one notice given for the whole.

The magistrate decided that each separate set of chambers and shops must be deemed a separate building under Section xxvii., Rules 2 and 3, and the charge of a fee for each separately was correct. He therefore ordered that the full amount of the claim, viz., 56l. 5s., should be paid forthwith, and also costs.

##### CONCRETE FLOORS.

SIR,—Architects and the general public are being now advised, through the columns of your journal, that to make floors of Portland cement concrete, without metal, of great span, and upon the beam principle, is safe construction. The proof adduced to show that such structures are safe is the fact that some of them are still standing. The argument for their safety, in reply to cited cases where they have fallen, is that "steeples fall; but we go on building steeples." A cause capable of being propped up in no better fashion than this, must be a very lame one indeed. Diagrams and algebra are superfluities when the point at issue is simply one of common sense. If it could be shown that steeples cannot be built in any way or out of any materials that will prevent their tendency to fall, it would be silly to go on building them.

Dismissing for the moment (as far as practicable) materials and construction, let us consider principles, upon which I lay down the proposition that tensile strength is of the very essence and the only final element of safety in beam structures made to support weight and carry loads. Also that any structure made to support weight and carry loads is an unsafe structure (whatever be the material or materials of which it is composed, or howsoever contrived and made), the nature of which is such as to make certain that whenever it does give way the break and fall will be sudden and without warning.

If these propositions are sound, the ideal concrete beam-floor construction of Mr. Caws is out of court; there is no case to be argued. What is a tensile strength of "500,"—the highest claimed by Mr. C. for Portland cement,—compared to the 60,000 of wrought iron? My indictment as to floors of concrete divorced from metal, made after the fashion described and recommended by Mr. Caws and others of your correspondents, is, that when they fall,

\* Of course we are in no way responsible for the views expressed by Mr. Caws in his own name; the responsibility rests with him alone. We have simply given him space for publishing what he considers to be the results of his own rather extensive experience in the construction of buildings with concrete floors.—ED.

the fall will be sudden and without warning. The "uneasy feeling" of Mr. Potter's unfortunate "tenant" was a well grounded uneasiness; and Mr. P.'s selection of the word "resigned," was well chosen. To propose the making of concrete floors without metal, upon any other principle than that of the "arch," is like proposing to construct suspension bridges out of concrete pure and simple. No prudent architect or builder would for a moment think of constructing such a floor.

THADDEUS HYATT.

SIR,—In the discussion lately carried on in your journal, on the above interesting subject, I have observed what seems to me to be a discrepancy relating to the "safe load," which tends to confusion.

In the second article (pp. 75, 76, ante), Mr. Caws suggests as a unit for base of calculation, a slab 1 ft. square by 1 in. thick, putting the safe load equally distributed at 400 lbs.; and, as part of his demonstration, he goes on to say that, if the slab be ten times as large, still keeping it 1 in. thick, the safe-load will be 40 lbs. per foot, i.e., as I understand his rule, the slab being ten times larger the safe-load per foot will be ten times less. Now, in the question raised by your correspondent, "Architect" (p. 123, ante), and in the example (2) worked out by Mr. Sutcliffe (p. 173, ante), the second supposed slab is put as 10 ft. by 10 ft., which, being 100 square feet, is one hundred times larger than the first, instead of ten times, as suggested by Mr. Caws.

If the slab in the said example (2) be put 120 by 12, or, to preserve a contour similar to that in example (1), 38 by 38 (disregarding minute fractions), the resulting stresses would be the same in both examples, which Mr. Sutcliffe says should be the case. Ed. COOKE.

Birmingham, Oct. 8, 1889.

SIR,—In "Rankine's Civil Engineering Manual" (14th edition, 1883, p. 544) there is a table of greatest bending moments of loads distributed and collected in the centre on a plate supported on two parallel edges (as a beam) or on all its four edges (as a slab) from which may be made the following

	COMPARISON OF GREATEST BENDING MOMENTS OF LOAD ON A SQUARE PLATE.	
	Supported on two parallel edges.	Firmly supported on all four edges.
Load uniformly distributed .....	$M = \frac{WL}{8}$	$M = \frac{WL}{16}$
Load collected in centre .....	$M = \frac{WL}{4}$	$M = \frac{3WL}{16}$

If the theory from which this tabular statement is deduced be even "approximately true," your readers are liable to be misled by Mr. Frank Caws, who, with a semblance of proof, says, in a communication recently published by you (*Builder*, September 21, 1889), that "under similar conditions a square slab is three times as strong as a beam to carry an equally distributed load" . . . ; and, again, that . . . "a square slab is twice as strong as a beam to carry a central load."

According to Rankine's theory, instead of the effect of the distributed load applied on a beam being three times as great as its effect upon a slab of the same size and shape supported all edges, it is only twice as great (2:1, not 3:1); and the difference due to two or four supported edges in the case of a central load is as 4 to 3, not as 2 to 1.

Can you determine the points in dispute, or must we choose between the authority of Mr. Caws and that of the late Professor Rankine? September 28, 1889. H. C. S.

\* In the next number Mr. Caws will reply in full to the various criticisms in the last two or three numbers, and with that the correspondence on the subject must close for the present. We may have our own summary of the subject to give in the next or a succeeding number.—ED.

#### PROFESSOR TICHBORNE ON THE INTERCEPTION OF Miasmatic Emanations FROM THE SUBSOIL OF DWELLINGS.

SIR,—In connexion with this very important subject, we find on p. 243 ante that Professor Tichborne, F.R.C., recommends the use of cement and condense asphalt, because it forms too tight a plug. He backs up his objection by stating that if we have every large area cemented by this material, the "surface gases" as he says, or rather as I would express it, the gases below the asphalt, would then be more or less under pressure, and so would force their way for escape at any fissure or crack, perhaps where not wanted.

Now in the case of the whole interior ground of a building being covered with asphalt, it would be quite easy to guard against the pressure Professor Tichborne refers to by putting in two small iron air-

\* W denotes the load, L the distance between supports, M the greatest bending moment.



pipes,—one in front of the house, and one in back, from outer face of each wall to below the asphalt, which pipes,—say 2 in. diameter ones,—would act as ventilators, according to direction of the wind, as well as as preservers of gas pressure. In his objection to asphalt Professor Titchmarsh seems to me to overlook the fact that, in addition to keeping down gases, we also wish to keep down damp. For this latter purpose asphalt, forming a more perfect barrier than cement, is to be preferred.

In many houses, villas, and mansions, &c., there is often a space from 2 to 5 ft. deep from the floor people walk to the earth below. In many cases this is often left as the receptacle for the odd rubbish of the new building,\* and no covering from either ground-damp or air being put down, the atmosphere of the house, &c., is deleteriously affected. It is in cases such as these that I particularly recommend asphalt in preference to cold and mayhap damp cement.

W. P. BUCHAN.

#### VENTILATING-PIPES TO "GEYSER" HEATERS.

SIR,—We ask the favour of your assistance in warning tradesmen against fixing geysers without a ventilating pipe to carry the fumes of the gas outside the bath-room, and also in urging upon those who have the specifying or oversight of such work, that they should specially insist on this very simple but absolutely necessary precaution.

The recent accident at Erixton has called public attention to the risk of using geysers without the proper pipe; but we know from experience that the panic is likely to subside very shortly, when people will not act as recklessly as ever. Besides, there is a danger of the alarm expending itself by being led off on a false scent. Someone is reported to have said at the inquest that geysers should never be used at all, and a gentleman writing since calls them "death-traps." Of course, such sweeping condemnations fall of their effect, now that so many thousands of geysers are in constant use with every satisfaction to their owners.

It is sufficient for the public security, and much more likely to be attended to, if the simple and inexpensive precaution of fixing a ventilating-pipe is urgently insisted upon.

We offer, wherever a geyser bearing our name has been fixed otherwise, to supply and fix the pipe free of charge. If other manufacturers will take the same course, we shall be spared the horror of reading of any more cases of asphyxia.

EWART & SON.

346, Euston-road, October, 1889.

#### ANCIENT FONTS IN COUNTRY CHURCHES.

SIR,—The writer of the interesting article on "Ancient Fountains in Country Churches," in the *Builder* of Sept. 21, 1889, has given a description of some fifteenth century fountains, with inscriptions, but has omitted mentioning many others of much earlier date, which are inscribed. Mr. J. Romilly Allen, in a paper of his on the "Antiquity of Fountains in Great Britain," read at the meeting of the British Archaeological Association in 1888, says:—"No satisfactory evidence has yet been brought forward to prove the antiquity of any font in Great Britain to be greater than about the middle of the eleventh century, unless, perhaps, the font at Bingley, in Yorkshire. This font has on one of its four sides an inscription in runes, which Professor George Stephens translates as, 'Eadricht, King ordered to hew this dip-stone for us—pray thou for his soul.' Other readings have, however, been given of this inscription.

At Bridkirk, Cumberland, is another ancient font, elaborately carved, and bearing a Runie inscription, which may be read, "Richard he me wrought, And to this mirth (beauty) gem me brought." A full-sized model of this font may be seen in the South Kensington Museum. In Wales there are three early inscribed fonts, all in Brecknockshire. One is at the Priory Church at Brecon, and is elaborately ornamented with interlaced ribbon work. The inscription, which is much defaced, runs round the rim. This font, and the two following ones, have been figured and described by Professor Westwood, in his "Lapidarium Wallie." Patrishow font, in Brecknockshire, has the inscription on the flat surface of the rim of the bowl, "Membr me fecit (in) tēmpore Genillia." This Genillia, or Cynhyllia, lived in the middle of the eleventh century. The third inscribed Welsh font is at Deynck, but the inscription is illegible.

At Potterne, in Wiltshire, is a very early font. It is of massive appearance and tub-shaped. It bears an inscription from the beginning of the 42nd Psalm:—"Sicut cervus desiderat ad fontes aquarum ita desiderat anima mea ad Dñ. Amen." From

\* This was the case with my own house when I first bought it, but I declined to occupy it until, *inter alia*, the rubbish was all taken out, the floor levelled, and all burst water-pipes. I think the little expense involved in this has made the house—a detached villa,—20 per cent. more comfortable and healthier.—W. P. B.

the style of the lettering it is probably of the end of the eleventh century.

An Early English font at Keynse, Bedfordshire, bears the Norman French inscription:—

" + TRESTVI : KEPARDIO IPASSK RVI PVRLEAL NEWARCL PRICY : KC DCVPARSA GRACIVE BREY-MERCILIFACE AM."

which forms in modern French:—

"Rester, qui parici passerez  
Pour l'ame de Warcl priez  
Qui Dieu par sa grace,  
Vraie  
or Votr ; merci lui face. Amen."

A font at Odiham, Hants, probably of the fourteenth century, has an inscription in Gothic letters of about 6 in. high round the basin, "Auxiliu meum a dño qui fecit celu (et) tra." This font is further remarkable for having a curious projection of oblong form on the south-west side of the basin, which projection is hollowed out into a species of small trough, 5 in. in length by 3½ in breadth and 1½ in depth.

At Southrop Church, Gloucestershire, is a massive circular font; the upper half of the basin is covered with richly-carved interlaced work, and the lower with figures of the Virtues overcoming the Vices, their respective names being inscribed over the figures. A very similar font, both as to ornament and figures, is at Stanton Fitzwarren. This latter font was figured by Mr. C. J. Richardson in the *Builder*, vol. iii. At St. Margaret's, Ipswich, is an octagonal-shaped font, ornamented with angels bearing shields and holding scrolls, which have been inscribed, but these inscriptions are now almost obliterated, with the exception of one, which the Rev. Evelyn White reads as "Sal et saliva," which he considers as referring to the giving of salt and anointing the eyes with saliva as practised in early baptismal ceremonies.

At St. Mary's Church, Nottingham, is a font bearing a Greek inscription, which is curious from the fact that it may be read (approximately) either backwards or forwards. It is as follows:—

NI'PON 'ANO'MHMA' MH' MO'NA' OWIN

"Cleanse your sin, not your face only." I believe this inscription may be found on several other fonts.

At Addeley, in Shropshire, is a font inscribed with letters, 1½ inches high: "Hic male primis homo fructu cum conjugio potest." There are several inscribed fonts in Cornwall. One at Llandwidnaok, of, probably, the thirteenth century, is inscribed, "I.H.C. D. Ric. (Donnus Ricardus) Bolham me fecit." Another, at St. Ives, has a much-obliterated inscription, the words: "Oes baptizatus gentes" being visible. Two panels of an inscribed font at Dunoby, in Lincolnshire, are figured in the "Journal of the Archaeological Institute," Vol. X., pp. 75, 173. They display a very singular combination of letters, which Sir F. Madden says form the words, "In principio." These fonts are but a few of the great number of pre-Reformation inscribed fonts still remaining in Great Britain; and the number of those of later date are still more numerous. Many of these have been styled "churchwarden" fonts from their bearing the initials of the churchwardens in office at the time of their being inscribed, for there are instances of old fonts which have had modern inscriptions put on them, so that the date of the inscription does not necessarily give that of the font.

Walton Manor, Oxford.  
Sept. 24, 1889.

EMMA SWANN.

#### The Student's Column.

##### WATER-SUPPLY.—XV.

###### RESERVOIRS.

HERE are many kinds of reservoirs made in connexion with water-supply on a large scale, the construction of which is not the least important matter the waterworks-engineer has to consider. Their actual nature and extent must necessarily vary with the source and method of supply. We have the immense catchment, impounding, or storage reservoirs constructed to catch and retain the water from drainage areas or rivulets; subsiding reservoirs in connexion with river and other similar sources; and, finally, pure water or service reservoirs for holding the fluid in a state ready for consumption. Reservoirs of the ones just mentioned, are neither these nor the ones just mentioned, but all present in any one scheme of supply.

We have already alluded to the connexion between rainfall and reservoirs, and there is no occasion to enlarge on the subject now. There are certain peculiarities in respect of the behaviour of water in great bulk, whilst many difficulties attend the selection of sites for the larger kinds of reservoirs, and of these we propose,

\* It is introduced on the eighteenth century font in Knapton Church, Norfolk.—En.

principally, to deal at the present time. Commencing with the choice of sites for impounding, or storage reservoirs, it may at once be stated that the engineer must possess a most accurate knowledge of the geology of the position proposed to be occupied. There is no part of the whole question of water-supply demanding the assistance of this science more urgently than in the selection of suitable spots for the storage of large quantities of water; and there is no part of a catchment area scheme, perhaps, that causes the engineer so much anxiety as the selection of position, and the making of these immense reservoirs. Situated as they must often of necessity be at the junction of a series of small rivers or springs in a valley, and at such a height as to admit of the supply being furnished by gravitation, the lives of hundreds of people living in the towns and villages in the valley below frequently depend on their stability of construction.

The engineer usually has to erect a dam in such a manner, and of such strength, from one side of the valley to the other, as to be capable of safely holding back the quantity of water required by his scheme; to permit the passage of a certain amount, for compensating purposes; and to admit of a conduit for discharging the supply—no small matter, simple though it appears. But the safety of the whole construction largely depends on surrounding geological conditions. The dam may be constructed in a perfectly skilful manner, and be adequate enough for its purpose; the arrangements for compensation water may be perfect; and the culverts may be made in such a manner as not to weaken the gigantic wall in the slightest degree; yet from the circumstance that the foundation and sides of the reservoir are insecure, the whole thing may fail, causing immense destruction of life and property. The elements which go to form the stability of the foundations of a large reservoir are mostly different from those of a large building. Apart from the fact that the area to be examined must necessarily be of much greater extent in the former than in the latter case, we have to consider the accumulated effect of the great pressure exerted on the dam, or embankment, from behind, not only in ordinary periods but in times of flood, as well as the weakening of the foundations so often caused by leakage. Reservoir foundations should, therefore, receive separate consideration. All things in connexion with the work of choosing sites and erecting the structure must be considered with economy. There is no credit due to an engineer who, without reference to expense, executes substantial works; all are agreed on this. The credit which an engineer ought to aim at is the execution of substantial work for, comparatively speaking, a small amount of money; any amount of substantial work can be accomplished by unlimited expenditure. At the same time, seeing the frightful consequences that must ensue in case of failure, in the construction of these gigantic reservoirs, it is better to err in being too substantial, and to be well within the mark, than to "sail too close to the wind."

Let us endeavour to get some idea of the nature of good and bad foundations for reservoirs. The student will probably have heard, and is led to imagine, that a large-scale geological map will be able to nearly settle the matter for him, but further reflection will soon show that maps are of only secondary value in this respect. The information conveyed in an ordinary Geological Survey map is not sufficient for the purpose—it is not intended to be. We are far from saying that such geological maps are of no assistance whatever; to an engineer making a preliminary survey for a site, they are indispensable, and the larger the scale obtainable the better. Broadly speaking, the Government Geological Survey maps may be divided into two kinds, each having a distinct object in view. One kind is termed "solid" maps, not that they refer only to hard materials, composing the earth's crust, as even clays and sands are comprised in them, but they indicate the igneous, metamorphic, and aqueous masses of rocks forming the main structure of the country, no matter what their consistency may be. But it so happens that in comparatively recent geological times, portions of these "solid" beds have been covered by superficial deposits, so it will be apparent that "solid" maps do not necessarily show the actual beds or rock cropping out, or visible at the surface of the ground. Where this is the case, the main geological formations play only



the part of substructure. It is extremely useful to know the exact extent of the "solid" beds for many water-supply purposes, especially in sinking wells for the precious fluid; but inasmuch as these maps do not indicate the existence of superficial deposits (except in certain instances) they are not so useful in aiding one in choosing the site for an impounding or storage reservoir, as the other series, viz., the "drift" maps, which do exhibit the positions and extent of the superficial accumulations. Wherever an appreciable thickness of these latter exist, they are mapped, and thus one gets a better idea of the structure of the ground at and near the surface,—a very essential feature in regard to foundations. In such districts as are not covered by these newer deposits, the "drift" maps show the "solid" geology, as usual. But let us pause to consider on what lines the country is geologically mapped, for we shall find it useful. In a previous article we said something concerning it, but that was in relation to water-bearing strata. We there showed that the geologist constructed maps from a geological point of view, that is, he broadly defined the boundary lines of strata according to the similarity of the suites of organic remains (or fossils) found in them, and which might have no reference to the actual lithological character of the deposits. It so happens that a change in the nature of the strata, such, for example, as the gradual alteration, when traced over a wide area, of a bed of sand into a clay, or a clay into a marl and limestone, is sometimes accompanied by a corresponding change in the nature of the fossils, even along the same horizon, because in those ancient times, as now, the kind of sea-bottom suitable for the existence of one kind of organisms, may not have been agreeable to another, although living in the water at the same time. These changes of fauna in the deposits may be mapped, and thus it often happens that a geological map roughly indicates lithological character also, although not necessarily intentionally. It is hardly ever safe to rely on this, however, in practice.

In constructing "drift" maps, the geological surveyor has something more to do. He endeavours to indicate the approximate geological age of the different superficial accumulations, but in doing so he makes many more subdivisions in comparison to their thickness. He takes considerable notice of position and lithological character, which, in the absence of fossils, are frequently his only guides in classifying the different beds. The extent of gravels, sands, and clays, as such, thus receive more attention than in the older solid maps, and this is another reason why "drift" maps are of more practical value for the purpose at present under consideration. The engineer may, however, be very much misled in determining the site of a reservoir, even from these—the most improved form of British geological maps. For example, we will suppose that an intended site is coloured on the "drift" map, as "boulder clay." Under ordinary circumstances, this might not be considered a bad one; but if the clay contained occasional thin seams of sand or gravel, it might, on the other hand, be extremely treacherous ground. The scale of the maps is much too small to show these local peculiarities, whilst the latter might not be important enough to deserve a notice in the explanatory memoir accompanying the map, unless it so happened that a detailed section is given of some artificial opening in the area comprised in the intended site, but the memoir would not give the extent of such thin seams. Anything like a minutely accurate idea of the structure of the locality can only be made on the spot, and the student will now understand why geological maps are only of secondary value. To make such a survey the engineer must be a geologist, or else employ a properly-qualified man. The experienced eye of a professional practical geologist can often detect, at a glance, what would only be found out after a most painstaking survey with trial-bores, &c., by the non-geological engineer. The relation of the drift to the beds beneath, its irregularity of disposition and cohesion, the dip of the strata, and many other things, which might cause undue settlement in the puddling and embankment, or result in a landslide, when the full pressure of the water is felt behind the dam, would all be fully appreciated by a properly-trained geologist. In the absence of such drift, the condition of the solid rocks as suitable foundations would have to be considered. Sometimes the foundations of the

embankment may be laid on a solid rock, and, apparently, be quite safe; but the rock, although level at the surface, might in reality have a tolerably strong dip down the valley, and from the circumstance that it was thin and rested on clay, the safety of the storage reservoir might be seriously impaired. In certain cases the nature of reservoir foundations is such that it produces much leakage, and the whole bottom, or a great portion of it, is almost invariably either puddled or concreted to make it sound, but this need not always be done. If the bed causing the leakage is only a few feet in thickness, and rests on an impervious bed below, it might be possible to save much expense by simply constructing deep and substantial puddle trenches on the impervious bed, in suitable places. The bottom might thus be waterlogged, but it would prevent the leakage, and keep the masonry from being unduly injured. This more particularly applies to repairs than original construction. Great care should be taken in seeing that foundations and sides are not too readily disintegratable; in making this observation we have in mind the failure of certain reservoirs constructed abroad. Sites have been selected in hot climates, where, by reason of the employment of unskilled labour, slight leakage through the foundation and sides has resulted, which has rapidly led to the formation of wide cracks, and ultimate failure of the reservoir, in consequence of the material being so easily disintegrated.

### RECENT PATENTS.

#### ABSTRACTS OF SPECIFICATIONS.

16,131, Stone-dressing Tool. A McKechnie. This invention consists of a portable tool with multiple cutters. In a hollow handle with provision for striking by the mallet is a series of grooves in which the cutters,—two, four, or six,—may be used in a hand tool-slide, governed by springs also contained in the hollow handle-piece. Rack notches or teeth are formed on the interior parts of the handle which engage the cutters so that they can be used to their full striking power.

16,408, Flushing Apparatus. J. Sharples. By means of this invention, the waste-water, slops, &c., which in domestic economy are usually discharged in a weak stream through a pipe of limited area, are run off into a closed cistern, and from there emptied by suitable mechanism, forming a flushing stream of some strength.

4,476, Impressing Designs on Wood. A. Martin.

According to this patent, the designs which are to be impressed upon the wood are put on by means of heated moulds, or by cold moulds while the heat is conveyed to the wood by means of heated traversing tables; and while the designs are impressed the ordinary processes of veneering are carried out, so that a common wood may be used faced with wood capable of a fine finish. The embossing cylinders which are used are built up of steel in permeable rings, by which, by reason of change, greater variety of design can be secured.

9,726, Discharge-pipe. F. Bolus.

In this invention, in order to prevent the rising of sewer-gas, a tube of galvanised iron is inserted in the discharge-pipe. Valves and hinged guards are fitted, and when the fluid has passed one valve it closes before the lower one opens, thus cutting off the connexion and preventing the escape of gas.

11,282, Securing Tiles or Slabs. H. Scott.

By means of this invention, metal carriers of H, or channel, section are used, and the tiles or slabs are slid into the grooves formed by this shape of carriers. Cornices or mouldings for the edges are provided, and these are held in place by carrier-bars. It is not absolutely necessary to use mortar or cement, the metallic fastenings proving an effective support.

12,269, Window Fasteners. J. T. Hunter.

This form of fastening, which is the subject of this patent, acts as a secret lock, and by a method of placing knob and bolt in such a position that they can only be opened in one way, the secret is practically known to but few persons. To any one unacquainted with the mechanism the window appears practically unopenable, but the owner of the fastener can at once correct the alignment, withdraw the bolt, and unlock the window.

12,457, Closets. W. Bunting.

This patent relates to improvements in "Bostel" closets, designed principally to cheapen their cost. The inlets and spread of the water are more effectively and economically managed, and the expense of making two or more connexions and metallic fittings, generally necessary, is avoided.

#### NEW APPLICATIONS FOR PATENTS.

Sept. 23.—14,963, H. Stanton, Fire-resisting Floors for Buildings.—14,967, A. Bishop, Burning

Lime, and Kilns for same.—15,005, C. Rabitz, Wire-netting for Fireproof Ceilings, Walls, &c.

Sept. 24.—15,015, J. Nall, Machines for Boring Long holes endwise or crosswise through or into thin wood.

Sept. 25.—15,093, R. Wilford, Screw-fasteners for Windows.—15,111, W. Hassall, Jointing of Stone-ware-pipes, &c.—15,115, W. Joy, Cement Kilns, &c.—15,131, C. Cross and A. Ashwell, Indicating Fastening for Doors.

Sept. 26.—15,140, J. Kaye, Releasing and Opening Doors.—15,171, C. Gabriel, Syphon Cisterns for Flushing Water-closets, &c.—15,174, T. Mercer, Automatic Sash-fastener.

Sept. 27.—15,194, E. Harrison, Revolving Window-shutters.—15,198, T. Walton, Locks and Latches.—15,220, J. Reynolds, Preventing the Return of Smoke in Chimneys, &c.—15,250, J. Bower, Door-latches.

Sept. 28.—15,270, R. Clapperion and J. Kay, Fastener for Window-sashes, Fanlights, &c.

Sept. 30.—15,336.—J. & F. Howorth, Ventilation.—15,355, S. Hill and R. Hodges, Automatic Combined Lift and Bolt for Double Doors.—15,367, J. Kidman, Bakers' Ovens.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

12,550, M. Dickens, Road-paving.—12,650, J. Judd, Expanding and Contracting Door, Window, Shop-front Guards, &c.—12,882, S. Lowcock, Holders for Sliding Sashes, &c.—12,932, J. Empson and J. Hewitt, Brackets for Glisten-pulls.—13,036, A. Taylor, Kilns for Burning Enamelled Bricks and Tiles.—13,051, J. Pierce and T. Luther, Enamelled Metallic Tesselated Plates for Hearths and Floors.—13,247, J. Hamilton, Circular Sawing-machines.—13,749, Treatment of Timber.—13,851, W. Graves, Chimney-top or Cowl.—13,972, J. Hatton, Chimney-pots.—13,997, A. Spencer, Metal Floors, Buildings, &c.—14,163, J. Kirk, Machine for Squaring, Beveling, and Mitreing Wood.—14,201, J. Reid, Drawing Boards and T Squares.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to Opposition for Two Months.

17,247, L. Scott, Hot-water, Warming, and Heating Stoves.—7,425, De Prescott, Band Sawmills.—9,883, C. Glanville and W. Williamson, Fan for Chimney Cows and Ventilators.—11,669, W. Doehring, Fire and Sound-proof Plastering.—12,417, C. Rogers, Wood Screws.—13,329, C. White, Waterproof and Fireproof Material for Roofing, &c.

#### RECENT SALES OF PROPERTY:

##### ESTATE EXCHANGE REPORT.

Oct. 1.—By T. B. WHITACOTT.	
Hutton-garden, Charles-st.—A profit rental of £30 per annum, ut. 10½ yrs.	2105
Oct. 2.—By EASTMAN BROTHERS.	
Sydenham, Dagres-rd.—The residence called "Palermo," &c.	2,030
By G. FRASER & SONS.	
Bethnal-green—21, 22, 23, and 24, Quiller-st., ut. 33 yrs., g.r. £16. 16s., r. £140 p.a.	895
10 and 12, Wimbolt-st., ut. 33 yrs., g.r. £8. 8s., r. £72 p.a.	420
Oct. 3.—By CHESTERTON & SONS.	
Shepherd's Bush—239, Goldhawk-rd., ut. 54 yrs., g.r. £8.	415
By NEWBOW & HARDING.	
De Beauvoir Town—15, Urban-rd., ut. 29 yrs., g.r. £3. 4s., r. £32 p.a.	235
29 and 37, Englefield-rd., ut. 32 yrs., g.r. £10, r. £77 p.a.	240
Horton—2, Hale-st., ut. 37 yrs., g.r. £4. 4s., r. £30 p.a.	585
Illington—1, Adelaide-ter., ut. 47 yrs., g.r. £6. 6s., r. £50 p.a.	480
City-road—20, Edward-st. and 49, Windsor-st., ut. 31 yrs., g.r. £11, r. £50 p.a.	51
Barnsbury—37, Upper Park-st., ut. 19 yrs., g.r. £5, r. £45 p.a.	215
Canabury—1, Douglas-rd., ut. 67 yrs., g.r. £10, r. £65 p.a.	620
Holloway—163, Junction-rd., ut. 62 yrs., g.r. £5, r. £42 p.a.	410
St. John's Wood—45, Circus-rd., ut. 31 yrs., g.r. £3. 16s., r. £50 p.a.	300
East Dulwich—14, Fellbidge-rd., ut. 79 yrs., g.r. £10, r. £55 p.a.	315
By GALT & CO.	
East Dulwich—218 to 230 (even), Friern-rd., ut. 90 yrs., g.r. £24. 10s., r. £175 p.a.	2,040

[Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; t. for term; c. for copyhold; l. for leasehold; e.t. for estimated rental; ut. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

**Blidworth Waterworks.**—On the 3rd inst. the Blidworth Waterworks, Notts, were formally opened. The water is obtained from a well sunk in the new red sandstone, and is elevated by means of a small horizontal steam-engine and three throw-pumps, by Messrs. Tangyes, of Birmingham, to a reservoir 200 ft. above the engine-house. The engineer of the works was Mr. H. Walker, A.M.I.C.E., of Nottingham; the contractor being Mr. J. F. Price, also of Nottingham. The scheme has cost 2,000l.



## MEETINGS.

TUESDAY, OCTOBER 15.

University College (Gower-street).—Mr. Hugh Stannus on "The Distribution and Application of Ornament with Reference to Surface, Material, Construction, and Purpose." 5 p.m.

Glasgow Architectural Association.—Mr. David Thomson on "Some Recent Developments of Architectural Design."

WEDNESDAY, OCTOBER 16.

University College (Gower-street).—Professor R. S. Poole on "Medieval Archaeology." 4. 5 p.m.

Liverpool Engineering Society.—Adjourned Discussion on Mr. T. Morris's paper on "Some Causes of the Crystallisation of Iron." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Quarterly Meeting. 8.30 p.m.

FRIDAY, OCTOBER 18.

Architectural Association.—Annual General Meeting. Address by the President, Mr. Leonard Stokes. 7.30 p.m.

## Miscellaneous.

**Bexhill-on-Sea.**—We are informed that a new seaside resort is being developed here. The place is situated about four miles to the west of St. Leonards-on-Sea. A promenade some two miles in length has already been formed, and plans are being prepared for its further extension. The land upon which building operations are chiefly being carried out at present belongs to the Earl De la Warr and Mr. J. Webb respectively, but other buildings have been erected more inland. Messrs. Lucas & Aird have laid out the roads and drains on the De la Warr estate, and a large hotel is also being built by them at an estimated cost of 18,000*l*. To the westward of this estate is the Egerton Park Estate, belonging to Mr. Webb, upon which the principal building has been carried on, with a hotel. Numerous villa residences have been erected upon this estate, and further west a site has been given by Mr. Webb for a new church, towards the cost of which the Rev. Canon Clarke has given 5,000*l*. Here is situated the Egerton-park, comprising an area of some fifteen acres. The park has been laid out by Mr. Webb, the owner, and contains ornamental water for boating and fishing, a large stock of fish having been put in. There is a cricket-ground and accommodation for the Lawn Tennis Club. At the south end, or seaside of the park, large swimming-baths are being erected, supplied with fresh sea water.

**New Market at Carlisle.**—On the 2nd inst. the new covered market at Carlisle, which has been erected on the site of the old Butchers' Shambles by the Corporation, at a cost of between 35,000*l*. and 40,000*l*., was opened by the Mayor and Mayoress of Carlisle. There are eight entrances to the market, which is built of red sandstone covered by an iron roof (designed by Mr. A. T. Walmisley, C.E.), of three bays of elliptical spans, about 70 ft. in width, and 50 ft. high, glazed with Helliwell's patent glazing. The outer walls of the body are 33 ft. in height, 18 in. thick on the north side, the remainder being 2 ft. thick. Externally they are rock-faced, and internally they are of sawn ashlar stone up to about 13 ft. in height, and finished with a moulded string-course. The cornice is played, and there are moulded corbels under the feet of all the principals. Messrs. R. H. & H. Hodgson were the contractors, the architects being Messrs. Cawston & Graham, of London.

**Association of Municipal and Sanitary Engineers and Surveyors.**—The eighth examination held under the auspices of this Association was held at 11, Victoria-street, Westminster, S.W., on Friday and Saturday, the 4th and 5th of October, when twelve candidates were entered. The written and graphic examination was taken on the first day, and the *viva voce* occupied the greater part of Saturday. The examiners were:—1. Engineering as applied to Municipal Work, Mr. W. G. Laws, M.I.C.E., Past-President, City Engineer, Newcastle-on-Tyne; 2. Building Construction, Mr. A. M. Fowler, M.I.C.E., Member of Council, Borough Surveyor, Stockport; 3. Sanitary Science, Mr. C. Jones, A.M.I.C.E., Past-President, Surveyor to the Local Board, Ealing; 4. Public Health Law, Mr. W. S. Crisp, A.M.I.C.E., Member of Council, Surveyor to the Local Board, Wimbledon.

**The Archer Sewer Joint.**—In the reference to this in "Notes on the Sanitary Exhibition" at Worcester last week, the phrase "loaded with a load of more than 1 cwt." should have read, "loaded with a load of more than 8 cwt."

**Society of Engineers.**—At a meeting of the Society of Engineers, held at the Town-hall, Westminster, on Monday evening last, Mr. H. Adams, Vice-President, in the chair, a paper was read by Mr. J. H. Cunningham, M. Am. Soc. C. E., on "Pin-connected Rivetted Bridges." The author stated that towards the end of the year 1884 he had made two designs for the superstructure of a bridge to carry a railway across the Mary River in Queensland. There were to be three spans, the centre one being 120 ft. long, and those at the sides each 80 ft. in length. In the one design pin-connected trusses having long panels, such as are now common in America, were adopted, and in the other the trusses were of the lattice type, and all their joints were rivetted. The pin-connected design was prepared as an alternative in order to ascertain whether a structure of that kind would be cheaper than the rivetted one. On carefully comparing them, it was found that the pin-connected trusses were 19 per cent. lighter than the rivetted ones, and that in erecting the work in the field 53 rivets would have to be driven in the rivetted structure for every one required in the other. But these advantages were partly counterbalanced by the greater weight of the floor in the pin-connected bridge, and the rivetted one was selected and built. He thought this indicated that pin-connected bridges could be more economical and more easily erected than rivetted ones, and in the States the best results were obtained by using long panels with pin joints. In concluding, the author drew attention to the importance of adopting improvements in bridge building. English engineers were fully alive to this, and he would merely suggest that progress was more likely to be made by greater care in designing, and more use of machine tools in constructing than by the invention of new types of trusses. He thought that those who tried to effect improvements on these lines would find their work simplified by using long panels and pin-joints.

**Edinburgh.**—The Edinburgh School Board have acquired Millerfield House and grounds, situated to the south of the Meadows, whereon it is proposed to erect what will be the most completely-equipped school yet erected by the Board. The ground, including the site of the house, which is to be pulled down, extends to about 6,200 square yards, and contains some fine trees, which will be preserved as far as possible. The plans, which have been prepared by Mr. Robert Wilson, the architect of the Board, show a building in the Queen Anne style, having an extreme length of 140 ft. and a width of about 100 ft. A conspicuous feature will be an ornamental belfry in the centre of the roof. The class-rooms and those for the staff are on the ground and first-floor, and in an upper story there are rooms for the demonstration of practical cookery, science, drawing, &c. In the basement there is a swimming-bath 50 ft. by 18 ft., a small cleansing-bath, dressing-boxes, and lavatories; and a gymnasium 50 ft. by 26 ft. On this floor provision is also made for heating boilers, &c. Accommodation is provided for 1,500 pupils, and the ground will be laid out in four separate playgrounds. Operations have been commenced in clearing the site, and the erection of the school will be proceeded with in due course.

**Wood-carving.**—The School of Art Wood-carving, City and Guilds Institute, Exhibition-road, South Kensington, has been reopened after the usual summer vacation, and we are requested to state that one or two free student places in both the day and the evening classes are vacant. These studentships are maintained by means of funds granted to the school by the City and Guilds Institute. To bring the benefits of the school within the reach of artisans, a remission of half fees for the evening class is made to artisan students connected with the wood-carving trade. Forms of application for the Free Studentships, and any further particulars relating to the school, may be obtained from the manager.

**Blackheath Hall.**—In reference to the architect's description of the work at Blackheath Hall, published in connexion with the illustration Mr. Stopher of Ipswich writes questioning Mr. Bishopp's statement that all the carved work was carried out by Messrs. Groom & Son from the architect's drawings; and stating that he executed two chimney-pieces from the designs of Lady Wentworth. We are not responsible of course, for the original statement; but probably this was work unconnected with the architect's commission.

**Exeter Theatre.**—The new Exeter Theatre, built upon the site of the old, ill-fated theatre, which was destroyed by fire two years ago, was opened on Monday last. The walls left standing after the fire have been again used, and a stone balcony has been constructed on the North-road front. The interior practically has but two floors, and no gallery, the circle being the highest part of the auditorium, this being divided into two classes of seats. Resembling a horse-shoe in shape, the circle is constructed of iron cantilever girders, with boxes on either side, brackets from the wall being used to support the ends of the circle, while at every ten feet there is an exit from the circle by stairs 6 ft. wide. There are five means of egress from the circle, opening direct into the streets. Behind is the circle saloon, situated over the foyer, and from the saloon is a means of egress on to an iron balcony, the drop from this into the street being but 8 ft. The total seating accommodation of the theatre is for about 900. Exclusive of boxes, the circle accommodates 250 persons, while 650 are provided with seats on the ground-floor. The seats are divided into an amphitheatre, the back taking the place of the gallery; a pit occupying the middle position, and the stalls being the front seats, immediately behind the orchestra. Two separate exits are provided to each part of the house. The auditorium has a fireproof ceiling, with a dome measuring 37 ft. by 25 ft. The auditorium is 75 ft. by 44 ft., and the stage 35 ft. by 60 ft. Every precaution against fire has been observed on the stage. The flies have iron joists, with fireproof flooring; fireproof doors are used both on and off the stage, and a fireproof curtain has been fixed on the stage side of the proscenium. Over the stage roof there is a smoke shaft, the upper part of which is constructed of glass. Electricity provides the lighting of the stage and auditorium, Edison Swan lamps of sixteen-candle power being used. The contractors were Messrs. Dart & Son, of Crediton; the architect being Mr. Alfred Darbyshire, of Manchester. The contract price for the building, exclusive of the fittings, was 5,000*l*.

**The English Iron Trade.**—The tendency in the English iron market is unchanged. Prices are still running up, and business is rather more active, if anything, although at the time of writing the results of the quarterly meetings are not yet known. Trade in pig-iron is assuming larger proportions, and there have been considerable purchases of Scotch warrants, with rates bounding upwards. Scotch makers have been as eager in advancing their quotations as speculators in warrants, and from 1*s*. to 4*s*. 6*d*. more per ton is quoted by them this week. Middlesbrough pig is 2*s*. 3*d*. dearer, and Bessemer iron has advanced 2*s*. 6*d*. a ton. Lancashire and midland pig-iron has gained from 1*s*. 6*d*. to 2*s*. 6*d*. in value. Finished iron is little more than nominal in price pending the quarterly meetings, but what orders are taken are booked at top prices. Welsh bars are quoted 5*s*. a ton more. The hardening tendency of steel, for which the inquiry continues very brisk, has developed into an important rise, from 5*s*. up to 15*s*. more per ton being asked. Shipbuilding continues active, and engineers fully engaged.—*Iron*.

**New Museum in Vienna.**—A new museum of natural history has just been opened in Vienna, situated in the Ringstrasse. It has been built with funds supplied privately by the Emperor, the style being Italian Renaissance. The architects are the late Herr Sempner and the well-known Baron Hasenauer, of Vienna. The museum, which cost six million florins, will be the largest of its kind in Europe, and all the rich collections owned by the Imperial family are to be placed there. Along a balustrade by the roof, thirty-four statues of past and present sovereigns are placed, whilst above the windows in the second story medallion portraits of sixty-four more have been fixed.

**Coxwold (Yorkshire).**—The ceremony of unveiling a stained-glass window, erected by Sir George Orby Wombwell, Bart., to the memory of his eldest son, the late Mr. George Wombwell, was performed on the 26th ult., at the Church of St. Michael, Coxwold. The window is the work of Messrs. Cox, Buckley, & Co., of London, and is divided into three lights. The subject of the centre light is the Crucifixion, and the side lights are occupied by figures of St. John and the Virgin Mary. The stonework has been executed by Mr. Cornforth, of Coxwold.



**Liverpool Engineering Society.**—The first ordinary meeting of the sixteenth session of this Society was held on the 2nd inst. at the Royal Institution, Colquhoun-street. After the usual routine business Mr. Henry H. West, M. Inst. C.E., the newly-elected President, delivered his inaugural address. He referred briefly to the generosity of Sir A. B. Walker, in his munificent gift to Liverpool University College of a fully-equipped engineering laboratory, which would be opened in the course of a few days, and he also wished to congratulate the members upon the part they took in the entertainment of the American engineers on their recent visit to Liverpool, and on the progress of the Society, which now numbers six honorary members, 151 ordinary members, and eighteen students. He urged upon the members to promote by all means in their power the study and practice of engineering, which he thought was a duty they had taken upon themselves in joining the Society. A vote of thanks to the President terminated the business.

## PRICES CURRENT OF MATERIALS.

TIMBER.				
	£.	s.	d.	£. s. d.
Greenheart, B.G. ....	ton	7	0	7 15 0
Tia, B.L. ....	load	12	0	15 0 0
Segonia, U.S. ....	foot cube	0	3	0 3 0
Ash, Canada ....	load	3	10	0 0 0
Birch ....	load	3	10	0 0 0
Elm ....	load	4	0	0 0 0
Fir, Danish, &c. ....	load	2	10	0 0 0
Oak ....	load	2	10	0 4 10 0
Canada ....	load	6	10	0 7 10 0
Pine, Canada red ....	load	3	10	0 5 0 0
Lath, Danish ....	fathom	4	10	0 5 10 0
St. Petersburg ....	load	6	0	0 10 0 0
Wainsot, Riga, &c. ....	log	2	15	0 4 5 0 0
Deals, Finland, and 1st. ad. 100	load	9	0	0 11 0 0
" 4th and 3rd. ....	load	7	0	0 8 15 0
Riga ....	load	11	0	0 9 0 0
St. Petersburg, 1st yellow ....	load	11	0	0 15 0 0
" 2nd ....	load	10	0	0 11 0 0
" white ....	load	7	0	0 10 0 0
Swedish ....	load	8	0	0 16 0 0
White Sea ....	load	8	0	0 17 0 0

## CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
New Cemetery	Lymington Burial Bd.	J. Lemon	Oct. 14th	ii.
Sewerage Works	East Ham Local Board	W. H. Savage	Oct. 15th	ii.
Works at Derby, Northampton, and Appleby	M. R. Co.	J. Richardson	Oct. 17th	ii.
Pipe Laying, &c.	Methley Local Board	G. J. Skipper	Oct. 21st	x.
Supply of Cast-iron Pipes	do.	do.	do.	x.
Town Hall, Corner	Bournemouth Commrs.	F. W. Lacey	Oct. 22nd	x.
Cast-iron Pipes, &c.	London County Council	do.	do.	ii.
General Works and Repairs	Hants County Asylum	E. J. Hildred	do.	ii.
New Buildings for Water Supply	Committee	R. Rushford	do.	ii.
Surface Drainage	Aldershot Local Board	Lewis Angell	do.	ii.
Main Drainage Extension	West Ham Council	do.	do.	ii.
Railway Footbridges	Dover Town Council	do.	do.	ii.
Fountain, &c., Admiralty Buildings	Com. of H. M. Works	J. W. Cockrell	Oct. 23rd	ii.
Cast-iron Water Pipes	Gl. Yarmouth Council	B. Pomfret	Oct. 26th	x.
Making Roads and Drains, Tunbridge Wells	Katate Owner	Official	Oct. 28th	x.
Reservoirs	Mountain Ash Loc. Bd.	G. J. C. Broom	Oct. 29th	ii.
Erection of Schools	St. Helen's Health Com.	B. Byon	do.	x.
Construction of Branch Railway, Heanor	G. N. R. Co.	R. Johnson	Oct. 31st	x.
Laying Patent Stone Channel on Concrete	Mortlake Highway Bd.	H. Richards	Not stated	x.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Assistant Surveyor	St. Mary (Islington)	4l. per week	Oct. 15th	xvi.
Surveyor	Vestry	200l., &c.	Oct. 25th	xvi.
Surveyor and Inspector of Nuisances	Kettering Local Board	100l.	Oct. 31st	xvi.
	Chepstow U.S.A.			

## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

**ADDINGTON.**—For alterations and additions at "Heathfield." Addington, Surrey, for Mr. W. H. Goshen. Mr. F. MacDonald, architect.—**£230 0 0**  
Holloway Bros. (accepted)

**ALDENHAM (Herts).**—For alterations and additions to cottage, Roundbush, Aldenham, Herts, for Mr. J. S. May, London. Mr. J. H. May, architect.—**£238 0 0**  
Turner, L., Watford ..... 225  
Andrews & Sons, Watford ..... 220  
\* Accepted.

**BINFIELD.**—For additions to external portion of Binfield Park House, for Mr. Reginald Cookson, Workson Manor, Workson. Mr. G. W. Webb, architect, 14, Friar-street, Reading.—**£317 10 0**  
Binnie, Wokingham ..... 311 2 0  
G. Lewis, Reading ..... 297 0 0  
Bottrill & Son, Reading ..... 283 1 6  
Green, Binfield (accepted)

TIMBER (continued).				
	£.	s.	d.	£. s. d.
Canada, Pine, 1st .....	18	0	0	28 0 0
" 2nd .....	11	0	0	17 10 0
" 3rd .....	8	0	0	10 10 0
" Spruce, 1st .....	9	0	0	11 0 0
" 3rd and 2nd .....	7	0	0	9 0 0
New Brunswick, &c. ....	4	10	0	9 10 0
Battens, all kinds .....	6	0	0	13 0 0
Flooring Boards, sq., 1 in. prepared, First .....	0	11	0	0 14 0
Second .....	0	0	0	0 10 0
Other qualities .....	0	5	0	0 7 0
Cedar, Cuba .....	0	0	4	0 0 5
Mahogany, Cuba .....	0	0	4	0 0 4
St. Domingo, cargo average .....	0	0	4	0 0 5
Mexican .....	0	0	4	0 0 5
Honduras .....	0	0	4	0 0 5
Box, Turkey .....	4	0	0	13 0 0
Rose, Rio .....	15	0	0	20 0 0
Statin, St. Domingo .....	14	0	0	18 0 0
Porto Rico .....	0	0	0	1 3 0
Walnut, Italian .....	0	0	4	0 0 5

## METALS.

	£.	s.	d.	£. s. d.
Iron—Pig, in Scotland .....	8	0	0	0 0 0
Bar, Welsh, in London .....	8	0	0	6 5 0
" at works in Wales .....	0	0	0	0 0 0
" Staffordshire, in London .....	7	0	0	7 10 0

	£.	s.	d.	£. s. d.
British, oak and ingot .....	47	10	0	0 0 0
Best selected .....	48	10	0	0 0 0
Sheets, strong .....	56	0	0	0 0 0
Chili, bars .....	43	0	0	0 0 0
YELLOW METAL .....	0	0	0	0 0 5
LEAD—Pig, Spanish .....	12	10	0	0 0 0
English, com. brands .....	13	12	0	0 0 0
Sheet, English .....	9	0	0	0 0 0
TR—Strata .....	90	10	0	0 0 0
Australian .....	91	10	0	0 0 0
English ingots .....	94	10	0	0 0 0
ZINC—English sheet .....	24	0	0	24 10 0

## OILS.

	£.	s.	d.	£. s. d.
Limead .....	21	7	6	21 10 0
Cocconut, Coochin .....	27	10	0	0 0 0
Ceylon .....	24	0	0	0 0 0
Palm, Java .....	23	10	0	0 0 0
Rapeseed, English pale .....	30	15	0	0 0 0
" brown .....	29	5	0	0 0 0
Cottonseed, refined .....	24	10	0	29 10 0
Tallow and Oleine .....	21	0	0	40 0 0
Lubricating, U.S. ....	5	0	0	0 0 0
" refined .....	7	0	0	12 0 0
Tar—Stockholm .....	1	5	8	1 5 8
Archangel .....	0	15	9	0 15 9

**BROMLEY.**—For alterations and additions to the "Royal Standard" public-house, St. Leonards-road, Bromley, E. Mr. Charles Young, architect.—**£1,112 0 0**  
Atterton & Latta ..... 1,000 0 0  
Walker, J. .... 990 0 0  
Mower & Sons ..... 957 0 0  
Silt ..... 919 0 0  
Burgess & Algar, Bromley .....  
\* Accepted.

**GORING-ON-THAMES.**—For additions to Battle House for Mr. F. W. Nash. Mr. G. W. Webb, architect, 14, Friar-street, Reading.—**£415 0 0**  
Bottrill & Son, Reading ..... 388 0 0  
Smallbone, Strealy (accepted) ..... 397 0 0  
Higgs, Goring ..... 376 0 0  
G. Lewis, Reading

**HENDON.**—For the erection of farmhouse at Dollis Farm, Hendon. Messrs. G. & W. L. Eves, architects, Uxbridge. Quantities by the architects.—**£254 0 0**  
Brown & Sons, Howfield ..... 607 0 0  
Kearley, Kensington ..... 589 0 0  
Hardy, Cowley ..... 577 0 0  
A. & B. Hanson, Southall (accepted)

**LONDON.**—For building the St. Peter's Institute and Gymnasium, Buckingham Palace-road, S.W. Mr. B. F. C. Clarke, architect. Quantities by Messrs. S. J. Thacker & Sons:—  
Holland & Hannen ..... £11,389 0 0  
Trollope & Sons ..... 11,343 0 0  
Ashby & Horner ..... 11,190 0 0  
Mowlem & Sons ..... 10,843 0 0  
Perry & Co. .... 10,687 0 0  
Higgs & Hill ..... 10,484 0 0  
J. W. Hobbs & Co. .... 10,390 0 0  
Patman & Fotheringham ..... 10,273 0 0  
Wm. Downs ..... 10,245 0 0  
Holloway Bros. (accepted) ..... 9,912 0 0

**LONDON.**—For the erection of almshouses, Edward-street, Blackfriars. Mr. E. H. Burnell, architect:—  
Regoley ..... £4,000 0 0  
Wagstaff & Sons ..... 3,898 0 0  
Hall, Bedall & Co. .... 3,690 0 0  
J. Smith & Son ..... 3,687 0 0  
W. & H. Castle ..... 3,489 0 0  
Holloway Bros. .... 3,357 0 0

**LONDON.**—For the erection of new Mission premises, Waterson-street, E.C., for the Committee of the Leyland Mission. Mr. W. H. Bony, architect. Quantities by Mr. E. S. Gale:—  
Holloway Bros. (accepted) ..... £4,670 0 0

**LONDON.**—For rebuilding premises in Cable-street, Shadwell, E., for Dr. F. E. Turner. Mr. H. Dow White, surveyor, 15, New Broad-street, E.C.:—  
Patman & Fotheringham ..... £3,173 0 0  
Grover & Son ..... 2,668 0 0  
Mayo ..... 2,449 0 0  
Spencer & Co. .... 2,448 0 0  
Porter ..... 2,435 0 0  
Hood ..... 2,396 0 0  
Mullett ..... 2,375 0 0  
Smith ..... 2,229 0 0  
Heywood ..... 2,184 0 0

**LONDON.**—For the erection and completion of new rectory, All Saints Church, Battersea Park, for the Rev. G. Harcourt. Mr. Fredk. W. Hunt, architect:—  
Gregory & Co. .... £1,889 0 0  
W. Johnson ..... 1,857 0 0  
W. Haylock ..... 1,841 0 0  
Lathley Bros. .... 1,830 0 0  
J. Howard ..... 1,816 0 0  
Holloway Bros. .... 1,758 0 0

**LONDON.**—For alterations and additions at No. 13, St. John's-road, Clapham Junction, for Messrs. Rabitts & Sons. Mr. A. G. Hennell, architect:—  
Lacelles & Sons ..... £1,645 0 0  
Clarke & Bracey ..... 1,645 0 0  
Drew & Cadman ..... 1,614 0 0  
Holloway Bros. (accepted) ..... 1,531 0 0

**LONDON.**—For enlarging the laundry and kitchen of the Chelsea Workhouse, for the Guardians of the Poor of the parish of Chelsea. Mr. D. Carmichael, architect, 2, Westwick-gardens, W. No quantities:—  
W. Bradley, Limerston-street ..... £276 10 0  
W. Jones, King's-road ..... 830 0 0  
Edmunds, Poplar ..... 820 0 0  
Josselyn, Young, & Co., Borough ..... 650 0 0  
F. Franklin, Cheyne-walk ..... 465 0 0  
Kent, Fulham-road ..... 429 0 0  
Millward, North-end, Fulham ..... 398 0 0  
McCarthy, Oakley-street ..... 380 0 0  
Wade, Flood-street ..... 390 0 0  
G. Searle, College-place ..... 365 10 0  
H. G. Heywood, 44, Bridge-road  
Hammermith ..... 337 0 0  
Whitehead & Co., Portland Works, Clapham ..... 310 0 0

**LONDON.**—For alterations to No. 43, Portman-square, for the Earl of Camarvon. Mr. W. A. Coombs, architect. Quantities by Mr. J. O. Abbott:—  
Holland & Hannen ..... £535 0 0  
D. Charteris ..... 504 0 0  
B. E. Nightingale ..... 495 0 0  
Holloway Bros. .... 472 0 0

**LONDON.**—For new sanitary arrangements at the Century Club, 12, Grafton-street, Piccadilly, W.:—  
Holloway Bros. .... £489 0 0  
[No competition.]

**LONDON.**—For alterations and additions to St. Stephen's Viceroy, Battersea. Mr. Clement Dowling, architect:—  
Holloway Bros. .... £250 0 0  
[No competition.]

**LONDON.**—For decorative work to Hall Bank, Kensington, for Mr. R. Granichsteadt. Mr. Walter Graves, architect, Winchester House, E.C.:—  
A. Siegmund (accepted) ..... £245 0 0

**BINFIELD.**—For gardener's cottage, Binfield Park, for Mr. Richard Cookson, Workson Manor, Workson. Mr. G. W. Webb, architect, 14, Friar-street, Reading.—**£312 12 0**  
Binnie, Wokingham ..... 300 12 0  
G. Lewis, Reading ..... 300 12 0  
Green, Binfield ..... 276 0 0  
Bottrill & Son, Reading (accepted)

**BOLDRE (Hants).**—For new residence at Sandy Down Boldre, near Lymington, Hants, for Mr. J. S. May, London. Mr. J. H. May, architect.—**£2,080 0 0**  
[No competition.]

**BRISTOL.**—For the erection of the new administrative department at the Bristol Lunatic Asylum. Messrs. Crisp & Outley, architects, Clare-street, Bristol:—  
J. Reed, Plymouth ..... £45,132 0 0  
E. T. Hatherly, Bristol ..... 44,400 0 0  
H. A. Forre, Bristol ..... 40,000 0 0  
W. Church, Bristol ..... 39,488 0 0  
W. Cowlin & Son, Bristol ..... 39,455 0 0  
C. A. Hayes, Bristol ..... 39,141 0 0  
A. Lyford, Bristol ..... 38,910 0 0  
Stephens & Bastow, Bristol ..... 36,909 0 0  
A. Kraus, Bristol ..... 36,914 0 0  
A. J. Beaven, Bristol (accepted) ..... 36,000 0 0

LONDON.—For alterations and additions to No. 28, St. Leonard's-terrace, Chelsea, for Miss Margesson. Mr. T. Francis, surveyor:—  
Billington, Bennett, & Lomas ..... £286 0 0  
\*Accepted.

LONDON.—For counter and piewtering at the "Camden Head," Bethnal Green-road, for Mr. Wright. Mr. R. A. Lewcock, architect:—  
Heath & Sons ..... £185 0 0  
Huel ..... 181 10 0  
Williamson ..... 177 0 0  
Pringle ..... 175 0 0  
Thompson ..... 173 12 0

NOTTINGHAM.—For erecting a Hebrew Synagogue in Chaucer-street, for the trustees of the Hebrew Committee. Mr. W. H. Radford, architect. Quantities by the architect:—  
J. Hutchinson ..... £2,973 0 0  
W. Woodson ..... 1,938 0 0  
— Cuthbert ..... 1,839 0 0  
G. Bell & Son ..... 1,863 0 0  
W. Hatfield ..... 1,743 0 0  
E. Hind ..... 1,727 0 0  
H. Vickers ..... 1,757 0 0  
Barlow & Whitaker ..... 1,756 0 0  
Hodson & Son ..... 1,727 0 0  
A. B. Clarke ..... 1,740 0 0  
J. Wright ..... 1,703 0 0  
Kenny & Woodcock ..... 1,661 0 0  
F. Warnaby ..... 1,689 10 0  
J. Oseroff ..... 1,670 0 0  
Wheatley & Mails ..... 1,670 0 0  
J. Cooper (accepted) ..... 1,593 0 0  
[All of Nottingham.]

NUNHEAD.—For alterations and additions at St. Anthony's Vicarage, Nunhead, for the Ecclesiastical Commissioners for England. Mr. Ewan Christian, architect:—  
Holloway Bros. .... £651 0 0  
[No competition.]

PORTSMOUTH.—For additions and alterations to Haslemere, for Dr. G. Gordon Sparrow. Messrs. Rake & Cogswell, architects, Portsea:—  
Crockerell ..... £540 0 0  
White ..... 520 0 0  
Jones ..... 499 0 0  
Lewis ..... 499 0 0  
Hall ..... 478 0 0  
Scammell & Dowdell ..... 470 0 0  
Clark & Son ..... 470 0 0  
G. Beech (accepted) ..... 417 12 10

SPALDING (Lincolnshire).—For the erection of a drill and entertainment hall for the F Company, 2nd Volunteer Battalion, Lincolnshire Regiment. Mr. John R. Withers, architect, Dane Chambers, Shrewsbury:—  
John Cook, Spalding ..... £2,087 9 6  
Robert Dye, King's Lynn ..... 1,882 0 0  
E. Bowman, Stamford ..... 1,744 0 0  
O. H. Watson, Spalding ..... 1,725 0 0  
S. Sherwin, Boston ..... 1,709 0 0  
J. Fishburn, Stamford ..... 1,583 0 0  
W. Greenfield, Boston ..... 1,393 10 0  
James Leaf, Boston (accepted) ..... 1,283 0 0

STAINES.—For finishing a house at Staines, for Mr. Layton. Mr. S. M. Wayborn, architect, Windsor. Quantities supplied:—  
W. Watson, Ascot ..... £284 0 0  
Oades Bros., Egham ..... 644 0 0  
G. Reavell, Staines ..... 639 0 0  
R. Foreman, Windsor (accepted) ..... 595 0 0

UPPER NORWOOD.—For the erection of stable and coach-house at 50, Belvedere-road, Upper Norwood, for Mr. W. A. Dawson. Messrs. A. W. Taylor & Co., surveyors:—  
H. Bishop & Co., Putney (accepted) £300 0 0

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# The Builder.

Vol. LVII. No. 247.

SATURDAY OCTOBER 19, 1889.

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### Architecture from a Fireman's Point of View.



It is universally acknowledged, theoretically at all events, that it is well for all of us on occasion to see ourselves as others see us; and on this principle it is not unreasonable to

consider how buildings and building operations are regarded by those whose special business it is to provide for their protection from fire. The recent issue of new editions of two small works on this subject by the commanding officer of the London Fire Brigade,\* offers a tolerably complete presentation of the fireman's view of building. It is a somewhat curious study for those accustomed to regard buildings in regard to architectural effect or to their provision for comfort as habitations, or their convenience for the carrying on of business, to go through a treatise in which buildings are regarded entirely in reference to their possible behaviour if set on fire; and perhaps the architect, on his part, may find something to criticise in the recommendations of the fireman, over and above the general criticism that, after all, but a small proportion of buildings that are erected are actually burned, or even stand much chance of being burned (theatres excepted), and that therefore the provision against danger from fire cannot be allowed to override too much the immediate objects of architectural effect or practical convenience for working.

On the other hand, it must be admitted that the consideration of buildings wholly in regard to their probable behaviour under fire leads the author of "Fire Surveys" to incidentally touch on some defects in structure which are equally defects apart from any contingency of conflagration, but the mischief of which is specially illustrated and emphasised under the action of fire. In respect to such points the Biblical phrase, that fire shall try every man's work, assumes a new significance. The importance of having a

solid foundation and basing a wall properly upon it is certainly emphasised by the dictum of a writer of such long practical experience in the ways of buildings under fire, that the principal cause of walls "tumbling about" in a fire, thereby additionally endangering the lives of the firemen and adding to the difficulty of dealing with the fire, is in almost all cases traceable to the want of proper foundation. And in connexion with this subject the author has some bitter remarks to make in regard to what he calls the "mysterious, unsatisfactory, and most expensive process known by the vague and unmeaning title 'underpinning.'" The word, for that matter, seems to us to express its meaning well enough, nor is the process by any means necessarily either mysterious or unsatisfactory; but we have no doubt that there are not a few cases in which it is, in Captain Shaw's words, "nothing more or less than a trick or device to hide what is in every case at least a damage, and, as all firemen of experience have frequently and bitterly experienced, in many instances an imminent and serious danger." The ordinary builder and his foreman no doubt attach a kind of superstitious reverence to what they call "underpinning," which with them often amounts to no more than curing a bad foundation by carrying a wall further down into one which is no better. It is like the elephant of Hindu mythology which stands on the tortoise, while there still remains the question, what does the tortoise stand on? Captain Shaw's fling at "this process, or trick, or device" will do good if it leads any building owners (or builders) to consider the matter a little more philosophically, and to reflect that the supporting wall introduced below is not necessarily any firmer basis unless it plants its foot in turn on a firm foundation. But if that firm foundation be secured either by coming down to rock or other firm natural bed, or by adequately-executed concreting, there is no reason why underpinning should be a delusion. We quite agree, however, that to underpin a single building of a row or block while the rest "is allowed to go on in its natural process of sinking," is only likely to result in unequal settlement of the walls and consequent cracks and further weakening. In such cases, where there is a division of immediate ownership, safety can only be attained by the intervention of public authority; and when our building legislation next comes to be revised, it may be desirable to

consider whether any future form of Building Act should not regulate the conditions of underpinning somewhat more in detail, instead of merely requiring a general notice to the District Surveyor or other analogous official. If Captain Shaw's representations bring about more careful attention to this matter of underpinning and its effects on structural stability he will have done good, though it by no means follows that all underpinning is as useless or dangerous as firemen appear to suppose.

We referred the other day to the difficulties experienced at a fire in Melbourne in dealing with very lofty buildings, and Captain Shaw urges the same consideration. The risk of a building is said to be in general terms in direct ratio to its cubical capacity: so much more space, so much more chance of something getting on fire, so much more space for fire to develop, and in general so much more bulk of material for it to feed on. But beyond a certain height the fire risk increases also with the height, as the fire-extinguishing and life-saving appliances now available are inefficient or useless above a certain height. This may be added to the reasons already adduced of late for taking some steps to limit the alarming tendency of town buildings to climb higher and higher. At all events, we are told, "persons who erect high buildings should invariably make their own arrangements for getting down externally to spots within reach of the ladders or other means of escape available from outside," and this means to a height of about forty feet from the ground, beyond which height life-saving appliances cannot be counted on at present.

In regard to walls the fireman will be found to be dead against stone, as the very worst material that can be used in building. As far as the use of stone for so-called fire-proof staircases is concerned, this is now matter of common knowledge, and it is in great measure owing to Captain Shaw's representations that this has been brought about; but he comments on the fact that the law still recognises stone as fulfilling the requirements of a fireproof material for lobbies, stairs &c., and that incalculable injury has been done by this piece of legislation, which ought to be reformed without delay; for though every competent architect and surveyor knows better now, the fact remains that in London a stone staircase complies with legal obligations and the surveyor has no power to disallow it; and though every one knows now (thanks again mainly to Captain

\* "Fire Surveys, or a Summary of the Principles to be Observed in Estimating the Risk of Buildings." By Captain Eyre M. Shaw, C.B., London Fire Brigade, Third Edition. London: Edinham Wilson & Co., 1889.  
"Fires in Theatres." By Eyre M. Shaw, London Fire Brigade. Second Edition. London: E. & F. N. Spon, 1889.



Shaw's former publication of his experiences) that an oak staircase would resist fire far better than a stone one, and remain longer in a safe condition for use in a fire, yet in any public building in progress we are still liable to see the spectacle of the District Surveyor solemnly condemning and ordering out a wooden staircase and demanding the substitution of a stone one, according to law. This is one of the matters which the County Council will be expected to look to before long.

It can hardly be expected that architects will accept Captain Shaw's dictum that "copings, balconies, cornices, or other projections should never be constructed of stone, as this material is certain to fall down at an early stage of a fire, and is likely to kill both persons endeavouring to escape and those coming to render aid." This is the fireman's view of architecture with a vengeance: that because a building might some day be burned, and in that case stone cornice blocks or corbels would fall, therefore all buildings are to be shorn of whatever architectural enrichment and effect is to be gained by oversailing stone work. That is an example of the unreasonableness of specialists, who can see things from no point of view but their own. The caution that walls constructed of stone alone are often found to stand better than those of stone with brick backing is more to the point; the different behaviour of the two materials under fire may have an even worse disintegrating and twisting effect than results in a wall entirely of stone. Captain Shaw's opinions about the bonding of walls are much open to question. In "Fires in Theatres" he remarks (page 6) that "it is a great mistake to have a number of internal walls merely touching the external ones, and not bonded into them or in any way contributing to the support of the structure." Where has Captain Shaw seen walls built thus? From another passage, however, in "Fire Surveys" we gather that the fireman's notion of bonding one wall into another is that "an external wall should be firmly tied to party and return walls by strong wrought-iron anchors, of sufficient strength and number to keep the whole of the building firmly fixed without the assistance of floors, roofs, or internal ties of any kind." The fireman's great desire is that the walls should be independent of floors, so as not to collapse when floors fall in; and he wants to be sure that the front wall will not part from the cross walls during fire. Now if we were providing for a building which was probably to be burned in a year or two, Captain Shaw's "anchors" might be accepted as an additional security against the parting of the walls; but as after all we construct buildings with the intention that they shall last many years and not be burned, we should object to the "anchors" as introducing an element of decay into a structure otherwise of permanent materials. Captain Shaw is alive to the danger of wood bond, but sees none in hoop iron bond or in his proposed "anchors;" but iron is always an element of decay in a wall; and besides, if the wall gets greatly heated in the fire, the iron within may itself get heated sufficiently to act as a destructive agent in cracking and twisting the wall. Ordinary brick bond may no doubt be insufficient, from the fireman's point of view, between walls meeting at right angles; but a stronger bond than the iron anchors, and one not liable to be affected by fire, might be formed by employing long tailing-pieces of concrete every few courses, built in cement into the cross wall and with a short cross-head, formed in the same piece of concrete, bedding on the front wall, and even (for greater security) with square joggles formed on the under side to tooth with the courses of bricks. The tensile strength of the concrete blocks would not support the weight of the outer wall if applied vertically, of course, but it would be ample to prevent the wall settling out of the perpendicular and away from the cross walls in the first instance, and it would form a permanent element of strength in the wall. That is how we should provide against the fireman's dread of the walls parting, and he might go safely on brick walls

thus bonded. But metallic bond is mainly the resource of careless and cheap building: scamp the wall, and then tie it up with bandages. No good comes of that.

In reference to this question of stability of walls Captain Shaw wonders why strength in a long wall is not often sought by building it on a zig-zag plan. There are many cases, he thinks, "in which the loss of space, loss of material, expense of construction, and inconvenience of approach, would be much less with a thin zig-zag wall than with one of those massive costly walls so commonly found, with enormous buttresses blocking up approaches and occupying space." Probably the principal reason against it is that, in spite of the opinion expressed in the above quotation, a wall so built would be regarded by most people as ugly externally and inconvenient internally. We know of one instance of this construction being employed in the side of a large saloon, by a gentleman who was "his own architect," in a building which actually was burned, and where Captain Shaw and his gallant band "assisted" at the catastrophe; but how that wall behaved under fire we did not learn. The idea however is one to be kept in mind, for it may be convenient in some situations, and moreover it has its architectural possibilities. In regard to the relation between floors and walls, the fireman's view is that floors should be quite independent of walls, and he is apparently as anxious that floors should not be bonded into front walls as that cross walls should be. As long as the floors are of materials inflammable or liable to be twisted or injured by fire, this is quite right; they must come down, and in coming down they tend to pull the walls down. But with floors which are as fireproof as the walls (and floors can certainly be made so now), the building of the floors into the walls ought to be a great source of strength to the whole structure in fire. But the whole matter of fireproof floors is passed over in this recently-published new edition of Captain Shaw's book with the most extraordinary indifference. There is a great deal said about the various species of wall that stand fire best, but little or nothing as to the various important forms of fire-proof flooring which have been brought out of late years, on which the opinion of the fireman might be of value. We are urged to arrange buildings so as to "divide the risks" as much as possible, i.e., to divide the building into separate compartments so that fire beginning in one of these cannot easily spread to another; but all this is said apparently in relation to horizontal division only, and the immensely important aid in subdividing risks which may be afforded by fireproof floors built into the walls is practically ignored. This looks as if the production of the new edition of the book had been carried out in a somewhat perfunctory manner, and without much trouble to bring it up to date in regard to the present possibilities of fire-resisting construction. The new edition of "Fires in Theatres" seems to be similarly not brought up to date. There is a great deal in it as to the possibility and importance of shutting off the stage section from the auditorium, and about the arrangements to be observed in the stage section for minimising fire risk; but there is no reference whatever to the absolutely new construction of several theatres lately with incombustible materials in the auditorium; an important move in the direction of fire-resistance (whether best for acoustics is a separate question) which seems really to have escaped Captain Shaw's notice. At all events, he practically ignores it.

It is worth note that the author states that, when it is impossible to fix iron doors to cut off communication, light revolving iron shutters, which can be drawn whenever the opening is not in use, are a considerable check to the passage of fire, and worth fixing with that object. In reference to iron, it is stated as a matter of fact and experience that solid iron columns are much more capable of resisting the effect of heat than hollow ones, a result which we should think by no means

improbable; but which need hardly be regarded as affecting the usual form of construction of cast iron columns, inasmuch as no one who knows what he is about would now depend on iron columns of any make in a building which he wished to regard as fire-resisting. The at first sight rather extraordinary recommendation that "circulation of air should on no account be permitted in any part of a building not exposed to view, especially under floors" &c., means really, we presume, that there should be no concealed spaces; an opinion we expressed not long since on sanitary grounds; and we find that Captain Shaw, from his point of view, is as critical as we were, for slightly different reasons, in regard to the evil of leaving between the roof and the ceiling "a large space to which access is difficult, and which may consequently conceal the elements of danger until they become serious"—a sentence as true in regard to danger from fire as to danger from accumulations of unhealthy matter. "It is difficult to understand," Captain Shaw sarcastically adds, "the principle on which those persons act who, after constructing and covering in for themselves a building of a certain size, deliberately deprive themselves of the use of a large portion of it." The principle on which they act is the principle of the truss; and there are cases where, while this principle is constructively necessary for spanning the space, it is not convenient, either as regards warmth or appearance, to leave the roof open to the rafters; but we entirely concur, and have already expressed our strong opinion, that these roof spaces should always be easily accessible, and sufficiently lighted to see what is going on there. In most cases they could be turned to practical use with but little extra expense.

A great portion of "Fires in Theatres" is historical, and in that sense of considerable interest, though not exactly coming into the scope of this article; and of course a good deal of the ground in regard to fire-resisting construction is covered by the general recommendations in "Fire Surveys." In regard to other considerations, two or three points present themselves as prominent. One is the employment of firemen in theatres, in regard to which Captain Shaw rightly condemns, and contemns, the device of merely dressing an ordinary workman in a special costume and calling him the fireman; but he is rather inconsistent in his recommendation as to what should be done. He says he has pointed out to managers three courses, (1) the attendance of a staff of public firemen at the managers' cost; (2) the permanent hiring of properly-trained men to act as firemen; (3) the appointment of skilled firemen to confidential posts in the theatre,—killing two birds with one stone, in fact. But almost in the same breath he admits that the cost of the two first systems is prohibitive, and all he can say for the third is that there are objections to it on the part of managers which "ought, if possible, to be overcome." In regard to fire-resisting metal curtains between the audience and the stage the author rightly says that "in the present state of mechanical skill and knowledge it is simply monstrous to say that the thing is impossible"; that it is easy to make and fix a curtain that fire would not get through for an hour, more than time for saving the audience. Such a curtain should in our opinion be down before the opening of each performance, so as to ensure that it is in working order; it need not be used for the acts; it is sufficient that it is lowered and raised before each evening's performance. In regard to further means of shutting off fire, the author recommends not only the new usual iron doors between the stage section and the auditorium, but iron doors between the auditorium and the lobbies, which latter, with the staircases, should be sufficient to contain all the audience who can be seated within the house. He speaks of the security given by "immediate exit" from the auditorium into the lobbies, with these doors closed behind the retiring audience; but then that word "immediate" raises the question as to the



movements of the audience themselves. As Captain Shaw says, if one man at the top of a theatre heard an alarm of fire he would run down and save himself easily, and "at first sight there appears no particular reason why a great many should not be able to do so as well as one." The difficulty is not only in the tendency to excitement, which Captain Shaw refers to, but in the fact that the movements of a heterogeneous crowd are not even or rhythmical. If they could, under any word of command, assume a uniform pace and formation, they would be out nearly as quickly as one man. We remember much admiration being excited by the manner in which the commander of a company of volunteers got his men into the train one year for the Easter Review. The men were formed four deep and halted parallel to the train; at a word of command each alternate rank entered a carriage and occupied the front seat; at a second word the remaining fours entered and occupied the back seats. Two or three hundred men might be got into a train well under a minute in this way; the same number as an irregular crowd would be twenty minutes over it. However, we cannot apply discipline to a heterogeneous crowd on the instant. Captain Shaw's proposal for breaking up long passages by barriers, at such distance as would include fifty people between each, is a kind of step in the direction of an enforced discipline; one person only being able to pass at a time, there could be no great and increasing pressure in any section. There would be a great deal of grumbling at the barriers under ordinary circumstances, and it may be argued that in a fire they would be a serious impediment to quick exit; but the supposition is that the theatre is so constructed as to leave plenty of time, and the real danger then is from a rush. We commend to the builders of theatres Captain Shaw's remarks on staircases; on the use of handrails, in passages as well as staircases, as affording a chance of checking a rush and preventing falls; on the value of turns in staircases, and the danger of a long straight staircase, a feature to be found in some of the most recent and advanced theatres, and which we have always regarded with suspicion.

The theatre book, in spite of the omission to take into account the latest manner of construction, is an admirable one. But we think that "Fire Surveys" required a good deal more re-editing than it has received, and that before another edition is called for the author might do well to discuss some of the matters referred to with those who have more scientific knowledge of construction than he would probably lay claim to.

**The Improvements in Naples.**—Naples seems at present likely to be quite an Eldorado to architects, builders, and artisans, in fact, to all concerned in building. Everywhere demolishing, planning, and rebuilding goes on. As an example of the extent of the operations it may be mentioned that the work of demolition will extend over an area of one million square metres, whereby 271 thoroughfares will disappear, making room for 127 new broad ones. Simultaneously sixty-two churches and chapels are being pulled down and 7,100 private houses. This will necessitate the removal of some 87,000 persons from their present dwellings. New and healthy dwellings will be provided for them on the site, which will cover an area of 375,000 square metres, whilst 424,000 square inches will be laid out in streets and open spaces. Among the new streets the plans show a very long one running through the central part of the new quarter crossed by fourteen others, besides open squares with fountains and gardens. However, the most sweeping improvements are those carried out in the poor quarter, —Vicario, Porto, and Mercato, —whose dark, narrow, and unwholesome alleys have been a stain upon the reputation of Naples. The whole of the harbour quarter, for instance, where the dregs of the population are found, is being swept away, this part having hitherto constituted a hot-bed of disease. It is estimated that the carrying out of the improvements referred to will occupy over five years.

# PAVING-STONES AT THE PARIS EXHIBITION.



## NE of the "Ville de Paris"

Pavilions at the Great Exhibition, amongst many other objects of interest, contains a stand showing divers materials used for paving the French metropolis. This exhibit, together with the models of two machines, close by, for testing the resistance of paving-stones to abrasure, have been briefly described in our columns on a previous occa-

sion,\* and these supplementary remarks are merely intended to give some details of the general appearance and "coefficient d'usure" of each principal kind of stone. The object of the exhibit, we suppose, is mainly to present some idea of the relative value of the various materials for paving and macadamizing, as derived from experiment; and the following table is constructed from information written on the specimens of stone referred to in it, except in regard to colour and grain, which were obtained from a close examination of the materials themselves:—

		Colour.	Grain.	Coefficients of wear.
Normandy.	GRANITES:—			
	Flamanville ...	pink	coarse	2.23
	Montjoie ...	grey	fine	2.36
	Vire ...	"	medium	2.11
	Ste. Honorine ...	"	fine	2.85
	La Varenne ...	"	"	2.56
	Courcy ...	yellow	"	2.31
	Montour ...	grey	"	3.12
	Laubelin ...	dark grey	"	3.41
	Louvoigne ...	grey	medium	2.33
Brittany.	Longéal ...	"	fine	3.08
	Kersanton ...	dark grey	very fine	4.30
	Laber ...	pink	coarse	2.41
	Fyrie ...	grey	"	2.59
	St. Briac ...	"	medium	2.27
	St. Marc ...	"	fine	3.14
	L'ile Grande ...	pink	"	4.09
		grey	coarse	3.27
		dark grey	medium	1.78
	Bonnemain ...	"	fine	2.44
Vosges.		"	medium	2.17
		light grey	very fine	1.51
		"	"	1.82
	St. Amé ...	dark grey	exceedingly fine	1.57
	Staingigoutte ...	light grey	fine	1.35
	Hautgrain ...	dark greyish pink	"	1.26
	Rain d'Autrey ...	light grey	coarse	1.52
	Rain de Storyes ...	light pink	fine	1.15
	Lagraine ...	dark grey	"	1.39
Auvergne.	St. Remy ...	grey	medium	1.74
	Fayet ...	"	"	2.76
		"	"	"
	St. Raphaël, Var. ...	bluish grey	fine	1.75
		very dark grey	very fine	4.08
		grey	fine	2.40
	Courzieux, Loire ...	"	very fine	1.41
	Luzy, Nièvre ...	brownish pink	medium	1.93
		greyish pink	"	2.35
	Drammen, Norway ...	"	fine	1.99
Belgium.	Artificial granite of Baron de Vaux ...	light grey	medium	6.02
	Guernsey, Channel Islands ...	black	very fine	2.44
	Aberdeen, Scotland ...	dark grey	fine	1.60
	Mountsorrel, Leicestershire ...	light grey	medium	1.77
	Quenast, Belgium ...	pink	"	1.36
		dark grey	"	0.72
	SANDSTONES:—			
	Westlinshoffer, Vosges ...	red	fine	1.03
		yellow	"	3.54
		light grey	"	6.64
	Jouvells, Haute Saône ...	"	very fine	1.18
		dark grey	"	1.17
	Jeumont, Nord ...	"	"	1.74
	Avesne, Do. ...	light grey	"	1.54
		brown	"	1.90
	Tourcoings, Do. ...	bluish grey	"	0.93
Norway.	Heryes sent Hayles, Ardennes ...	light grey	fine	0.97
	Vierzon, Cher ...	yellow	"	2.65
		light brown	very fine	1.15
		"	fine	2.68
	St. Chéron, Seine et Oise ...	"	very fine	0.94
		"	fine	1.95
		light grey	very fine	0.89
		greyish brown	"	1.68
	Marbchaux ...	red veins	"	0.47
	May (quartzite), Calvados ...	brownish yellow	fine	0.62
Belgium.	Rouesse (Do.), Mayenne ...	light grey	very fine	0.66
	Couptrain (Do.), Do. ...	brown	"	0.69
		dark grey	very fine	1.83
	Dinant ...	greyish yellow	"	3.34
	Evieux ...	dark grey	"	3.10
		greyish yellow	"	3.45
	Ourthe ...	grey	"	2.88
	Anseremme ...	dark grey	"	1.44
	Huy ...	pink	"	1.17
	Pépin ...	grey	fine	1.14
Norway.	Drammen ...	dark grey	very fine	1.63
	Holmestrand ...	greyish yellow	"	0.94
	Siemmesstad ...	dark grey	"	2.07
		"	"	"

Several limestones and crystalline rocks, other than are alluded to in the above table, are also exhibited, but, from their minor importance, we have not thought it worth while to mention them.

Many of the stones called granites are, as usual, not true granites; the more correct definition of the whole would have been "ig-

neous rocks." This is especially noticeable in regard to the dark grey stones from Kersanton and St. Raphaël, which bear some of the highest coefficients on the list. We could not, of course, subject them to an exact analysis, but they did not appear to be granites at all; and we may remark that, although the

\* The Builder, vol. lvi, (1888), p. 44.



above table is useful in a certain sense, yet, like all information of the same class, it is very one-sided. For paving in the interior of large buildings, no doubt some idea could be gained from such experiments; but it is very misleading to suppose that this can also apply to outdoor work. The resistance of stones to the wear and tear of street traffic does not altogether depend on the hardness and cohesion of their constituent minerals. The hardness of a mineral is not a sure index of its durability, neither does it prove much in regard to applicability for road-metalling and the like. Many hard minerals weather with comparative ease, whilst several, also, are extremely brittle. For macadam and paving (especially the former) this last property is very undesirable. No matter if a stone be composed of the hardest and most durable minerals, if it has much tendency to cleave, and, above all, if it be brittle, it is no good for road-metalling; for this last purpose, the stone must be tough, and toughness is not necessarily accompanied by hardness. It is extremely difficult to ascertain the toughness of a rock: it is possessed to be done in laboratory experiments, but we think these are not, in this case, the best guide. It is true the cohesion of minerals, or particles, can thus be relatively determined, and the "crushing strength" arrived at, as nearly as may be. But the steady pressure of machinery is very different to the action of traffic, to which macadam and paving are subjected. The stones used for these purposes are suddenly called upon to bear enormous weights, which are withdrawn as unexpectedly as they came, and during the process the pieces of rock undergo an uncertain, uneven, grinding action, both against the vehicle (or what not) passing over them, and against each other, so that if they are not very tough they soon snap. One of the qualities of paving-stone is that it should not wear "slippery," and it would be useful if the experiments could have given any information on this head.

This leads us to perceive that the coefficients, or statistics derived from experiment, are of very little practical value. We do not say this in disparagement only of the exhibit of the Municipality of Paris now under discussion; all things of the kind must necessarily come under the same category.

It would be desirable to know whether the pieces of stone on view are, as nearly as possible, of the same composition and structure as those from which the results of the experiments have been deduced, and whether they are fair samples, because if so, nothing could be more misleading or detrimental to the more extended use, in France, of the British true and homoradic granites exhibited, than the results recorded on the stones from Guernsey, Aberdeen, and Mountsorrel. We take special exception to the Aberdeen stone, which, although it certainly came from that district, is not at all typical of the normal material quarried.

The name of the quarry is not appended to every stone, as it should be, to be of any use whatever for practical purposes; and this, again, is common to nearly all exhibits of the same character. Good and bad stones are, as every one knows, found in all quarrying districts, and, in justice to the materials, it is imperative to record on them the name of the quarry, and, in the case of sandstones and limestones, the level in it also, from which the specimens experimented upon were respectively taken. It is not sufficient merely to give the name of the district. For trade purposes it is only human to institute unfair comparisons, though we would not attribute any motives of this nature to the exhibitors of the stand in the Pavillon of the Ville de Paris; yet it is strange that such stones as those from Quenast, in Belgium, and most kinds from Guernsey and Mountsorrel, which are acknowledged by all practical people to be amongst the best materials for paving and macadam in the north-west of Europe, should come out at such low coefficients of wear and tear, even with laboratory experiments. The reason is partly explained if the samples dealt with were not representative.

From the preceding remarks it will be gathered that we believe the principal use of the table of coefficients will be found in regard to the employment of paving materials for interiors, and this especially applies to the results on sandstones; and, if they do nothing else, the samples of rock exhibited by the Municipality are sufficient to convey some idea of the sources, nature, and variety of the paving-stones used in the French metropolis.

#### NOTES.

**T**HE Board of Trade inquiry into the railway classifications was opened at the Westminster Town Hall on Tuesday, and this question has, therefore, just entered upon a most important phase. The opposing forces may now be said to have joined issue, after a great deal of preliminary skirmishing. Lord Balfour presided at the meeting, which was convened for the purpose of settling the mode of procedure. The railway companies have secured the services of a number of eminent counsel—including Mr. Pope, Q.C., and Mr. Littler, Q.C., who so ably conduct cases before the Railway Commission,—and these gentlemen and others having spoken on behalf of the railway interest, and Mr. Balfour Brown in the name of the Mansion House Committee and other objectors, a "plan of campaign" was decided upon. The opening is to be on the part of the railway companies, the London and North-Western Co.'s schedule being first considered, and afterwards another (probably that submitted by the Great Western Railway Co.) selected by the remaining companies. Thereafter the objectors will be heard, the intention being to conduct the proceedings in a manner analogous to that adopted by Private Bill Committees. It had been announced that the first subject for discussion would be the question of terminals; but Lord Balfour on Tuesday requested that the whole case should be submitted at the outset. It is also desired that the objections shall be amalgamated as far as possible, and a good deal has been accomplished in this direction in the last few weeks. Only on Monday last the agriculturists, as a body, appointed a Committee to act on their behalf, twenty-seven County Councils and other bodies being represented. The Railway and Canal Traders' Association, the Mansion House Committee, and other bodies, seem disposed to act in concert, and many individual objections will doubtless be merged in those of such organisations. A number of trading and other Associations in Ireland were also formed into a central body last week, and such co-operation will, no doubt, facilitate the proceedings,—which are to be resumed on the 29th. Both sides have, therefore, a little more breathing time, after which the sittings are to be each Tuesday, Wednesday, and Thursday.

**T**HE scheme submitted by the Improvements Committee of the London County Council for the long and sorely-needed new street from Holborn to the Strand has been, for a time at any rate, comfortably shelved, as will be seen by the report which appears in another column. Urgently as some such new street is needed, we cannot altogether think that the plan submitted by the Committee, and which we reproduce on another page, is as perfect as it might be, and a little further delay and consideration will, we hope, result in some improvements of the plan before the work is entered upon. The new street, as will be seen, starts from Holborn mainly on the line of Little Queen-street, crossing Great Queen-street east of the Freemasons' Hall; but no provision seems to be made for widening Southampton-row, which would be the northern continuation of the proposed new street. Nor is the way in which the southern end of the street debouches upon the Strand, at the eastern corner of Catherine-street, at all satisfactory,—especially if the proposed works at the corner of Wellington-street,

rounding off the approach from the Strand to Waterloo Bridge, are to be abandoned, as was stated by Mr. Clarke to be the intention of the Improvements Committee. The scheme was shelved mainly on two grounds,—firstly, on the ground that due consideration had not yet been given to the question of housing the poor who would be displaced by the demolition of the property required for the scheme; and, secondly, because it is the feeling of a large section of the Council that no such improvements should be carried out until the incidence of rating be so altered that the ground-landlords or owners, as well as the occupiers of property, are made to contribute to the cost of such works. Many of the Councillors are so thoroughly imbued with this view that when it was urged, in support of the adoption of the Committee's report, that the Council had already agreed to apply for powers to proceed with the widening of the Strand by removing the Holywell-street block, and that it would be well to proceed with the two improvements *pari passu*, strong disclaimers were put in by member after member, who explained that though they had voted for obtaining power to widen the Strand, they certainly should not vote for the carrying-out of the works unless they also had power to make property-owners contribute to the cost of such improvements. In view of the present and prospective burdens upon the London ratepayer, Mr. Marks was bold enough to suggest that possibly some day the Imperial Government would help with Imperial funds in defraying the cost of London improvements, for, he urged, London was the only great capital in Europe which owed nothing to its Imperial Government for the vast improvements of the last half-century. This suggestion was scouted by some subsequent speakers as "a humiliating proposal," and we fear that Londoners will not find a solution of their difficulties in that direction.

**T**HE competition for the National Monument to be erected at Berlin in memory of the Emperor William, to which we alluded lately, has resulted in the award of six premiums,—two first and four second,—to the following gentlemen:—500*l.* each to Messrs. Rettig & Pfann and Mr. Bruno Schmitz, all of Berlin; and 150*l.* each to Mr. Hildebrand, of Florence, Mr. Hilgers, of Charlottenburg, Messrs. Schäfer & Ferber, of Berlin, and Messrs. Schilling & Grabner, of Munich. The drawings and models are now on view, and attract large crowds.

**D**R. WALDSTEIN'S catalogue of the Cambridge Museum of Casts, just published by Messrs. Macmillan, should interest a wider public than that to which it is primarily addressed, *i.e.*, the undergraduate students of archaeology. The Cambridge casts are so admirably representative of the various epochs of Greek art that a catalogue of them becomes in effect an excellent primer of the subject. It places before the student the *facts* of this study with less intermixture of opinion than the ordinary hand-book. The Cambridge catalogue cannot, of course, attempt to rival such a work as the *Bausteine* of Friedrichs and Wolters, which, though it is ostensibly merely the catalogue of the Berlin Cast Museum, is in effect the most comprehensive manual of Greek sculpture extant. Like this work, Dr. Waldstein's catalogue gives abundant reference to the literature of the subject,—a literature very easily accessible to the Cambridge student, for the Archaeological Library immediately adjoins the Cast Museum. The catalogue also mentions the best illustrations of each of the various sculptures. Dr. Waldstein's unique position as Reader in Archaeology at Cambridge, and at the same time for one term in each year resident Director of the American School of Archaeology at Athens, give him special facilities, of which he is not slow to avail himself, for that touch-and-handle knowledge of originals so essential to the compiler of a catalogue.



ONE of the most interesting of the ancient buildings of Florence is the palace of the *Arte della Lana*, a building which was originally in the possession of the *Compibbi*, one of the most powerful families in the age of civil discords, and was later on given up as a residence to the corporation of the *Arte della Lana*. It underwent some alterations in order to be used as the residence of the *Arte*; for instance, all the first floor was transformed into one grand hall, in which the audiences granted by the provosts and the meetings of the guilds took place. Fortunately, this palace has been declared, after a long discussion, a "public monument," and is not, therefore, comprised in the number of buildings fated to destruction. It is proposed to insert into the north wall of the building some of the remains of ancient doorways of buildings connected with the *Arti* of Florence; the doorway of the *Arte dei Brigattieri e Linaiuoli*, that of the *Arte degli Albergatori*, the coat of arms of the *Arte dei Medici e Speziale*, &c. The interior of the *Arte della Lana* is to be made a museum of art and archaeology.

THE fine twelfth-century cathedral of Freyburg, on the borders of the Black Forest, has of late shown serious signs of decay, especially in the tower and spire, which together reach a height of 385 ft. A commission, consisting of four architects, namely, Von Schmidt, of Vienna; Von Egler, of Stuttgart; Durm, of Carlsruhe; and Denzinger, of Munich, having been appointed to examine and report, these gentlemen have just published the result of their examination and the steps which they advise should be taken to prevent further mischief. We are informed that amongst other items they propose to reduce the height of the spire by some 50 ft., to replace the heavy, wooden frame for the bells by a light iron one, and to open up the east end of the choir by the demolition of the houses now built against it. The cost of these several measures is estimated at from 100,000*l.* to 150,000*l.*

THE outbreak of diphtheria at Uxbridge again emphasises the necessity of constant need of all sanitary precautions in regard to water-supply. As there is to be an inquiry into the matter by the Local Government Board, it is to some extent an assumption that the cause of the outbreak is the water-supply. But it appears to be the opinion of the Local Board that therein is the beginning of the present epidemic. At a recent meeting of the Board, a letter was read from a person who had been clerk of the works when the water-pipes in the district were laid down some thirty years ago. In it he states that "I only gave most of the materials to last twenty years . . . as most of the service-pipes were laid for quickness and convenience, some very deep, and others shallow; and in some cases, if one pipe did not reach to another on the level, it had to be bent or elbowed to the bottom, and where the soil contained water or soakage the decay has taken place at the bottom, in fact perished, and now, of late, the water-supply is so often turned on with force, that the scales of iron fall off, and cause great leakages. . . . Of this one thing I am certain, that a very great portion of the former works requires renewing." We see no reason to suppose that this statement is not quite correct. But if so, it shows in what a fool's paradise the people of what is almost a metropolitan suburb have lived, materials only intended to last twenty years being still in use for years after that period, with the result that sickness and death have grown rife. This state of things shows that constant examination of the water and sanitary works of a district is just as necessary as the proper supervision of the works in the first instance.

IN Dr. Greswell's report to the Local Government Board on the Sanitary Condition of Cradley, in the Rural Sanitary District of Stourbridge, in reference to a recent

outbreak of enteric fever there, the following conditions of drainage are noted as characteristic of a district which "has been long known to the Board for grave sanitary shortcomings and filth diseases":—

"The Highway Authorities have laid down during the last ten years some three miles of 9 in. and 12 in. socketed pipes, for drainage of all the chief roadways not previously drained. Old brick-and-mortar culverts, about 2 ft. in diameter, still, however, remain in use in Cradley proper (in the High-street, Butcher's-lane, and New-street). The new pipes are not cemented at the joints, and neither they nor the culverts have their inlets trapped. Road gullies are not provided with catchpits. For about a half of the dwellings there are channels by which liquid refuse may find its way to these conduits, but most of the channels are circuitous,—mere tracks upon the surface, cut by the sewage in the loose soil, or bricked gutters, many or most of them only dry-sterned; a few are covered, and these are commonly faulty as to the mode of their construction, trapping, and ventilation. . . .

Half or so of the house-sewage, as well as filth from a few water-closets and slaughter-houses, passes into the highway drains, which ultimately discharge directly or indirectly into the river. These drains frequently become silted up in wet weather, owing, it is said, to the large amount of road detritus washed into them. This is formed in abundance from the slag of the iron-furnaces, which is used as metal for the roads, and it is carried off into the drains, there being, as already said, no provision at the gully inlets for intercepting solid matters of this sort. Four of the main highway drains were blocked in this way quite recently, three of them at the time of this inspection. House-drains also are frequently blocked, owing to a similar cause, and then, as in instances which came under my notice, a sewage swamp ensues, and extends over several adjacent premises. It should be stated also that there is no public paving in the district; in the chief places there are kerbing and irregular channelling, but the footpaths are uneven, and, consisting, as they do, largely of ashes and slag, they add their quota to the sediment which tends to block the drains.

In cases in which liquid refuse from the house is not disposed of by way of the drains—and this holds of, perhaps, a half of the total,—it is thrown on to the premises to soak, if it can, into the ground, or else to form swamps."

In regard to the water from the old town well, there is an observation which illustrates the difficulty of persuading the poorer classes, in country districts especially, to act on sanitary advice when it is given them. The polluted character of this water had been the subject of frequent warnings from the Medical Inspectors of the Local Government Board, and the Vicar had told the people, in the pulpit and elsewhere, that those who drank this water "were drinking dead men's bones"; but the water continued in use.

IN Dr. Parsons' report to the Local Government Board on an epidemic of diphtheria in the Sowerby Bridge Urban Sanitary District, some well-known old sins in drainage appliances are credited with part, at least, of the mischief. It should be mentioned also that in Sowerby Bridge "back-to-back" houses predominate, and a large number of the houses have no open space belonging to them. Concerning the drainage, the report gives the following among other statistics; and points out the manner in which, in addition to other and well-recognised objections to back-to-back to houses, this method of building increases the difficulty of proper placing of pipes for drainage from the interiors:—

"The houses in Sowerby Bridge are provided almost without an exception with indoor slopstones, and the discharge-pipe from the slopstone, in the great majority of cases, is connected directly with the drain. The attention of the Local Board was called to the danger of this arrangement at my visit to the district in 1886 in connection with the cholera survey, and in houses built since then the slopstone-pipe has been made to discharge in the open air, but little has been done towards getting a similar plan adopted at houses built before that date. The slopstone-pipes are usually furnished with an S-shaped trapping bend, affording a water seal between 2 in. and 3 in. in depth; but some were found untrapped, or provided only with bell-traps, here as elsewhere usually broken or out of place, so as to allow drain-air to come up into the house. In particular instances also where the slopstone-pipe seemed at first sight efficiently trapped, opportunity was found to exist for the escape of drain-air into the house below the trap, from holes in the imperfectly-soldered seam of the leaden pipe,

or from faulty connexion between the latter and the drain.

One of the disadvantages of the back-to-back plan of building houses as practised in Sowerby Bridge, is the objectionable position in which the slop-stone is often placed in houses of this kind. In Sowerby Bridge the usual positions are:—First, in a cupboard next the fireplace; here the warmth promotes decomposition of any putrescible matter which may cling to the slop-stone, and effluvia therefrom can pass to the upper shelves of the cupboard, which are used for keeping such things as plates, cups, and saucers, and sometimes articles of food. Second, in a cellar-band or stairfoot at the back of the house against the centre party-wall: these places are dark and unventilated; the pipe cannot be made to discharge in the open air, and any effluvia from the sink find their way into the living-rooms or bedrooms, or into the places where food is kept. Third, in the cellar; a position more or less liable to similar objections. Owing, also, to the way in which the houses are built one above another, the waste pipe from the slop-stone in an upper house is often carried through a lower one."

WE have received from Mr. T. Jones, teacher of engineering science at the Central Board School, Manchester, a very useful set of small sheets containing diagrams,\* notes, and formulae in reference to leading problems of mechanics and mechanical construction, accompanied also by some very ingenious cardboard working models of slide-valves. The sections of cylinder, steam-ports, and valves are drawn and filled in black in the sectional parts, the valve portion being on a separate slip of card which works backwards and forwards in slots, with small metal clips as guides; the head of the clip forms a small button for moving the slide. The student can thus set the valve in the various positions for steaming, expanding, exhausting, &c., and its connexion with the cylinder in each position is visibly shown, much more completely and intelligibly than by a series of diagrams of the various positions.

THE second Pastel Exhibition at the Grosvenor Gallery contains no doubt a good deal of clever work and some charming things, but also a good deal that is vulgar artistically, if not in other senses. In regard to some of the best works there, too, there seems to be rather too much of the attempt to give to pastel the look of a finished picture, to imitate an oil painting in short; whereas the real power of this method is shown rather in sketches of brilliant colour effect. Mr. Scholderer's portrait of "Miss Breul" (25) in walking-dress is certainly a success, though the costume is the most successful part of it, the texture of the medium lending itself exceedingly well to the representation of the textures of the particular costume selected; the colouring and modelling of the features cannot compare with that possible in finished oil or water-colour painting. Mr. Hacker's portrait called "Mauve and Gold" (40) is a far better exemplification of the real province of pastel,—of what it can do better than any other medium; but of this class of work there is far too little in the room. One attempt at a gorgeously-filled flower-garden (236) has a sadly worsted-work effect, even at the height at which it has prudently been hung; and Mr. Holman Hunt's head of "Mr. R. Martineau" (123) is a still sadder exemplification of this mistake, and looks painfully like a hair-dresser's advertisement. M. Emile Levy's "Jeune Fille en costume Japonais" (106) is a good work; his study of a little nude child (68) illustrates on the other hand the shortcomings of the method. Among the landscape sketches that bring out the true properties of pastel may be named, Mr. Llewellyn's "The River Camel—Padstow" (35), though the water in the foreground is very wool-worky, but the middle distance is fine; Mr. Peppercorn's "Hay Wagon" (79); Mr. Amonier's "Strayed Flock" (141), on the edge of a chalk quarry; Miss Lucas's "Loch Fyne" (187), &c. Mr. Vigor has made a beautifully refined portrait of "Mrs. Tennant" (155), but here again, though the pose of the figure is admirable, the costume represents the prominent part of

\* Published by the Author at 27, Barton-street, Moss Side, Manchester.



the work. It is characteristic of an English exhibition that there is so little attempt at poetic suggestion in slight studies, for which this medium is so suggestive, or should be; but it is nearly all plain prose,—sometimes very plain prose indeed, for some of the large portraits exhibited are absolutely ugly besides being vulgar in sentiment, and no better can be said for them than that the artist has achieved a certain kind of coarse realism.

#### THE LONDON COUNTY COUNCIL.

THE ordinary weekly meeting of the London County Council was held on Tuesday last in the Council Chamber at Guildhall, Sir John Lubbock, Vice-Chairman, presiding, in the absence, through indisposition, of the Chairman, Lord Rosebery.

*New Member.*—Mr. W. J. Orsman was introduced and took his seat on his election for Haggerstone, in the room of the late Mr. Firth, Deputy-Chairman.

*The Proposed Street from Holborn to the Strand.*—The consideration of the Report of the Improvements Committee, recommending the formation of a new street from Holborn to the Strand, on the line shown by the accompanying map, was then resumed. The report, the substance of which was printed by us last week, recommended the formation of a street 90 ft. wide, at a total estimated cost of 1,473,000*l.*, made up of the following items: Engineer's estimate for the formation of the roads, &c., 59,000*l.*; Architect's estimate of net cost of property to be acquired, after deducting recoupments, 1,414,000*l.* The Committee recommended that the Council should apply to Parliament for the following powers:—

"(a) To construct a new street from Holborn to the Strand, as shown on the plan submitted with the report.

(b) To construct a spur street from a point of the new street near Drury-lane to St. Clement Danes Church.

(c) To form such new streets 90 ft. in width.

(d) To widen the approach to Waterloo Bridge on both sides of its junction with the Strand.

(e) To purchase the whole of the property comprised in Block A (see map).

(f) To construct a subway under the new streets."

The Committee further recommended:—

"(g) That in the event of any or all of the above recommendations being adopted by the Council, it be referred to the Improvements and the Parliamentary Committees to give effect to the same.

(h) That provision be made for the planting of trees on each side of the streets."

Mr. Clarke, the Chairman of the Improvements Committee, said he wished to say that, so far as the approaches to Waterloo Bridge from the Strand were concerned, the estimated cost of that part of the scheme had proved to be greater than the Committee had at first anticipated. By omitting that portion of the improvement for the present, the estimated cost of the scheme would be reduced by about 216,000*l.* There was also, he thought, a possibility that a new railway might be made beneath the new street, and if that railway were made, the cost of the improvement to the ratepayers would be very materially decreased. It was also suggested that part of the land north of Holywell-street, marked A on the plan, would afford a spacious and central position for the offices and Council Chamber which the Council would have to provide for itself within the next few years. In answer to a question as to the intention of the Committee with regard to the Church of St. Mary-le-Strand,—whether it was intended to remove the church or to retain it, and if to retain it, whether there would be a wide carriage-way on the north side? How did the Committee propose to do that when they had not scheduled the property north of the church? Mr. Clarke replied that the question of the two churches was one which entered into the report which came up before the Council and was agreed to a fortnight ago. As a matter of fact what they proposed to do was to take the land surrounding both the churches and throw it into the roadway.

Earl Compton moved the following amendment:—"That the report be referred back to the Committee with an instruction that no steps



The County Council Plan for a New Street from the Strand to Holborn.

be taken with regard to the new street between Holborn and the Strand, until any insanitary area affected by that scheme can be dealt with under Cross's Act, and until the arrangements to be made for rehousing the displaced working classes shall have been submitted to the Council." He supposed the Council would agree with him that if they had a committee on the subject of the housing of the working classes, nothing would be more important than that they should understand, when a great improvement scheme was brought forward, what would happen to those displaced by that scheme. It was also manifest that it would be to their advantage if they were going to undertake great improvement schemes in London, that they should carry them out where there were insanitary districts, and thereby save the cost to a great amount. As to the insanitary area of that particular district, his committee received a report from their Medical Officer the previous day that there was

one lot of houses through which those streets would go which he would condemn as insanitary. That lot would contain a very large number of people. Then they were advised by their Solicitor that it would not be possible to buy this land under Cross's Act in time for the next session of Parliament. That was the reason why he wished the report referred back. If they applied to Parliament for permission to acquire this land, they would not be able to apply under Cross's Act, and they would, therefore, apply for the land under circumstances which would necessarily inflict on this particular district and the whole metropolis additional burdens in the way of expense. They had been told that it would be impossible to acquire this land under Cross's Act, but that Act had been applied in Birmingham to insanitary areas and carried out, and what had been done in Birmingham he thought might take place in London. He contended



that the Committee on the Housing of the Working Classes had not had time to make inquiries, and if the Council carried out the proposed improvement scheme they would be doing it without sufficient notice as to the wants of the people they were to displace. He had made a calculation, and the street itself as proposed would actually touch dwellings which at the present moment contained from 3,000 to 4,000 of the working classes. If they scheduled land to the east or the west of the proposed streets, he imagined that they would really have to face the problem of housing 6,000 or 7,000 people. He appealed to the Council whether this was a matter that they ought to rush through. Before any further improvements were carried he hoped the Council would pause, so as to show the people of London that they did not intend to follow the example of those who removed large masses of the working classes in order to build the Law Courts without providing for the rehousing of them, nor of those who made Shaftesbury Avenue,—in fact, that they did not intend to enter upon any improvement scheme of any kind whatever until they had met the interests of the working classes, which had hitherto been neglected in the metropolis.

Mr. Beachcroft, in seconding the amendment, said the improvement schemes which were needed at the present moment were schemes for improving the dwellings of the working classes, and his reasons for seconding Lord Compton's amendment was that the present scheme was one which would in no way meet this want. The scheme of forming a new boulevard 90 ft. wide from Holborn to the Strand was a purely fancy one, and one which, however desirable, would benefit the better classes only and those who could perfectly well afford to occupy a few minutes more in their journey from Ruston-square to Waterloo. One million and a half had within the past few years been spent in this part of London in respect to Shaftesbury Avenue and Charing Cross-road, and with the fact before them of the heavy burden which the ratepayer had to bear, they had no right to spend another million and a half unless the necessity for it was shown to be urgent. There was no worse part of London than that south-west of Lincoln's Inn-fields, Clare Market being the centre of it. The proposed scheme would do nothing towards rehousing the people of that long-neglected district, and it was because he believed that if they adopted it they should postpone the necessary rehousing question, that he trusted Lord Compton's amendment would be carried.

In the course of further discussion, Colonel Hughes opposed the scheme, which he characterised as ill-considered and immature, on the ground that the present financial position of the Council would not permit of so heavy an expenditure on one improvement just now; and other speakers opposed it on the ground that no improvement of the kind ought to be undertaken until the incidence of taxation were so altered that the owners of the property to be benefited by improvements should pay their fair share of the cost. Eventually Earl Compton's amendment was carried.

*The Smoke Nuisance.*—The Sanitary and Special Purposes Committee presented the following report:—"Your Committee have to report that they have considered the resolution of the Council of June 4 last—that it be an instruction to the Sanitary and Special Purposes Committee to take into consideration the causes of the fogs which trouble London during the winter months and the increased death-rate during their prevalence, in order to put in force existing powers for dealing with them, and obtaining increased powers if necessary. Your Committee have arrived at the conclusion that it is at present impossible for them to propose any practical suggestion for dealing with the question of London fogs. The discussions and investigations on the subject which have taken place in the past few years have not disclosed any method of prevention which promises to effect any material abatement of the evil. There is little difference of opinion as to the extent and gravity of the injury caused in London by fog, and your Committee would gladly consider any suggestion of a practical nature which would enable the Council to take effective measures for abating the evil. The only existing legislation bearing on the subject is contained in the Smoke Abatement Acts, which provide that the furnaces of engines and furnaces in buildings used for trade, and in vessels on the river

Thames, shall be so constructed as to burn their own smoke. The police are entrusted with the enforcement of these Acts, and the Council have no jurisdiction under them, and cannot therefore put the powers given by the Acts in force as indicated in the reference." This was agreed to without discussion.

*Tenders for Building Work at Asylums.*—The consideration of the Report of the Asylums Committee, bringing up lists of tenders for important works at the Cane Hill Asylum, Coulsdon, and Claybury Asylum, Essex, was postponed. The lists of tenders will be found in another column of this week's *Builder*.

#### IMPROVED DWELLINGS FOR THE POORER CLASSES.

We give this week plans of one of the modes of construction of improved dwellings included in the scheme submitted to the Economic Science Section of the British Association, at Newcastle, by Mr. D. G. Hoey, together with a fuller summary of the practical part of his paper.\*

In proposing a method of cure, Mr. Hoey stated the chief points of difficulty, as follows:—

1. The cost of ground, rendering it inevitable that many such houses should be erected on a limited space.

2. Providing means, within such limited space, for due separation and privacy of the sexes, together with

3. Thorough ventilation, producing continuous renewal of the atmosphere; whilst

4. Causing neither discomfort nor danger from draughts.

5. Comfortable warmth in a fresh atmosphere; protection from cold in winter and from wind or storm ever entering.

6. Adequate privacy accommodation, possessing the privacy the term implies, and comfortably accessible to women and children.

A seventh, adequate cubic space, had received great prominence, and legal enactment had prescribed a minimum of 300 cubic feet per adult, but this measure of adequacy he characterised as a dangerous delusion, stating the true measure of adequacy to be that of the forces continuously at work in the renewal of the atmosphere of the house, and that small houses for the poor, possessing efficient ventilation, will be more healthful *quoad* the cubic feet of air they contain, than the unventilated banqueting hall or assembly room or theatre, crowded with wealth and fashion.

The first difficulty, the cost of ground and the resulting multiplication of houses within a restricted area, is disposed of, so far as mechanical science is concerned, by a system of ventilation,† which he states can be efficiently adapted, in its essentials, to such small houses, adding little or nothing to the cost of erection. It works automatically, acts most powerfully when most required, as when cooking is going on, and cannot be interfered with, without great trouble and ingenuity, not likely to be exercised, as it gives rise to no draughts or felt discomfort.

It was first applied in the Glasgow International Exhibition of last year, in a long low narrow bar, constantly filled by men standing close together, smoking, with a cubic space to each occupant, not one-sixth part of that provided in these houses for the poor. The severest tests were applied to it by Dr. Wallace, the City Analyst, who certified (1) that before the application of this system the bar had a "very impure and oppressive atmosphere," and (2) that the application "more than satisfied the requirements of the case, giving, continuously, a practically unvitiated atmosphere, without gusts or draughts. The bar was densely crowded." It can be seen in continuous operation in the smoking *foyer* of the Gaiety Theatre, Strand, the cubic space to each occupant in which is also only a fraction of that provided in these small houses, and there, as tested in the presence of the architects for the proprietor, Messrs. Romaine-Walker & Tanner, it is automatically renewing the entire atmosphere three times an hour, continuously, which can be instantaneously increased to six times an hour, by turning on a tap; whilst the atmosphere, although fresh, is absolutely free from draught or sensible current.

\* It should be understood that what is here given is the condensed report by Mr. Hoey of his own paper, read at the British Association: for convenience we print it in the form furnished to us, but the responsibility of it rests with Mr. Hoey.

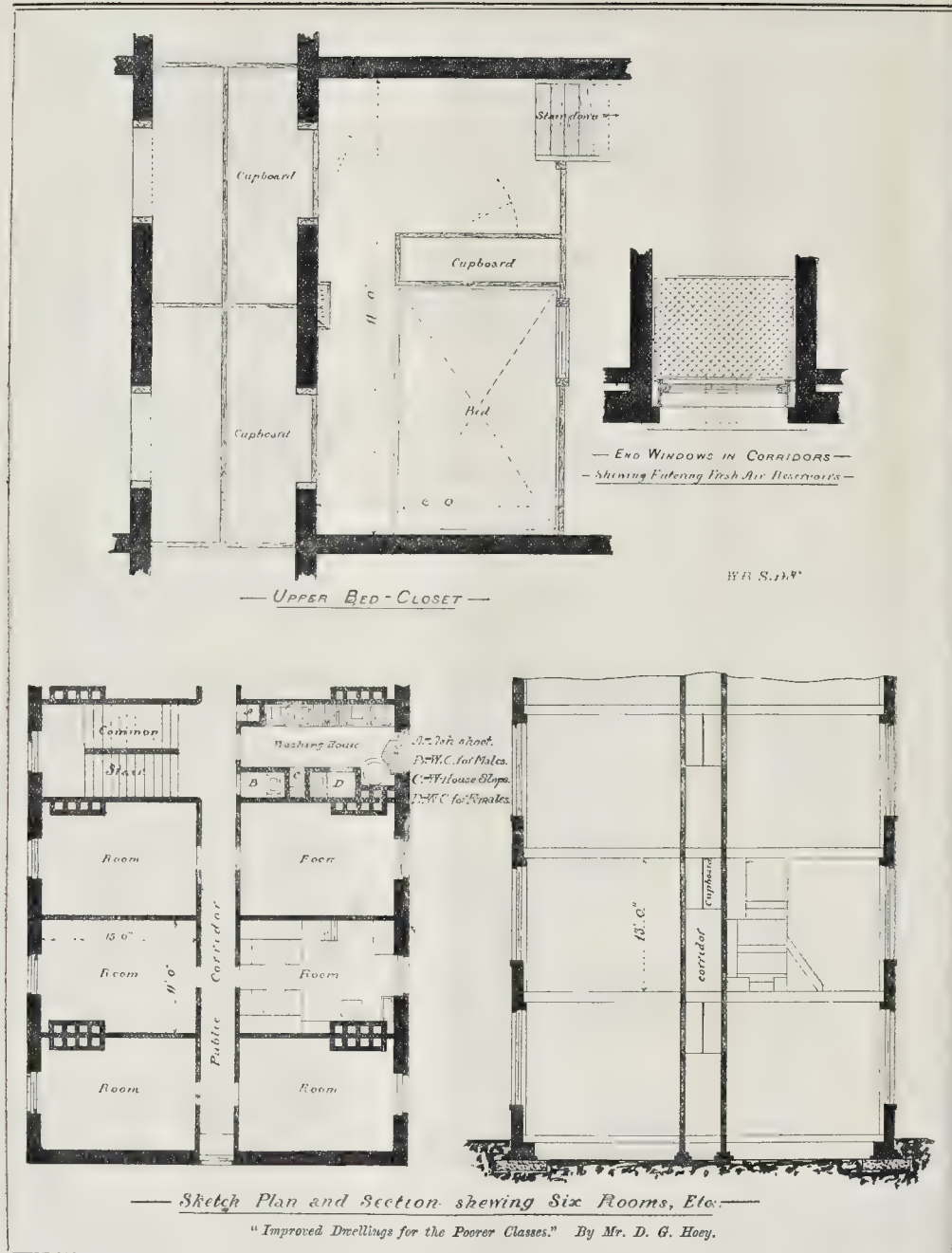
† For a complete description of this system see the "Journal of the Society of Arts" of 31st May, 1889.

By these means the third and fourth difficulties,—continuous renewal of the atmosphere without draughts,—are thus also disposed of. The fifth,—comfortable warmth, and protection from wind and storm,—is secured by a variety of simple devices, such as air spaces in the outer walls, forming an efficient non-conductor, and the entrances into the houses being from closed passages, which are themselves efficiently ventilated and free from draughts.

The second,—due separation and privacy for the sexes, within such unavoidably limited space,—is, in conjunction with efficient ventilation, the greatest of all the difficulties, and the accompanying plans, of one of the modes of construction embraced in the scheme, show the arrangements made under this head. The plans proceed on the principle of a state cabin on board ship. They were originally designed by Mr. Hoey's father, who was an experienced naval architect, and the principal additions or alterations made by himself are in connexion with the application thereto of his ventilating system.

The enlarged section and plan (see p. 277) show a single apartment, 15 ft. in length from door to window, 11 ft. in breadth, 13 ft. in height, and how this bare and comfortless room may be converted into a well-arranged and comfortable family dwelling. In the middle of the 11 ft. end, leading out of the public corridor, is the entrance door, 2 ft. 6 in. wide, opening into an internal passage, 6 ft. long and 2 ft. 6 in. wide, on each side of which there is a space, 4 ft. 3 in. wide, 6 ft. long, and 7 ft. high. These two spaces, enclosed by the partitions forming the passage and the partitions between them and the remainder of the room, are thus converted into bed-closets, or, in shipbuilders' phrase, state cabins, 6 ft. by 4 ft. 3 in. by 7 ft. high, each containing two single beds or "berths," along the wall, 6 ft. long and 21 in. wide, leaving a clear floor space, 6 ft. long and 2 ft. 6 in. wide, in front of the berths; the lighting is by corrugated glass in the partition. At both ends of each there is a seat, fitted as a locker, and, at the end next to the public corridor, a cupboard, the entire height of 7 ft., *minus* the space occupied by the locker in front of it, at the side of which the inlet for fresh air into the cabin is shown, whilst the outlet for the vitiated air, at the top, is indicated by an arrow. The partition, at the 6 ft. length from the door, is continued up to the 13 ft. ceiling, across the entire breadth occupied by the berths and the passage between them. A space is thus enclosed, on the top of these berths and passage, 11 ft. by 6 ft., and 6 ft. high, which forms a sleeping apartment, with a bed at one end for two persons, 6 ft. long and 4 ft. wide, leaving a floor space, at the end of the bed, 6 ft. by 5 ft., and another, 6 ft. by 2 ft., between the front of the bed and the wall of the public corridor. But the ceiling of this public corridor is only 8 ft. high, whereas that of the room is 13 ft., and this yields space, within the sleeping apartment, for cupboards or lockers, along the entire 11 ft., the bottom 1 ft. above the floor, the top at the ceiling, with a large cupboard, from floor to ceiling, at the end of the bed. This dormitory is lighted, in like manner, by corrugated glass in the partition. The inlet for fresh air is shown, and the outlet for vitiated air, at the top, is indicated by an arrow.

After thus providing comfortable separate sleeping accommodation and receptacles for clothing and other personal belongings (1) for a husband and wife, (2) for four of a family, two and two, and quite suitable for young children lying two in a berth, there is left a living-room for the family, with a floor-space 11 ft. by 9 ft., and 13 ft. high, not lumbered up by the family belongings, because the various members have been as well provided with these in their private sleeping-rooms, as the families of people in a much higher sphere. The enlarged section and plan show the accommodation provided for the housewife to be on a par with that in the sleeping-rooms, and the outlet to the ventilating shaft, for keeping the air always pure, is also shown, with the entering air reservoir for the living-room. There is an enlarged plan of the upper bed closet, with a front plan showing eight rooms, a sketch cross section of the building, and an enlarged plan of the end windows in the corridors, showing fresh-air reservoir. The roofs of the berths are supported by T-iron, the corner supports are of angle iron, giving strength, and occupying practically no space; whilst the whole fittings are of fixed and defined make and dimensions, capable of being produced in any



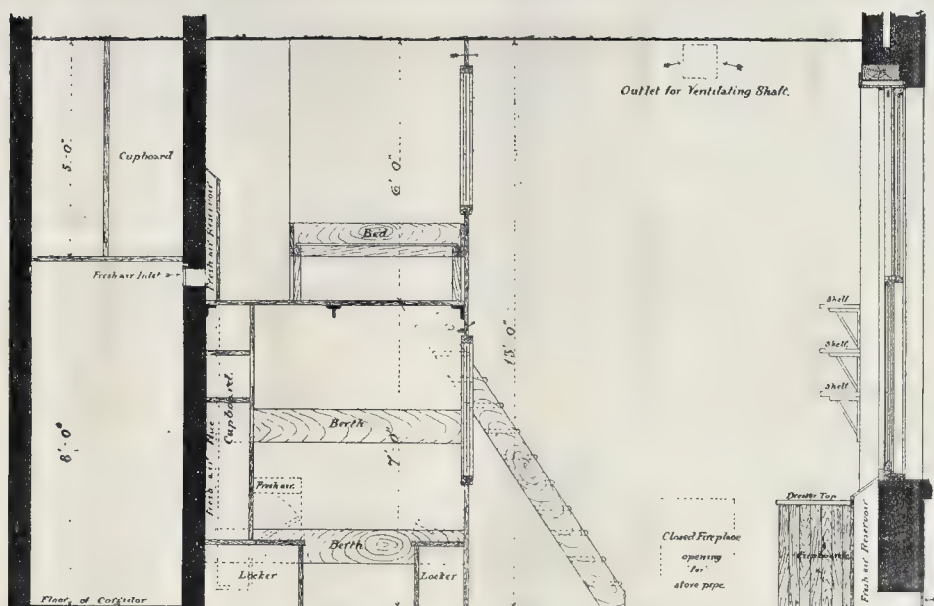
quantity, at small cost, and fitted up, in little time, at trifling expense. The stove, which does the cooking, heating, and ventilating, burns any slack, and consumes its own refuse down to powdered ash; has a blower which sets it ablaze in a few seconds, and a damper which keeps it smouldering a whole night; its cost is low, and any number can be supplied quickly by the makers, Messrs. McDowall, Steven, & Co., Milton Iron Works, Glasgow, the largest makers of stoves in Scotland. The adequate cubic space of the statute is 300 cubic feet per adult, for a whole night. This stove has been tested and proved to give twice that amount of fresh air every hour when burning, and that amount

every hour, after the burning ceased, by closing the front and keeping the chimney warm. It will be seen that the chimneys are built in stacks, to conserve the heat and keep the ventilation always going efficiently.

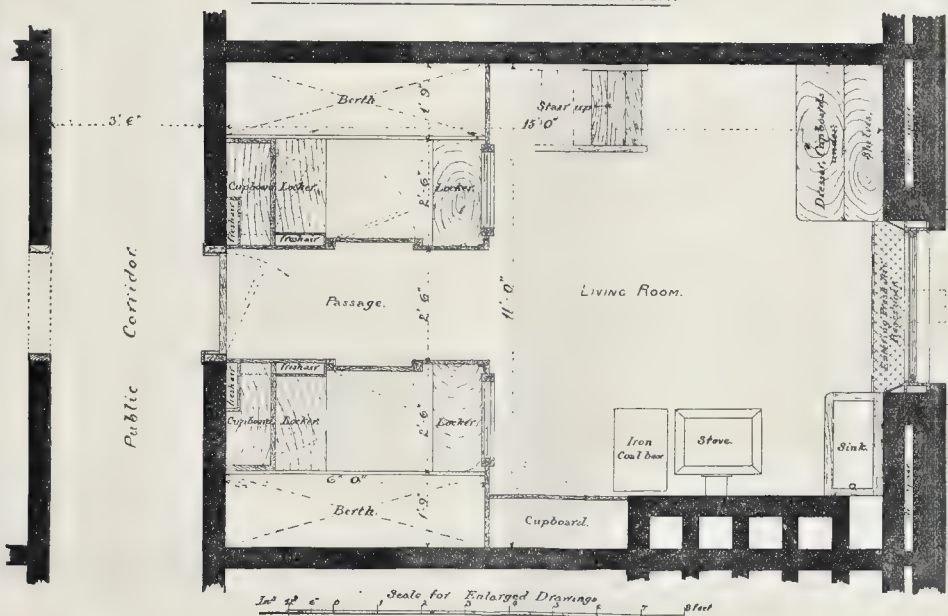
Mr. Hoey claims that these houses can be constructed, on sound commercial principles, to yield a fair return, at rents of 4*l.* 10*s.* per annum, with others, having yet superior arrangements, at 1*l.* more, and that the sole help needed from those who possess the means, is to finance the enterprise, so as to obtain the necessary advances at the very lowest rate of interest, for which reason the advances themselves must be made absolutely secure. He

states that he is prepared to produce in Glasgow one hundred honest poor, who have seen better days, and are familiar with better surroundings, who will make model tenants for such model dwellings, and prove it by punctual payment of the rents, and by keeping the model houses in model order; and that, so soon as it is thus proved that decent and healthful homes for the poor can be provided, and kept and paid for, costing no more than the hovels to which they are now condemned, legal enactments may be resorted to to compel others to a mode of life which is essential for the public health, and the promotion of the comfort and longevity of the entire community.





ENLARGED PLAN AND SECTION OF ONE ROOM.



"Improved Dwellings for the Poorer Classes." By Mr. D. G. Hoey.

## LONDON BUILDERS AND THE SCHOOL BOARD.

For the past two or three weeks we have given brief reports of meetings of London builders held to protest against the contemplated action of the School Board for London with regard to placing the work of repairs, &c., to their schools in the hands of a comparatively few firms instead of leaving the work open to public competition. Another meeting was held at Anderson's Hotel, Fleet-street, on Tuesday evening, when it was resolved to memorialise the Board on the subject and to appear before them by means of a deputation on Thursday

afternoon. As this deputation would be addressing the Board just as we go to press, we cannot announce the result until next week, but we give the text of the Works Committee's report in which the change is proposed:—

"On the 21st February, 1889, the Board passed the following resolution:—

'That tenders be obtained both for general repairs and painting, based upon schedules of prices renewable at the end of each two years, and that firms willing to carry out the work be appointed for Divisions or Groups of Schools.'

This recommendation had originally been made in the Report of the Special Committee on the Work of the Works Department, and

was subsequently confirmed by the Works Committee in their report, which was submitted to the Board on February 21, 1889. The Board then rescinded their resolution of December 17, 1888 (requiring that all contracts should be advertised and tenders invited by open competition, so far as it related to this and certain other classes of work). On July 18, 1889, the Committee in their report to the Board explained that they were about to invite tenders for carrying out repairs to buildings and furniture generally, and that they were of opinion that these tenders should not be obtained by open competition, but that a selected list of approved firms

should be invited to tender. On August 1, 1889, the committee further reported that they had come to the conclusion that it would be desirable that in future tenders for all works should be invited only from a limited and selected list of builders. Acting under the above resolutions of the Board, the committee accordingly selected twenty-one of the most reliable building firms in London, and asked them whether they would be willing to tender for the repairs to the schools and furniture of the Board on a printed schedule of prices. Two of these firms were not prepared to tender, viz., Messrs. Shillitoe & Sons, and Messrs. Trollope & Sons; and a third firm, Messrs. Clarke & Bracey, did not reply till after the tenders had been received. The following is a list of the remaining eighteen firms from whom tenders were received:—Atherton & Latta, of No. 71, Christ-street, Poplar, E.; Belham & Co., of No. 155, Buckingham Palace-road; Charteris, D., of Page-street, Westminster; Colls & Son, of No. 53, Moorgate-street, E.C.; Cox, C., of St. George's Works, Mare-street; Cubitt & Co., of No. 258, Gray's-Inn-road; Dove Brothers, of No. 15, Studd-street, Islington; Downs, W., of Hampton-street, Walworth-road; Grover & Son, of Wilton Works, New North-road; Higgs & Hill, of Crown Works, South Lambeth-road; Holloway, J., of Marmion Works, Lavender-hill; Kirk & Randall, of Warren-lane Works, Woolwich; Lathey Brothers, of St. George's-road, Battersea; Lawrence & Sons, of Nos. 14 to 16, Wharf-road, N.; Macey & Son, of No. 268, Strand, W.C.; Patman & Fotheringham, of Nos. 100 to 102, Theobald's-road; Stephens, Bastow, & Co., of No. 195, Stewart's-road, S.W.; and Williams & Son, of Richmond-street, N.

The above list was submitted to the Committee at their meeting on July 29, when the Chairman of the Committee was authorised, as a matter of emergency, to accept tenders during the vacation. The tenders were received on Aug. 12. . . .

In the meantime the committee beg leave to make the following recommendations with regard to the remaining divisions:—

That the tenders of the following firms for carrying out repairs to the schools and furniture of the Board in the divisions mentioned below on the Contract Schedule of Prices, subject to the discount specified, be accepted; the contract, in each case, to be determinable at the end of one year, or at any time thereafter, by three months' notice being given on either side:—

(a) Schools in the City Division.—The tender of Messrs. Cubitt & Co., of No. 258, Gray's Inn-road, W.C. The Contract Schedule of Prices to be subject to a discount of 5 per cent.

(b) Schools in the Chelsea Division.—The tender of Mr. J. Holloway, of Marmion Works, Lavender-hill, S.W. The Contract Schedule of Prices to be subject to a discount of 7½ per cent.

(c) Schools in the Greenwich Division.—The tender of Messrs. Kirk & Randall, of Warren-lane Works, Woolwich, S.E. The Contract Schedule of Prices to be subject to a discount of 10½ per cent.

(d) Schools in the East Lambeth Division.—The tender of Mr. D. Charteris, of Page-street, Westminster. The Contract Schedule of Prices to be subject to a discount of 5 per cent.

(e) Schools in the Marylebone Division.—The tender of Messrs. Cubitt & Co., of No. 258, Gray's Inn-road, W.C. The Contract Schedule of Prices to be subject to a discount of 5 per cent.

(f) Schools in the Southwark Division.—The tender of Messrs. Patman & Fotheringham, of Nos. 100 to 102, Theobald's-road, W.C. The Contract Schedule of Prices to be subject to a discount of 5 per cent.

(g) Schools in the Tower Hamlets Division.—The tender of Messrs. Atherton & Latta, of No. 71, Christ-street, Poplar, E. The Contract Schedule of Prices to be subject to a discount of 5 per cent.

(h) Schools in the Westminster Division.—The tender of Messrs. Cubitt & Co., of No. 258, Gray's Inn-road, W.C. The Contract Schedule of Prices to be subject to a discount of 5 per cent.

This report is still awaiting consideration by the Board. It is alleged that it owes its origin to the fact that a great deal of bad work has been done for the Board under the open contract

\* We have not space for the whole list of tenders which were sent in by those who offered to do the work—some at schedule prices, others at 2½, 5, 7½, and 10 per cent. less than schedule prices.

system; but at the meeting on Tuesday night it was roundly asserted that all the bad work which had been brought to light had been done under the system of close or select competition which prevailed prior to the election of the last Board in November, 1885. Several speakers at the meeting on Tuesday severely criticised the Board's printed schedule of prices. It was declared that many of the prices which it was proposed should be paid to Messrs. Cubitt and other large firms were greatly in excess of those paid to the small builders who had hitherto done the work, and that therefore the schedule was unjust to the ratepayers. Moreover, it was not free from errors, as blind-work was priced at 3s. 4d. per yard, evidently a misprint for 3d. One speaker strongly contended for the work in each local division of the School Board being put up to competition amongst local men only, on the ground that economy, efficiency, and promptness of execution would be thereby ensured.

## Illustrations.

### THE GREAT CLOISTERS, GLOUCESTER CATHEDRAL.

THIS plate is reproduced from a forcible pencil sketch by Mr. C. E. Mallows. It represents the well-known "great cloister," which was built at the latter end of the fourteenth and beginning of the fifteenth century on the north side of Gloucester Cathedral. It was completed in the year 1412, and the vault is one of the earliest, if not quite the earliest, example of fan tracery. According to Professor Willis, the Gloucester district was probably the nursery of the Perpendicular style, and this piece of fan vaulting may have been the prototype of all others, as it is one of the most beautiful specimens of its class of work. The length of the cloister from north to south is 148 ft. and from east to west 144 ft., and its height is 16 ft. 6 in.

### VIEW OF THE PROPOSED CHANNEL BRIDGE.

WE give this week a view, copied from a photograph which has been exhibited publicly in Paris, taken from a drawing made for the engineers in order to give a general idea of the scheme and of the appearance the bridge would exhibit if completed.

As will be seen, the principle of construction is the use of a form of cantilever which may be described as a gigantic cross-head seated on two piers sufficiently far apart to form a space which will give stability, while the space between the ends of the cross-heads is filled by an intermediate girder carried between them. As in the Forth Bridge, the girders are tapered each way, horizontally and vertically, from the base or bearing-point of the cantilever.

As in the case of the Forth Bridge, the enormous scale of the work can only be inferred from the drawing by comparison with that of the objects grouped with it, the shipping and the train, which are correctly put in with reference to the scale of the whole. The design of the masonry piers is indeed entirely destructive of scale, the details being those common to smaller structures, much magnified.

The security of the form of cross-head cantilever here employed appears to us to be far inferior to that of the Forth Bridge, with which it is natural to compare it. It has nothing like the solid abutment and wide base of the Forth Bridge piers: nor can the cantilevers be susceptible of being bolted down into the concrete pier in the same way.

The main measurements are given under the drawing. It is proposed to build the masonry piers inside metal caissons kept in position by compressed air. According to the full statement of the scheme by the engineers, a translation of which has been given in the *Engineer* for September 27 and October 4, the roadway would be floored throughout its length with ribbed sheet-iron, with sufficient space outside the roadway for establishing refuges, houses for employes, signal-boxes, &c.

The greatest distance between the axes of the main girders, over the piles, is 25 metres, which it is considered will give sufficient lateral stability to the construction. The engineers go into many details as to putting the work in position, but these may certainly be regarded for the present as premature.

Our own opinion as to the probability and

advisability of such a work being carried out we have already stated (page 219, ante).

The engineers who are responsible for the scheme are MM. Schneider & Co. and M. H. Hersent. The eminent English engineers, Sir John Fowler and Mr. Baker, are named as consulting engineers for the scheme; but we believe we may say that our previous conjecture as to their real position in the matter is not far from the truth.

### DESIGN FOR STAINED GLASS.

THIS illustration is reproduced from a coloured drawing by Mr. Rowland G. Jones, which was exhibited at the last Royal Academy Exhibition.

The design shows a window, the main portion of which is white glass (painted slightly in grisaille) to admit the necessary light, while the band at the top is leaded with sufficient colour to act as a sun-blind.

The device of Cupid's bow and torch gives the cue to the detail throughout the whole.

### DESIGN FOR A TOWN HOUSE.

THIS is reproduced from a drawing by Mr. A. C. Breden, which was exhibited at the Royal Academy this year. The author says: "The materials intended are a warm-toned red brick, with buff terra-cotta dressings, strings, &c., with Broseley brimble tiles for roofing. All the carved brickwork to be executed in the same bricks as the plain work. The windows to be filled in with lead glazing as indicated."

### ENTRANCE LODGES, QUEEN'S PARK, CREWE.

THESE lodges and gates form the principal entrance to the park which was opened last year by H.R.H. the Duke of Cambridge, and presented by the London and North-Western Railway Company to the Borough of Crewe, as a Jubilee gift, and also in commemoration of the opening of the railway at Crewe, which, by a coincidence, took place in the same year as the accession of her Majesty.

The park contains about forty acres, and a large amount has been spent in forming roads, boundary fencing, ornamental waters, and planting; besides which there has been provided a large tea pavilion, band-stand, and the lodges, &c., which we illustrate.

The clock tower shown in the drawing was subscribed for and presented by the workmen in the employ of the railway company.

The whole of the work was carried out under the direct supervision of Mr. F. W. Webb, the chief engineer to the Company, to whom, with the co-operation of the Chairman, Sir Richard Moon, and the other directors, Crewe is indebted for the successful completion of the park as it now stands.

The Lodges are from my design, the outside walling being of stone, and the timber framing of picked English oak, the roofs being covered with Staffordshire tiles. JOHN BROOKE.

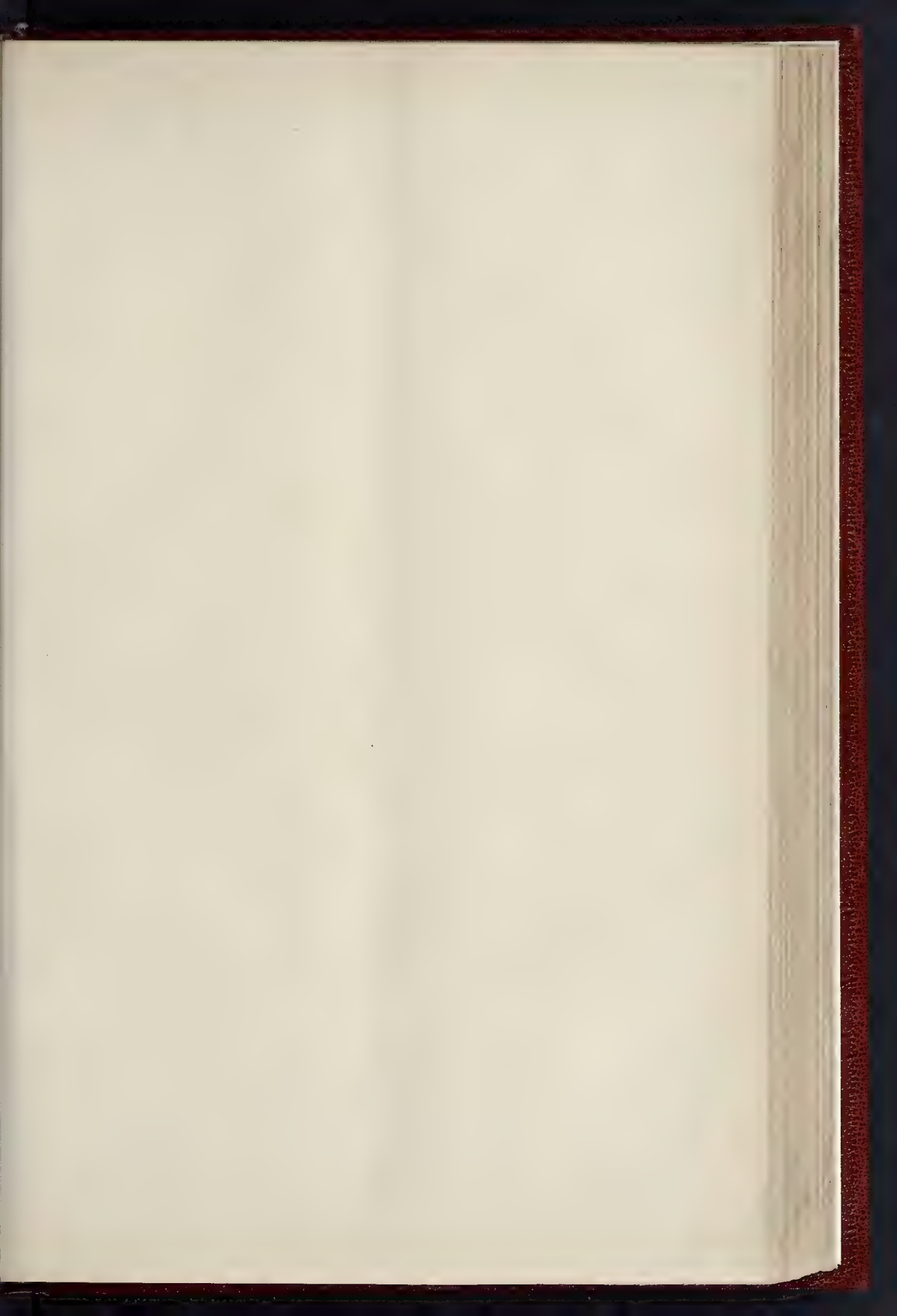
### HOUSE AND STUDIO, AVONMORE-ROAD, W.

THIS illustration is from a drawing exhibited at the Royal Academy. The building, which has lately been finished, contains a residence on the right-hand side and a sculptor's studio to the left on the ground floor. There is also a painter's studio and suite of rooms in the upper portion of the left-hand side of the building, having a separate entrance under the porch and approached by the turret staircase.

The architect is Mr. J. M. MacLaren.

**New Prison at Aberdeen.**—In order to keep within the authorised expenditure, the plans have been modified by reducing the size of certain buildings, &c.; and Messrs. Daniel MacAndrew & Co., builders of Aberdeen, have obtained the contract for the whole of the works to be carried out meantime, and operations will be commenced immediately. After the buildings are occupied it is expected that extensions will be made, as is from time to time found necessary, by convict labour, in the same way as is at present being done in the case of the convict prison at Peterhead in connexion with the harbour of refuge works there, so that the ultimate cost will amount to about the sum stated in last week's *Builder*. Messrs. D. MacAndrew & Co.'s contract price is, in round figures, 20,000.

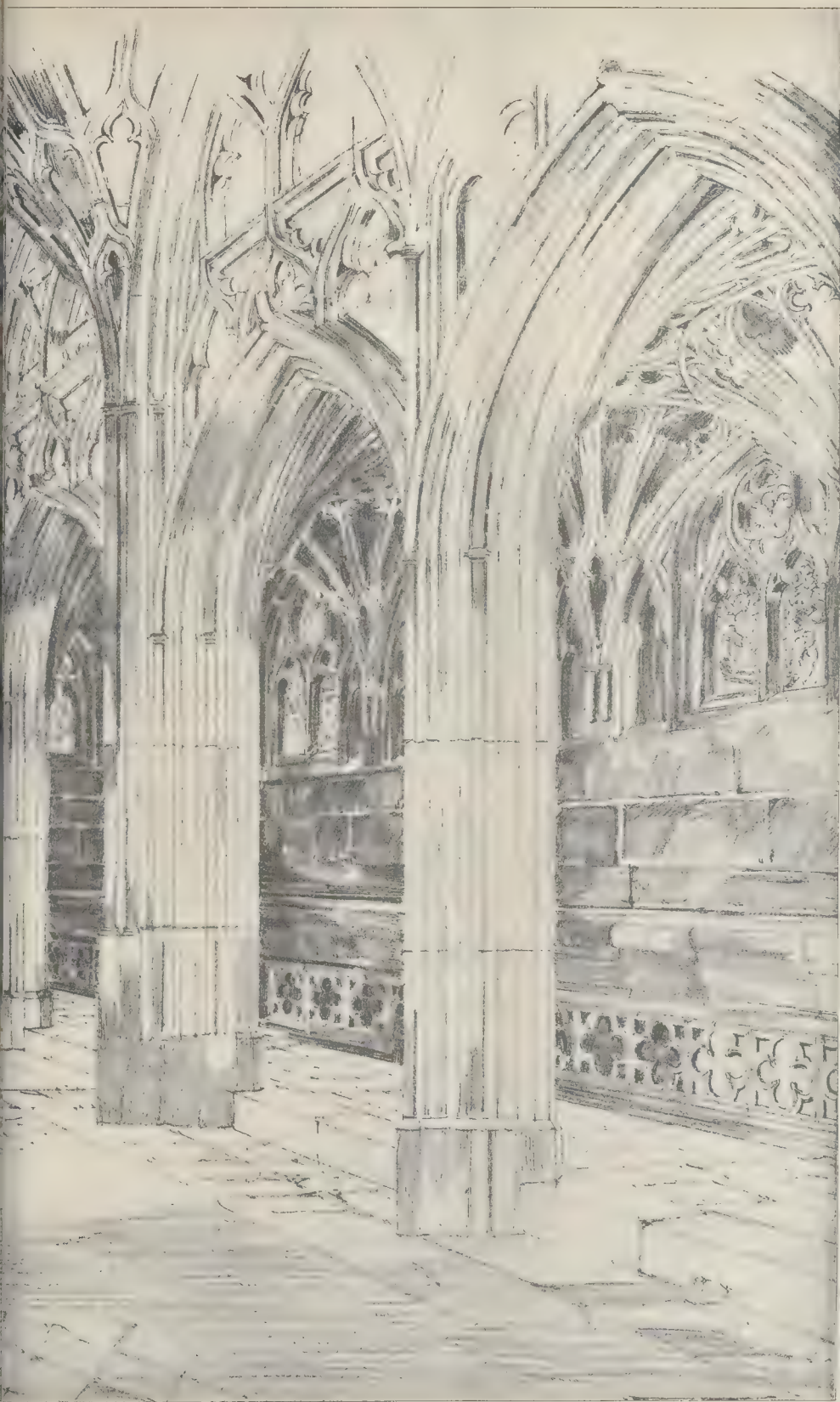




## The Cloisters Gloucester

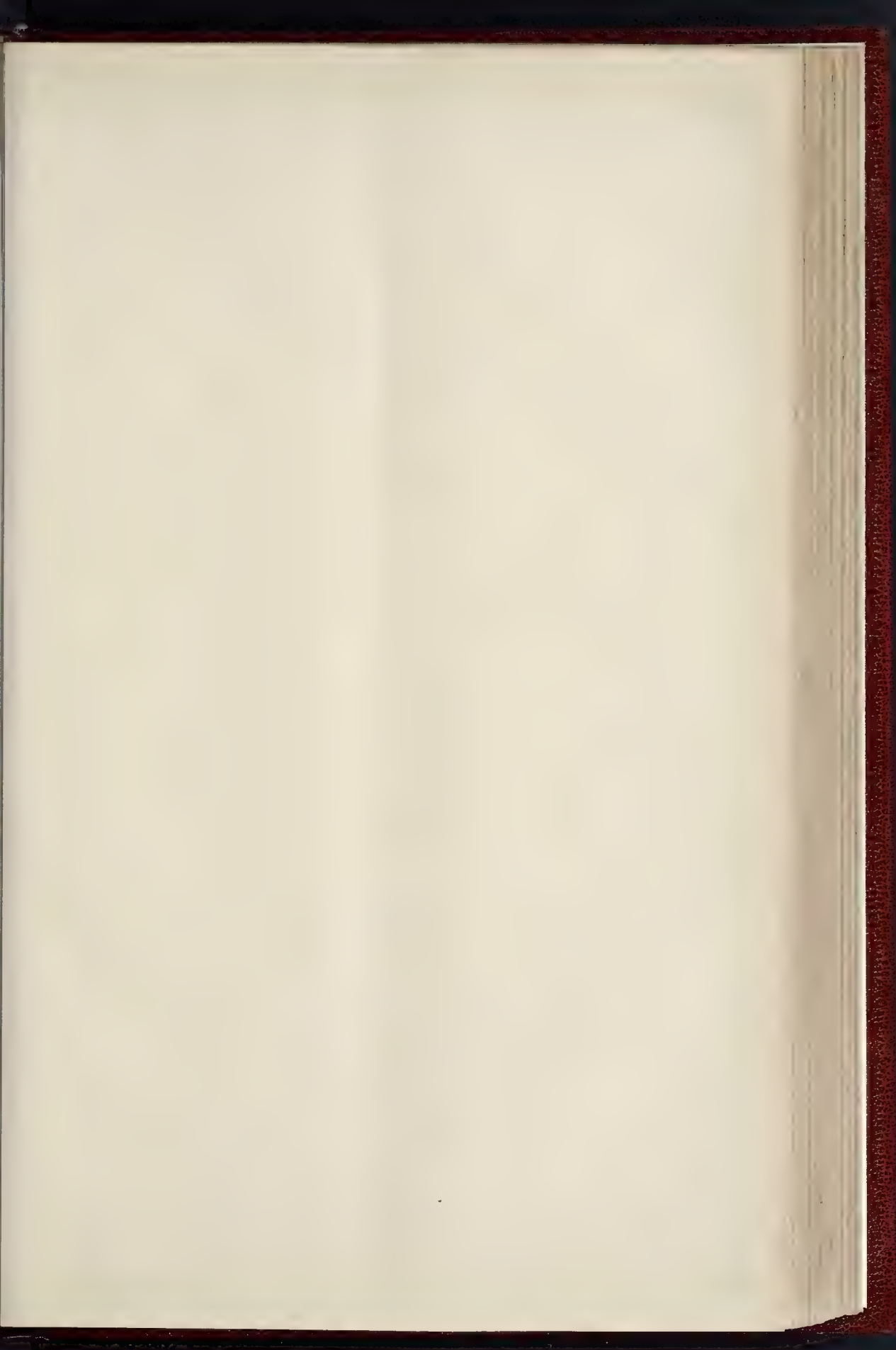








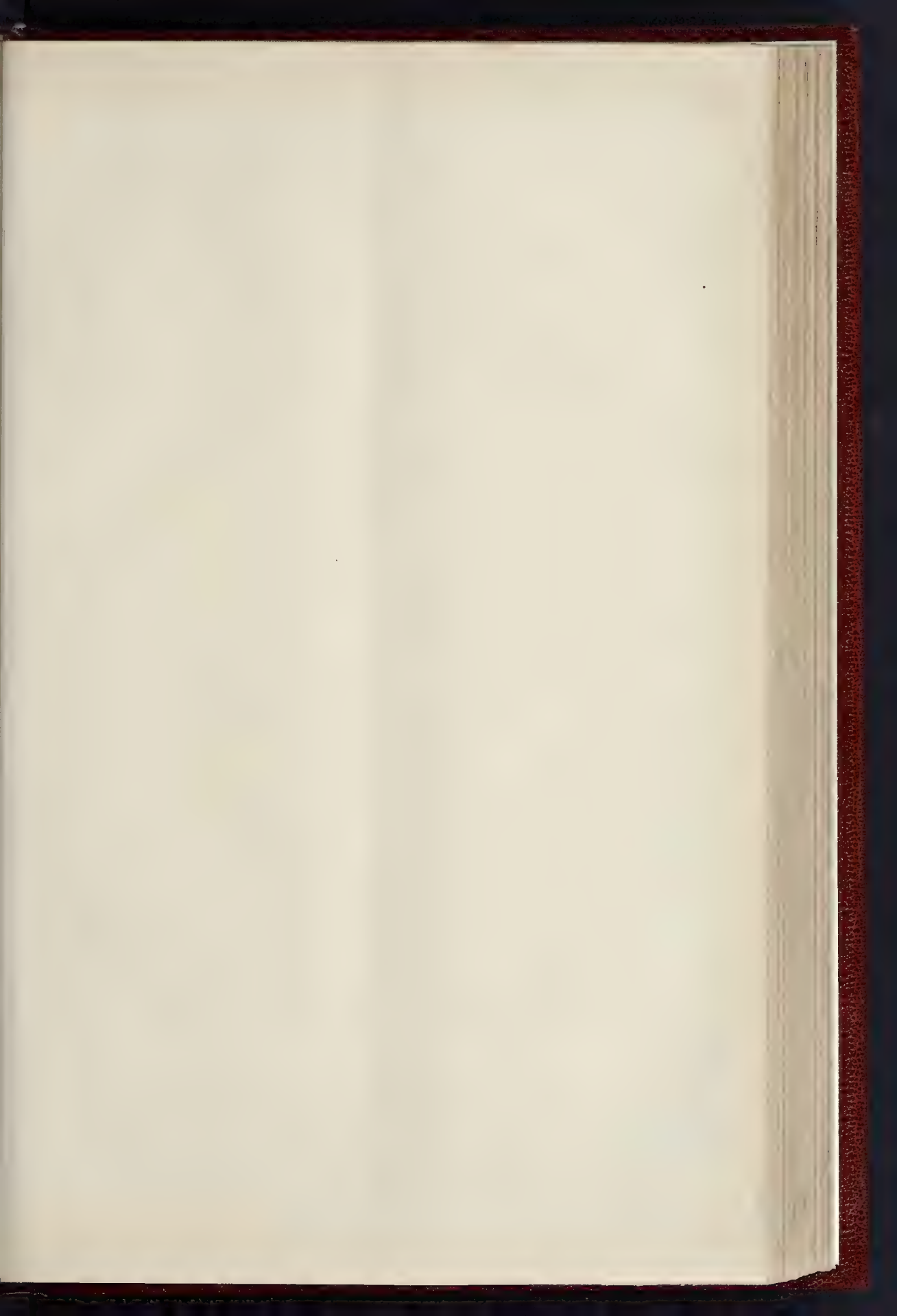


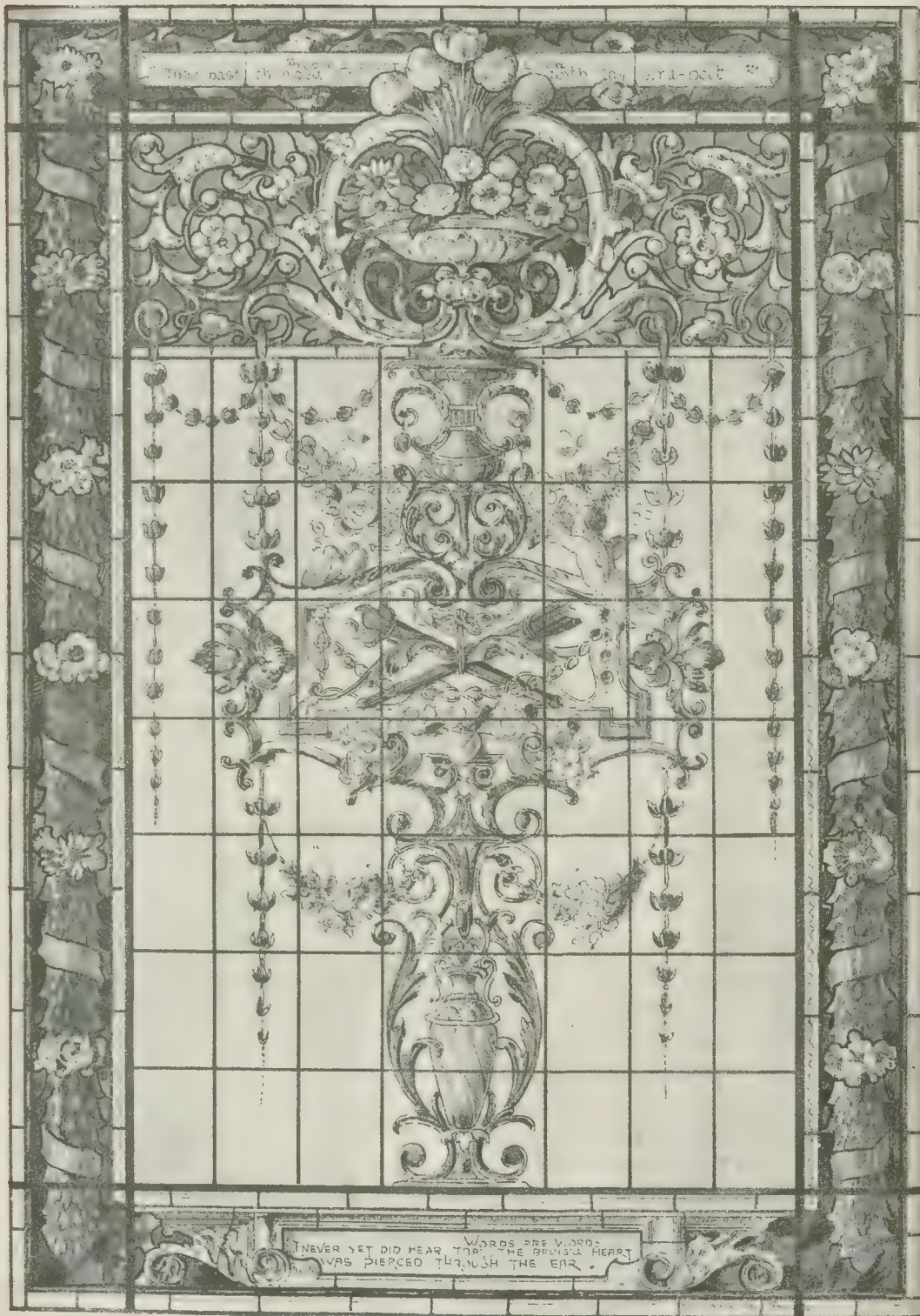


Entrance Lodges  
Queen's Park Circle.  
*John Brooke Ashby  
Architect*









DESIGN FOR STAINED GLASS.—By MR ROWLAND G. JONES.

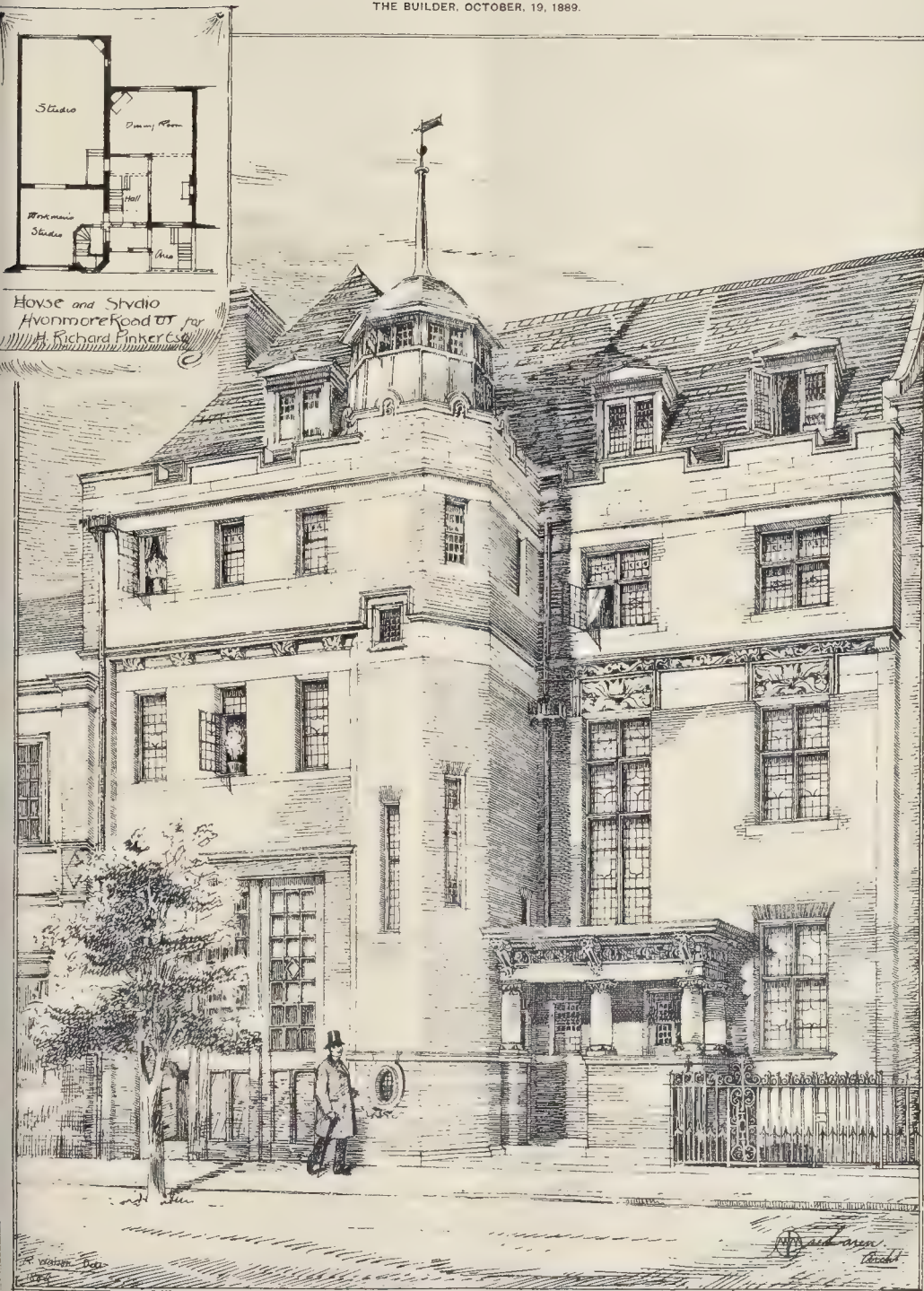




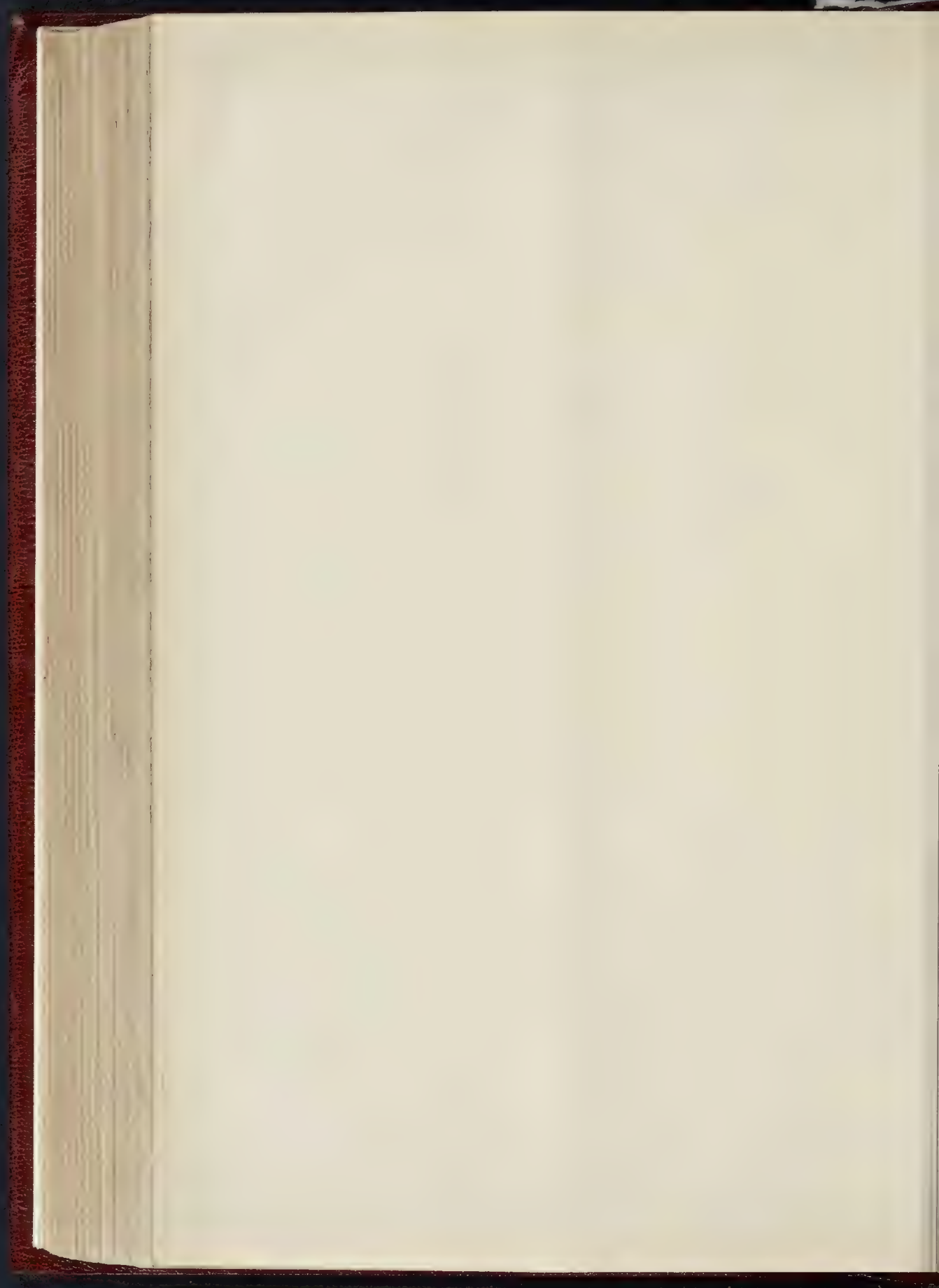
A TOWN RESIDENCE. MR. A. C. BREDEN, ARCHITECT.



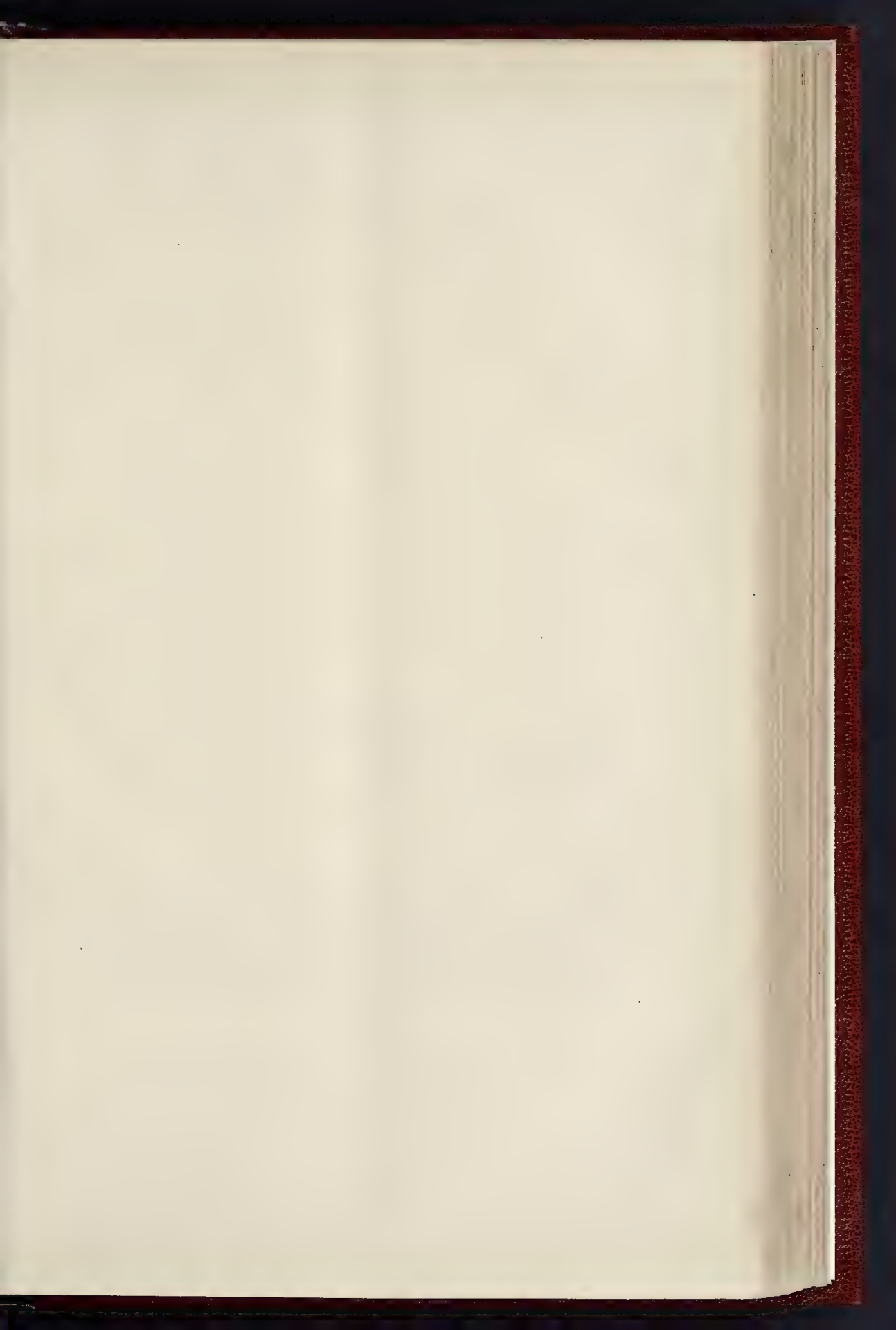




HOUSE AND STUDIO, AVONMORE ROAD. MR. J. M. MACLAREN, ARCHITECT.







# THE PROPOSED CHANNEL BRIDGE

DESIGNED BY  
MESSRS SCHNEIDER & CO & M. H. HERSENT.

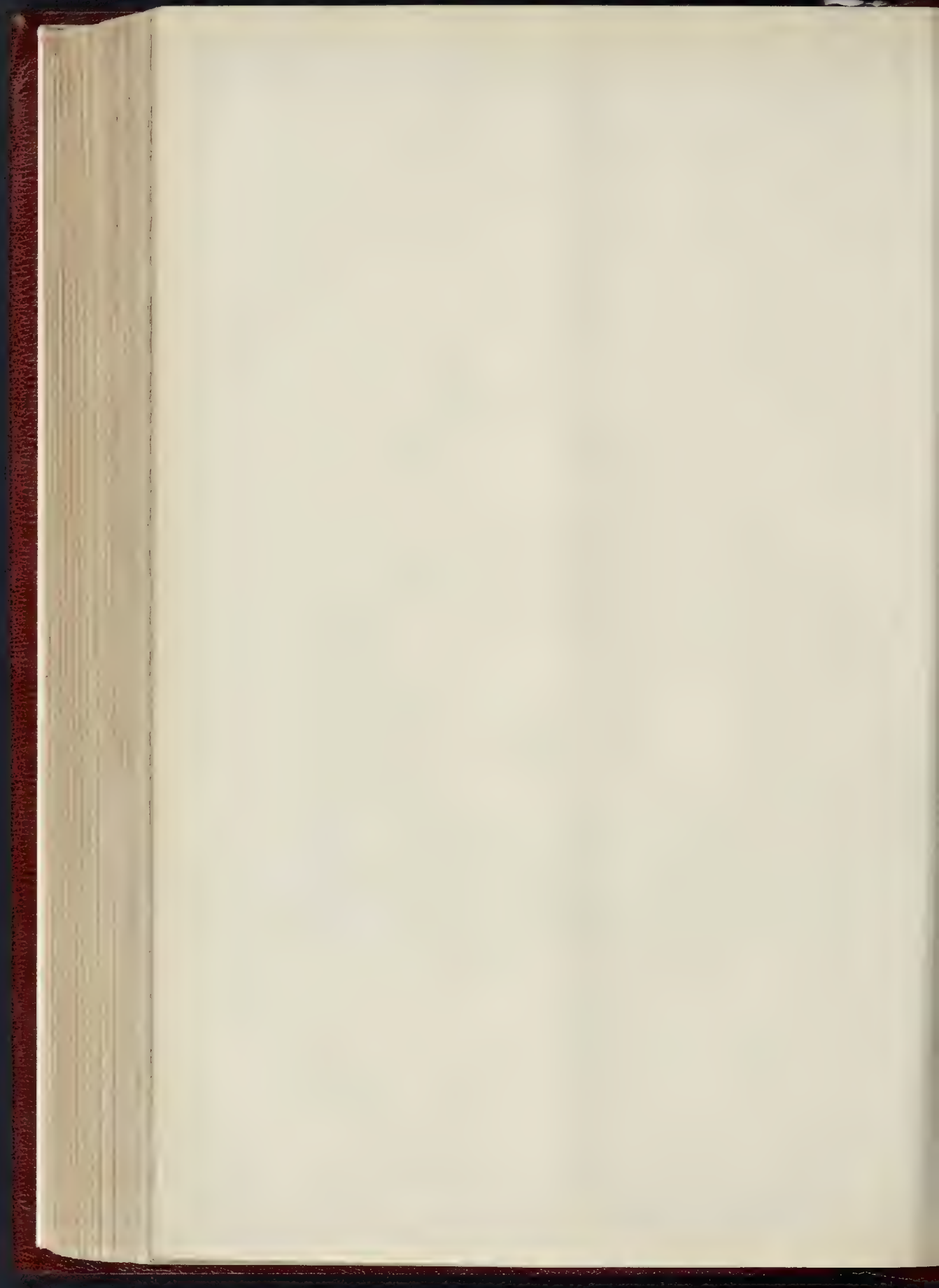


Total length of the Bridge .....	24 Miles
Number of Piers .....	120
Spans { Main Spans .....	1640 ft. & 96
{ Smaller Spans .....	830 ft. & 32
Height free for Navigation at High Water .....	180 ft.





greatest depth of Water .....	180 ft.
total height of Main Masonry Piers .....	249 ft.
height of Iron-work of Piers .....	181 ft.
height of Main Girders (Largest Spans) .....	213 ft.
height from Earth to highest point of Bridge .....	600 ft.





## CARVED SETTLE END.

ALTHOUGH not now used for its original purpose, the old oak settle end here illustrated is an excellent specimen of a class, examples of which are comparatively rare. It was formerly in an inn in North Devon, but has been removed from its original position. It is probably of



sixteenth-century date, boldly carved, but carefully finished also, especially the seated figure at the top. The shield seems to bear a fancy device, and not an heraldic charge. The opposite or inner side is quite plain. It measures 5 ft. 9 in. in height at the back, and its width decreases from 18 in. at the bottom to 6 in. at the top.

**New R.C. Church at Leeds.**—The Bishop of Hexham and Newcastle laid the foundation-stone of a new Roman Catholic church, on the 28th ult., which is to be erected at the top of Quarry-hill, Leeds. The building is to be of brick, with stone facings, the style of architecture being Decorated Gothic. The nave of the church will be 118 ft. long and 30 ft. wide. There are to be double aisles on both north and south sides, with two ranges of arcades, giving a width of 72 ft. Along the outer aisles are to be chapels and confessionals alternately. The sanctuary at the west end of the church will be of the same width as the nave, with an apical end and an ambulatory round. On the north side of the sanctuary there will be the Lady Chapel, and on the south side the organ-chapel and sacristy for clergy and choir. At the west end there is to be a nine-light tracied window. The roofs are to be of framed and dressed timber, with moulded cornices, principals, and purlins, filled in with framed boarding. The seats are to be of pitch-pine, and the choir-stalls of oak. The architects are Messrs. Kelly & Birchall, Leeds.

## CONCRETE FLOORS.

SIR,—Formerly I held, not less tenaciously than Mr. Sutcliffe holds now, to Professor Unwin's formulae for strength of flat plates, until my faith was staggered by their application to large sizes.

I invite Mr. Sutcliffe's thoughtful attention to the following example, as a case in point:—  
*Ex.* One square inch of  $\frac{3}{8}$  in. iron plate weighs .052 lb. Say the ultimate tenacity is 20 tons per inch of sectional area.

Set a plate of  $\frac{3}{8}$  in. iron over a clear span of 10 ft. square, with four edges *encastré*. Can Mr. Sutcliffe really believe that a load of a trifle over one-third pound per square inch of area will actually *rupture* that iron plate?

Here is the calculation, according to the formula, Mr. Sutcliffe justifies:—

$f$  = greatest stress per inch.

$s$  = length of side in inches.

$t$  = thickness of plate in inches.

$p$  = load in lbs. per square inch of area.

$$f = \frac{s^2}{t^3} p$$

$$f = \frac{120^2}{\left(\frac{3}{8}\right)^3} p = 20 \text{ tons} = 44800 \text{ lbs.}$$

From which equation we learn that  $p = .4375$  lb. = breaking weight per inch. Deducting the plate's own deadweight, we have breaking load per inch of area = .4375 - .052 = .3855 lb.; or, as above said, a trifle more than  $\frac{1}{3}$  lb.

My faith in the formula is certainly unable to stand the strain of that  $\frac{1}{3}$  lb. per inch load! whatever the plate can stand.

I will now name to Mr. Sutcliffe another consideration, which appeals very strongly to my constructional instinct against his belief that strength is simply inverse to area of slab.

We know we weaken a beam at same rate as we widen its span. Thus, if we make the span four times as long, we make the beam one-quarter as strong. But, according to Mr. Sutcliffe's pet theory, if we increase the slab-span to four times we reduce the slab-strength to one-sixteenth! I say I feel instinctively this is absurd. But, apart from the stress analysis,—which I will touch on presently,—I will offer a practical reason for this instinct of mine.

The theory of beams' lengths varying inversely as their strengths neglects the *twisting force*, due to transverse stress, which is always ready to take advantage of a beam's lateral weakness. In the case of very long, narrow beams, a material reduction of strength, below the limit assigned by the ordinary theory, results from this twisting force. But in the case of slabs no loss of that kind occurs; for each infinitesimal unit of length is stayed and stiffened, and rendered absolutely proof against twisting force; and on that account my reason supports my instinct, in the faith that you may increase the span of a slab with less relative loss of strength than actually attends, in point of fact (though not of *ordinary* theory), the increase of a beam's length.

As a practical illustration of the effect of excluding the twisting force, &c., in slabs as contrasted with beams, I remember at this moment an interesting experiment of my own. About seven or eight years ago I designed a model slab, from which, soon after, no less than 1,800 tons of slab flooring were executed in one of my buildings. The minor span of the rectangular slabs was 12½ ft. I did not realise at first the greatness of difference between slab-strength and beam-strength. So, in order to see if such slabs as I had designed would be safe, I caused to be made a concrete beam, 12½ ft. span and 1 ft. wide, of same depth as proposed slabs, and of concrete of the proposed quality.

When this trial beam was one month old, we removed the centreing, and immediately the beam fell *asunder*! simply from the stress of its own dead weight. This experiment disappointed me, and caused me seriously to question whether I had not better alter my design. But I soon came to see and feel strongly that an enormous gain of strength must be experienced by a slab supported transversely at every place and point of its substance, beyond the strength of a mere beam liable to twist as well as bend. So I then had a slab made of exactly same depth as beam, and of same material. This slab was about 12½ ft. square. When it was a month old, we removed the centreing. Why did not that slab break and fall by its own dead weight? Why did it sustain the enormous load we immediately heaped upon it, in the shape of bags of cement, amounting to an imposed load of 2 cwt. per

square foot of surface? Why has that same slab stood ever since, sometimes with even much heavier weights upon it? There must be a reason for these facts; and I think I have above stated what that reason is. We all know the difference between a long column's strength and the strength of a short column; also between the strength of a wall with and without buttresses. The same principle, of lateral support against transverse stress, is powerfully active at every point of a concrete slab, and contributes incalculably (and probably much more largely than we imagine) to sustain the slabs.

Mr. Sutcliffe complains that I "do not in any way attempt to disprove the correctness of Professor Unwin's rule." I must ask Mr. Sutcliffe to make a reasonable allowance for the distinction between a letter and a treatise. One cannot prove and disprove everything in a breath.

Then Mr. Sutcliffe notices that I am "somewhat loth to declare the absolute inaccuracy of the rule, but consider it to be probably at fault." Here Mr. Sutcliffe has ignored the fact that my letter at that point is written in the past tense, descriptive of my state of mind when I began to see that the rule was wrong. I am free to admit, however, that such is my respect for Professor Unwin, that I do now feel exceedingly loth to discover, and still more loth to declare, his formulae at fault; but, as Mr. Sutcliffe confronted me with these formulae, I had no alternative.

I am surprised that Mr. Sutcliffe should make a suggestion so entirely unscientific as that a mere change of constant would suffice to correct a rule essentially wrong in ratios. But he is quite right in his contention that I ought to show that the formulae give unreasonable results in comparing the strengths of large and small plates. It was the inapplicability of the formulae to very large plates which first drew my attention to the flaw. I have given one example at the opening of this letter which may not satisfy Mr. Sutcliffe, but which is more than enough for my satisfaction; for, where facts and formulae clearly differ, I do not expect the facts to budge.

I am glad to see that Mr. Sutcliffe accepts, without demur, my analysis of the leverage of a square slab. I did not carry my analysis farther than to determine the resultant leverage. I was careful to explain that—"It was my intention to deal in this letter not only with the stress-causing *attacking* forces of slabs, but also with the stress-causing *resisting* forces of same; the measure of the latter is the measure of counter-leverage due to slab's thickness. I also wished to deal with the encasement question. But I must leave these parts of the subject, at least for the present, as this letter has extended far beyond the limits I desired to observe. I trust I have said enough to satisfy Mr. Sutcliffe that I was not mistaken in stating that the strength of slabs is *inverse* to their span,—which was, as I understand him, the point he was in doubt about." Mr. Sutcliffe ignores this important sentence entirely.

It is not as to my analysis of the *attacking* stress that Mr. Sutcliffe finds fault; but it is as to the slab's resistance, and the mode of estimating it,—subjects, which I, in the above sentence, expressly reserved.

I thought, when writing the passage above quoted, Mr. Sutcliffe would not dispute that, as with beams, so with slabs, stress and strength must vary inversely as leverage, and I trusted that, in proving that the leverage of slabs varies as their span, I had proved enough for his purpose.

Moreover, I was well aware that, if I took one step further, I should introduce Mr. Sutcliffe to pastures new, not only new probably to him, but new also to constructional literature: pastures new and trackless, where the blind may lead the blind to confusion worse confounded.

Mr. Sutcliffe, however, heedless of my reticence, has himself crossed the frontier where I stopped short; and, as I will presently show, has, at his first stride, floundered. He takes from my letter the product of load on quarter square  $\times$  leverage of same, and proceeds to resolve this product *in his own way*; but his way is quite different from Nature's. The product with which I supplied Mr. Sutcliffe is the primary product of all the attacking forces operating on the edge of the quarter square.

If these attacking forces were all not only parallel, but also equal to one another (which they are *not*), Mr. Sutcliffe's method of dividing this primary product by the length of edge of



quarter square would be the correct method of arriving at the amount of attacking force expended on each unit of edge length.

But the forces attacking the slab edges are not uniform throughout the length of any edge; and so Mr. Sutcliffe's method of dividing the primary product by the length of edge does not give the *greatest* force, but gives the *mean* force per unit of edge. It is, however, the *greatest*, and not the *mean*, stress which determines the strength,—and therefore it is the *greatest* stress we need to find, and which Professor Unwin's formulae are supposed to give.

Mr. Sutcliffe may, however, grant this distinction, but yet contend that, in the case of square slabs, the greatest stress would bear a constant ratio to the mean stress for slabs of all spans; so that, for purposes of comparing strengths of small and large spans, the mean stress would be as good a comparative standard as any other constant function of the slab.

But behind this contention, and beneath it, lies a deeper truth, a truth which places the slab in a different order of stress—quite—from that of a beam.

That truth is as follows:—The forces which cause the rupture of a beam under a load act in a direction coincident with, or parallel to, the axis of the beam's length; and the fracture of a beam, being necessarily normal to the stress which caused it, is parallel to the beam-ends and coincident with transverse axis of beam. But in the case of a slab a different order of things obtains.

Now, here is a very simple experiment, exhibiting the distinction I seek to show between beam and slab-stresses, and their modes of action and distribution. The cover of this cardboard box (fig. 1) was as per dotted lines,

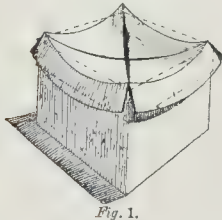


Fig. 1.

until broken by overloading. The fractures are not parallel to bearing-edges (as they would be in beams) but are *oblique* thereto.

Thus Nature does not resolve my primary product in Mr. Sutcliffe's academical fashion; but by a method of her own, as yet unnoticed in schools and text-books; at least, so far as I am aware. Of course, in a slab, as in a beam, or any other structure, the *fracture* is always *exactly* at right angles to the stress which caused it.

Thus these diagonal fractures plainly show that the primary product issues (by the transverse principle of its radial stress) in two sets of forces symmetrically intersecting each other at right angles, each set of forces being normal to the mitre line of slab on which it acts. Thus, we have (fig. 2) the C O mitre, for example, torn

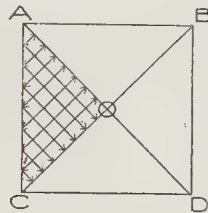


Fig. 2.

asunder by a set of parallel forces on the A C side, and an equal and opposite set on the D C side. Of the A C set of forces, A O is max. and C is (*nil*) min.

Likewise the mitre A O is torn open by one set on the A B side, and an equal and opposite set of forces on the A O side. Of the latter, C O is max. and A is (*nil*) min.

I have put an arrow-head at *both* ends of each component force, so that you may read the force darting from the mitre as the attacking stress trying to tear the mitre open, while at same time you may read the same arrow press-

ing back against the mitre as the equal and opposite force of resistance.

Mr. Sutcliffe will not be slow to see how different this resolution of the primary product is from his method. He will see that the greatest stress is represented by A O, or C O, and thus, without more complication, it is plainly to be seen that the measure of *greatest* stress is the diagonal half-length; while the measure of *total* stress is the area of the greater square, A O C. To say, as I have said all along, that the strength of slabs varies inversely as their span, is the same in effect as saying the greatest stress varies directly as the half-diagonal.

The form of resolved stresses which Mr. Sutcliffe proposes would be graphically expressed thus (fig. 3). I have shown only one

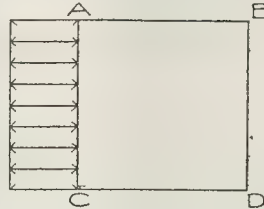


Fig. 3.

side of square; but, of course, all sides would be same way.

Unless I am deceived in the high estimate I have already formed of Mr. Sutcliffe's reasoning powers and fairness, he will not be slow to see, and admit, the error into which his mode of resolving the stresses has temporarily betrayed him.

The diagonal fractures are Nature's duly certificated teachers of the principles which determine the greatest stress of slabs. There is much more wisdom to be learnt from their parted lips than can be told in one letter.

Find a crack gape equal throughout its length, and you find a dumb, but sure, witness that the force which caused that crack was equal and simultaneous at every unit of its length.

But the diagonal fractures of slabs which have been broken by uniform overloading, with their lips wide open at the centre and closed fast at the corners, tell, with no less certitude, a very different story of their own creation. They tell of a force greatest where their gape is widest, and the area of their fissure is a long triangle proportional to the triangle of varying stresses into which, as I have shown in the above interlacing figure, the primary product of weight by leverage is finally resolved.

I may point out, as a very interesting further detail, that the stress causing the crack was a force exactly as much in excess of the force of cohesion which resisted the stress as the diagonal of slab plus the width of crack is longer than the diagonal *per se*.

I have now replied to the only point of difference between Mr. Sutcliffe and me. The latter half of his able letter is devoted to demolishing a statement which I never made. But as he honestly believed I had made it I must correct the misunderstanding.

I did not say "the more nearly square the slabs the stronger they are per unit of area."

I said only the words italicised. Mr. Sutcliffe by his construction in effect added the last four words, which I never dreamed of.\*

What I meant was, not per unit of area, but for a given span. I wish I had thought to add the words for a given span. But it never occurred to me I should be so gravely misunderstood.

I strongly italicised the fact that square slabs are stronger than rectangular, because I thought an architect is very likely to have a number of slabs of same minor span and same thickness, but not of equal lengths. Some will be rectangular, possibly of very long proportions (for example, I saw one the other day more than 100 ft. long by about 15 ft. wide), and some will be nearly square. The architect needs to be warned to make his calculations in such cases to suit the weaker (i.e., the rectangular) form. The neglect of this precaution might involve very serious practical consequences. Hence I put the warning in italics, and regret I did not make my meaning plainer.

\* We must say that we do not see what other meaning any reader could have been expected to give to the sentence in question.—Ed.

However, I hope Mr. Sutcliffe will understand now, and will see that he has knocked away at an argument I never erected.

Similarly, the other sentence of my letter to which Mr. Sutcliffe, very properly, takes exception, has been confused by my writing too elliptically. By adding the words hereafter italicised, Mr. Sutcliffe will see what I meant to convey:—

"And thus the leverage, as well as the load of trapezoidal area is greater than that of a triangle of equal perpendicular, making the stress of the trapezoidal portion of rectangular slab more or less than that of the triangular area of the same slab (*notwithstanding the greater perpendicular of the latter*), as the triangle departs more or less from square."

I note, with pleasure, that the few small points of difference between Mr. Potter and myself are made still smaller by his last letter, which strikes me as being even more admirable than his first, containing, as it does, excellent information clearly and convincingly stated.

I quite agree that the small quantity of cement which leaks through non-waterproof centring is of more trivial account than the fluid motions which discharge it. I think the loss of water more injurious or wasteful of strength, than the loss of cement by such leakage; because this loss enables the cement to set more rapidly, and less strongly, than when waterproof centring is used.

As to the 120 ft. floor not expanding because the concrete wall on which it is built shows no token, I would suggest to Mr. Potter that the concrete wall and concrete floor would naturally expand at nearly, if not exactly, equal rate. Moreover, the *repressed expansion*, due to the enormous inertia of a mass of concrete 120 ft. long, must not be forgotten.

No doubt Mr. Potter is right in attributing the dislocation of the stone cornices, which I instanced, to the use of too hot cement. But this is a proof that, with all one's care, one does get hot cement sometimes; and in view of this unpleasant, though not dangerous, contingency, I think I fairly specified hot cement for the bottle; for, as I said before, my principle is, do your best to get cool cement; but *calculate* for hot. For this reason I would rather experiment with hot than with cool; because the hot exaggerates the defects, and enables the student to understand them better from their exaggeration.

I may mention, here, there is also a danger (seldom encountered in practice) of having cement too cool.

Cement will not keep longer than about three to five months in bags without sometimes bursting the bags, and losing not only quantity by leakage, but also quality of proper strength. I met a case of this kind a few days ago. Of course, when stored in bulk, it loses strength less rapidly.

I think my remarks on Mr. Irwin's letter really cover the ground of Mr. Potter's observations on the lamination question. I am quite sure that neither the ceiling grout nor the fine stuff upper surface on my waterproof system can ever lose their homogeneity with the main damp under vertical loads.

We know, by *sound*, when a china bowl or plate is cracked, before the eye can see any sign of crack; and, in the interesting experiments by Col. Seddon, which Mr. Potter quotes, I believe the jumping did, or at least initiated the mischief; and the subsequent dead load revealed and finished it.

I feel amused at Mr. Fawcett's idea that my being in a north country, instead of London, practice disqualifies me from judging whether the temperature of concrete does or does not render it a fit material for floors of dwellings. The buildings I alluded to, as fireproof with naked slab floors, have polished stone and granite, or else best red terra-cotta, fronts, with plate-glass windows and mahogany sashes, doors, and fixtures. They are large and costly edifices, and even in London would be deemed superior. I wish Mr. Fawcett every success commercially, and while I claim for plain slabs that they are cheaper and less liable to harbour vermin than wood-covered floors, I should be sorry indeed to have said one word injurious to Mr. Fawcett's business prospects. Mr. Fawcett still seems not to understand that the slab ceilings I have described are smooth and fair to eye and touch.

I agree with you, sir, that my reference to the laminations of *terra-firma* was rather far-fetched. But I think it is generally believed that we are walking, all of us, on an ice-like



crust, over a heart of fiery fluid, which the ages have failed to cool.

FRANK CAWS.

P.S.—Since I wrote the above, three more letters, raising further points, have appeared in your last issue, to which I will reply as briefly as possible.

Mr. Hyatt's best course will be to call on me, when I shall be pleased to show him nearly two hundred large slabs in floors of buildings, about half of which number were constructed seven years ago, and have been doing heavy work ever since. Not one of these has failed, or is more likely to fail than a well-built steeple. The sight of these slabs is the only specific I can offer for the positive unbelief which still persists in regarding them as mere "idealities."

Rankine gives "Portland cement (from compact limestone and clay), thirty to fifty days after mixture, 1,200 lb. to 1,550 lb. tenacity per square inch." I gave the tenacity strength at 500 lb. per inch, desiring to keep within the truth on the safe side; and knowing perfectly well that Rankine has given (probably by pure oversight) the strength not of 1 in. sectional area, but of the orthodox "briquelette" of 1½ in. section; showing that even Rankine is liable to err, like the wisest of mortals. Molesworth (who has excellent notes on concrete) gives tenacity of Portland cement at 400 lb. to 600 lb.

Mr. Hyatt's "iron at 60,000 lb. per inch" is such stuff as ordinary practice is not privileged to use. I need use no more "algebra" than I have used yet in my articles or letters (and that is none at all) to remind Mr. Hyatt that 60,000 lb.

$\frac{2,240}{100} = \text{over } 26\frac{1}{2}$  tons. Mild steel will stand that stress per inch. Merchant iron will stand from eighteen to twenty tons only.

As to concrete floors "breaking suddenly and without warning," and as to the question of laminations, Fairbairn's experiments proved that strong sandstone resisted a crushing pressure, applied normally to its layers, seven times greater than the force which crushed it when applied in a direction parallel to its laminations, and also that only the hardest stones crush without warning. Softer stones give more or less ample notice. The softest stones crack at about half their crushing weight. Grant proved by experiment that Portland cement cracks at about five-eighths its crushing weight. I can show Mr. Hyatt several large slabs which were badly cracked right across when new, owing to the subsiding of foundation of a column on which their weight rested. These slabs have endured in their cracked state six years' warehouse work, and are likely to endure for centuries. I can also show a slab badly cracked through its centering giving way while the slab was in process of setting, and this cracked slab, instead of collapsing suddenly, has stood good three years, and is likely to remain good long after the wooden floors in the same structure have decayed. I can assure Mr. Hyatt I am not the only architect who has been so "imprudent" as to adopt slab floors on a large scale. I know several architects whose works bespeak their skill and rank, who have used, and are using, very large slabs in buildings of great magnitude and importance with excellent results.

Mr. Cooke will see, from what appears above in reply to Mr. Sutcliffe, that the discrepancy is not on my side, and that the explanation is not quite what he so good-naturedly suggested. "H. C. S." hurls at my devoted head the authority of the greatest of modern writers on engineering and applied mechanics. In challenging to the proof any teaching at variance with the pre-eminent authority of the late Professor Rankine, "H. C. S." has my entire sympathy; for I can assure him, if it be a case of apparent conflict between Rankine and Nature, my first impulse is to say, "So much the worse for Nature!" for, so profound is my respect for the great professor, I could fain disbelieve my own eyesight rather than his theory. But there is a reasonable limit to this childish habit of mind; and I have shown above that even Rankine had not attained the divine incapacity for error.

No writer teaches more unmistakably than Rankine that the point, or line, where load divides is where shearing force,  $F = 0$ . It may help us, in the case of slabs, to regard this line where load divides as, so to speak, the "water-shed of load."

If "H. C. S." will break by equally distributed, or concentrated, loads, square slabs of cardboard, glass, or any material of equally distributed strength, he will find that the lines of first fracture invariably and inevitably coincide with the diagonals, as in fig. 4.

And if "H. C. S." will apply Rankine's own method to this indisputable fact, he will find it impossible to resist the conclusion that (as I have stated) a square slab is three times as strong to carry an equally distributed, and twice as strong to carry a concentrated, load, as a beam of equal surface-area, thickness, and span.

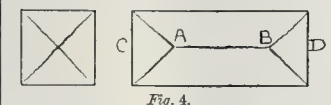


Fig. 4.

At the apex of the triangle (A, B, in diagram) the line of greatest stress bifurcates, and follows the mitres; therefore, any formula which, ignoring the bifurcation, assumes the tendency to split along the long axis to be in force from one end of the rectangle to the other, from C to D, must necessarily be at fault, and cannot, with fair regard for truth, be accepted even as "approximately true."

Between the square slab of three times beam strength and the rectangle of infinite length of equal strength to beam there are an infinite number of rectangles whose strength approximates to that of beam, or of square slab, as the length increases or diminishes.

I may say I have felt deeply sensible of the responsibility accruing to what I have written on this subject. Your readers will do me the justice to remember that I waited for years of experience to teach me before I took the serious step of publishing my conclusions; which may be summed up in this one result, proved in my experience, viz., that dwelling-house floors of good cement concrete are quite safe, so long as their least thickness is not less than  $\frac{1}{10}$  the effective mitre-length of their rectangle, which can be found thus:—

Let  $l$  = length, and  $b$  = breadth of rectangle, then the effective mitre-length is:—

$$= \sqrt{\left( \frac{2 \times \frac{b}{2(b+l)} \times bl}{b} \right)^2 + \left( \frac{b}{2} \right)^2}$$

For warehouse-floors, let least thickness be not less than  $\frac{1}{10}$  mitre-length. Best cement and brick 1 to 4; five weeks before removing water-proof centres.

F. C.

#### STREET IMPROVEMENTS IN THE DRURY-LANE NEIGHBOURHOOD.

SIR,—I shall be glad to be allowed to explain that my letter and plan, published by you last week, were in type before the appearance of the report of the Committee of the County Council. In view of their scheme, which is more extensive, and therefore, probably, more desirable, I should not otherwise have brought forward my Lincoln's-Inn Fields proposal. I assume that the present bad gradient of Catherine-street is got rid of in the new scheme.

My suggestion for a new north road still applies, since it seems most desirable to cross Holborn, as in my scheme, at its widest part rather than at Little Queen-street, which is nearly the narrowest part, and to cross it obliquely rather than at right-angles.

My plan would obviate the necessity, pointed out in the *Times*, for widening Southampton-row. Something is said in the report of a new street parallel to the Strand. Such a street is rendered impossible by Covent Garden and Lincoln's Inn, for Carey-street can never be made a great thoroughfare, even if the Record office did not block the way. Moreover, no other route into the City could ever compete with the advantages offered by the Viaduct; Long Acre also would really fulfil the purpose of a parallel road, if Great Queen-street were continued into Holborn to the point shown in my map, and Drury-lane opened to the south-east, as in my letter of April 20.

A perhaps preferable alternative to the part of my plan would be to take the new road through Day & Martin's to the east side of Red Lion-square, and down Harper-street and Orde Hall-street to Guildford-street.

My new Tonbridge-street, by the bye, would

serve St. Pancras arrival as well as King's Cross, leaving Judd-street to serve St. Pancras departure. RALPH NEVILL, F.S.A.

Rolls Chambers, Chancery-lane, Oct. 16.

P.S.—I venture to point out that my scheme for passing through Lincoln's Inn-fields has the great advantage that it would displace no quantity of dwellers. The Clare-market block is tenanted, or almost so, and the other alterations destroy only one side of Houghton-street, and the Holywell-street block that must in any case come down. The insanitary blocks mentioned by Earl Compton would be separately dealt with at leisure under the scheme for widening Drury-lane.

My access through Newcastle-street would be immensely straightened and improved if treated in as bold a spirit as the Committee's scheme, and I confess I should then prefer my own plan to that published as the Committee's in the *Globe* of the 16th inst., though mine, of course, depends entirely on the adoption of my line of New North-road. In any case, the very wide part of the Strand to the west of St. Mary's seems the proper place to introduce cross traffic, and such a route would be more useful than the straight road that looks so nice on plan, but has no corresponding advantages in practice.

The opening at the corner at Catherine-street must be very expensive, and the buildings immediately behind here are mostly new and not insanitary.—R. N.

SIR,—It is a common saying that "there is nothing new under the sun," and I was again convinced of its truth with reference to a portion of the scheme formulated in Mr. Ralph Nevill's contribution under the above heading, which appeared in your issue of the 12th inst. I gather that Mr. Nevill, while making a passing reference to a previous proposal for improving the Strand, and forming a new thoroughfare from thence to Holborn, which was suggested some few years since by Mr. C. F. Hayward, claims originality for the scheme which he now places before your readers. In justice to the original author of this scheme, Mr. William Milford Teulon, with whom I was for some years associated as a pupil and assistant, I trust you will find space for this protest.

It is now nearly twelve years since Mr. Teulon first began to move in this matter, and prepared a plan for widening the Strand between the churches of St. Clement Danes and St. Mary-le-Strand, and the roadway on the north side of the latter church. To this plan was added a proposal to form a main thoroughfare from the Strand to Holborn, and the complete scheme was approved by the Strand District Board of Works, and the Metropolitan Board of Works, and favourably considered by the First Commissioner of Works (Mr. Shaw-Lefevre); but, owing to other large improvements being in progress, the proposal was shelved. Now that the matter is again attracting public attention, I think it only just that the original author of the scheme, who sacrificed much time to its consideration and promotion, should receive whatever credit may attach to its initiation.

I enclose a copy of the plan as last amended by Mr. Teulon in 1882, and your readers will at once see the scheme now submitted by Mr. Nevill bears a very striking likeness to the original. It is, of course, quite possible that this is a coincidence, but it is a very remarkable one.

Southsea.

J. BROOKES HUNT.

\*\* The plan sent only deals with the route between Holborn and the Strand, which was but a small portion of Mr. Nevill's plan. As far as it goes, however, the two are almost identical.—Ed.

#### VENTILATING-PIPES TO "GEYSER" HEATERS.

SIR,—The admission or recommendation by Messrs. Ewart & Son, on page 264, that ventilating-pipes are necessary for all "geyser" or such-like gas water-heaters is timely. At the same time, it is not always either "very simple" or easy to put in the necessary ventilating-pipe so as to give satisfaction. I had a case recently of a gentleman who had one of these gas-heated water-heaters in his bath-room in the top flat of the house. He first had a ventilating-pipe for it led out through the window. It did not do. He then carried the pipe up to about 4 ft. above the gutter, but still there was a down-draught which sometimes blew the gas out, and the bad air back of course. He then put up the pipe 2 ft. higher still, with a small induced-current fixed ventilator on its top, and then, I understand, he got peace. I merely mention this to show that, although an intended outlet ventilating-pipe is put in, it does not necessarily follow that it will serve the purpose desired, and especially if not put in properly.

W. P. BUCHAN.

#### THE RUSKIN MUSEUM, SHEFFIELD.

SIR,—To your notice of Mr. Ruskin's Museum at Sheffield, will you allow me to add that the founder had two reasons for choosing Walkley as the site: One to provide Sheffield workmen with a definite



object for a country walk; the other to secure for his works of art a better light than any in the smoke-covered town.

E. R. ROBINSON.

What we were told at Sheffield, and what we believe we have seen somewhere in one of Mr. Ruskin's communications on the subject, was that the museum was put at a distance "because we value a thing more when we have to take a little trouble to get at it." With the object of promoting a country walk we entirely sympathise, and the site is a beautiful one; but it seems the scheme is thrown away on those for whom it was intended.—ED.

#### MUSEUMS AND GALLERIES IN CON- NEXION WITH POPULATION.

SIR,—From personal observation I can quite endorse what you say in your last issue as to Mr. Ruskin's curious little museum having failed to attract visitors.

But if you will allow me I should like to point out that a central position as regards population is not always a guarantee of permanent attraction. For example, if the official statements of the National Gallery be examined it will be found that there has been a large and persistent decline in the number of visitors. This curious process, too, has been going on in spite of the well-known and successive enlargements, both of the building and of the collection. Putting the number of visitors for 1877 as equal to 100, the figure for 1888 would be 41.3, or less than half.

In the table below are the figures similarly calculated for the series of years:—

Date.	Visitors, Public Days.	Date.	Visitors, Public Days.
1877	100	1883	63.7
1878	67.7	1884	51.7
1879	65.4	1885	62.4
1880	77.7	1886	63.2
1881	71.9	1887	59.1
1882	67.2	1888	41.3

Some of your readers may have noticed lately in the *Times* a very able article criticising the institutions which the Charity Commissioners propose to aid from the City funds. The subject of population-movement in connexion with their site was referred to. Presumably the outward flow there has been from the central parts of London,—as in Paris and Manchester—may have some part in the process going on at the National Gallery. On the other hand, while facilities of access have so enormously increased, there is something in the whole matter that rather puzzles me.

PERCENTAGE.

#### "A QUESTION OF FEES."

SIR,—In your report of this matter [p. 263], in which Mr. C. F. Hayward, District Surveyor of St. George's, Bloomsbury, sued my clients, Messrs. Sandon Bros., for fees for fifteen separate shops and sets of rooms contained in one building, Tavistock Chambers, Museum-street, you say that Mr. Bridge, the magistrate, ordered that the full amount of the claim, 562.5s., should be paid forthwith, together with costs; but you omit to say that our counsel, Mr. Morton, gave notice of appeal, and that the magistrate at once consented to state a case.

Our contention is that sec. 27 applies only as to the separation of buildings and limitation of their areas, and does not refer to fees, which are limited by sec. 49 to 10s. on one building.

As this is a question largely affecting builders and speculators, and one upon which some decision is necessary, I shall be glad to hear if any who are interested in the decision will help to fight the battle, and I shall be happy to acknowledge any subscriptions, limited to a guinea, and to account for the proper expenditure of the same.

W. SECKHAM WITHERINGTON, F.R.I.B.A.

\* \* We received no information as to the appeal, or should of course have given it.

#### CHURCH-BUILDING NEWS.

**Axmouth.**—The ancient church at Axmouth, which has just been restored, was re-opened on the 1st inst. by the Bishop of Exeter. The church, the north west doorway of which is of Norman work, dating probably about A.D. 1080, has received the addition of new vestry and organ chambers on the north side, local Beer stone being used. The roofs of the nave and chancel are entirely new, and externally the roofs have been covered in by blue Welsh slates surmounted by red creases of Maidenhead clay. The seats are all of dry wainscot oak, the backs and fronts of which are panelled and enriched by carved tracery. The stalls are of oak, as also is the carved lectern. The building is warmed by Porritt's system of hot air. An old doorway to the eastern end of the north wall of the nave has been discovered and opened out, and a double-light window in the south wall of

the chancel which has been blocked up has been reopened and fitted with coloured glass. The architects were Messrs. Hayward, Son, and Tait, of Exeter, and the work has been carried out under the architect's personal supervision by Mr. Harry Hems, of Exeter.

**London.**—On Sunday, the 6th inst., the church of the Good Shepherd, in Paddington-street, which serves as a mission church for St. Marylebone Parish, was reopened for divine service. The roof has been rebuilt, and the fabric, generally, repaired and decorated. The work was carried out by Mr. Masters, under the superintendence of Mr. T. Harris, architect, who rehabilitated the interior of the parish church, in Marylebone-road, a few years ago.

**Mydrim, Carmarthenshire.**—The parish church was re-opened on Tuesday, October 8. It has been carefully repaired and reset, an organ-chamber and vestry added, a heating-apparatus provided, and a pulpit and lectern worked in oak, passages laid with tiles, and other minor works, carried out under the direction of Messrs. Kempson & Fowler, architects, Llandaff.

**Nottingham.**—The new Church of St. Michael, Nottingham, has just been consecrated by the Lord Bishop of Southwell. It consists of nave and side aisles, chancel, and organ-chamber, and clergy-vestry on the south. The plans make provision for a choir-vestry on the north, and a porch and narthex at the west end, but these will not be added until a later period. Bulwark stone is used for the main building. Bath stone being employed for the dressings to the windows, doors, nave arcade, piers, and arches. The roof is of pitch pine, and the heating is effected on the low-water pressure system. The church is built from designs by Messrs. Habershon and Fawcner, architects, London and Newport, while Messrs. Bell & Son, Nottingham, were the contractors for the building.

**Roslin, N.Z.**—The parish church of Roslin, which has been closed five months for repairs, has just been re-opened. The improvements are mostly in connexion with the interior, but some little alterations have been made in enlarging the porch and access to the vestry. An open timber roof has replaced the old low plaster ceiling, and a choir gallery over the inner porch and a new pulpit have been added. The windows also have been renewed and glazed in panels of cathedral glass and tinted borders. The works have been carried out by Messrs. Steven & Stoddart, of Bonnyrigg, under the superintendence of the architects, Messrs. Hardy & Wight, Edinburgh.

#### The Student's Column.

##### WATER-SUPPLY.—XVI.

RESERVOIRS (continued).

IT is difficult to say what should be the precise nature of the best kinds of foundations for impounding or storage reservoirs. Nearly all that has been learnt by engineers on this head has been derived from bitter experience. It is quite clear, however, that each case must stand on its own merits; but a great deal may be gained by the discussion of failures. The bursting of the great Bradford dam in connexion with the Sheffield waterworks may be cited as a case in point. This failure resulted in great destruction of life and property, and one of the most competent engineers who examined the site of the catastrophe, the late Mr. J. F. Bateman, F.R.S., came to the conclusion that it was largely caused by a landslip. The dam was constructed on one side of the valley on hard, firm rock, and on the other on treacherous ground, which eventually formed the landslip. After the contract had been entered into, the engineer finding the conditions of a slip existing on one side, turned this end of the dam higher up the valley than was originally intended, and, as he supposed, off the treacherous ground. But even then beneath the embankment there was a flaggy rock, as smooth as a table, at an inclination of 1 in 4. The puddle-trench was sunk through the flag rock to the shale below, but when the pressure came against the puddle, standing as it did on a landslip, and that landslip again upon the inclined smooth flaggy rock, the whole thing gave way. This, therefore, proved a most injudicious site for the reservoir. It should be mentioned, however, that other authorities were not altogether in accord with Mr. Bateman as

to the actual cause of failure; they attributed it in part to the outlet pipes.

The failure of the Holmfirth reservoir, which burst in 1852, was assigned to the fact that it was very badly constructed on sandstone foundations, being open at the ends, and open beneath. Mr. Bateman observes\* that "The water escaped through the fissures of the rock, and gradually washed the embankment down in such a way that the top of the embankment was lower than the top of the swallow which was constructed as a waste weir for the purpose of letting the water off, and not until the occasion on which it burst, was the reservoir full. The floods that previously came were not too large to be discharged by the leakage of the reservoir at the ends, and below."

Clay foundations are not always to be trusted. It is true the purer kinds of clay hold up water, and when ground and properly-mixed they form good puddling material; yet, from its plasticity, clay may often be regarded as the worst form of foundation, as it is so treacherous and uncertain. Making the reservoir water-tight is important enough, but it is not everything; the foundations of the embankment must also be secure. Limestones do not, as a rule, make good sites for impounding reservoirs. On some portions of oolite and mountain limestones, the rocks are very liable to be fissured, and some of these open cracks may not be found out until either the work is well in hand, or finished. The same remark applies to some portions of the millstone grit formation.

Some valleys owe their origin in part to the existence of faults in the strata, and these dislocations are thus occasionally met with in making large reservoirs. The Rosebery reservoir of the Edinburgh waterworks caused some trouble in this respect. In constructing the puddle-trench, a satisfactory water-tight foundation was not reached until it was taken right down to the bottom of the valley, through 8 ft. of gravel and other superficial accumulations, then through 15 ft. of hard limestone, until a bed of impervious shale was reached. Mr. A. Leslie, M.Inst. C.E. says† with reference to it:—"The stratification is almost horizontal, and across the bottom of the embankment there is a fault whereby the strata are lowered towards the north, about 3 ft. Some anxiety was felt as to how this fault was to be dealt with, which crosses the puddle trench diagonally, but after considerable trouble a satisfactory bottom was obtained." In the same reservoir, the open character of the joints in the limestone was such that some of the fissures were many inches in width, and in these several water-runs were occasionally found, all which had to be rendered water-tight as nearly as possible. From the circumstance that faults are sometimes (for the reason given) found in valleys, and that the latter are so frequently covered with drift, it is not always possible for even a geologist to indicate, off-hand, the presence of small dislocations in the strata, these "solid" rocks being so thoroughly masked by the superficial accumulations.

The search for a site for the Edgeland reservoir, also in connexion with the Edinburgh water-supply, furnishes an excellent example of how an engineer may be misled by appearances. During the tests made by trial borings as to the nature of the foundations for the puddle-trench, what was apparently solid rock was met with, but which eventually turned out to be merely a large boulder, most probably transported to the position in which it was found, by ice action in recent geological times. The boring tools soon pierced the boulder, and went down to an additional depth of nearly 30 feet without reaching solid rock, in consequence of which the site had to be abandoned. In some "boulder clays" such a large number of these immense loose blocks of hard rock occur, close together, that an engineer might readily be excused if his trial borings led him to believe they were solid material *in situ*. To a good geologist there might not be much difficulty in the matter: in the majority of instances he would know of the existence of this class of deposit in the district, beforehand, from surrounding circumstances, and would thus be put on his guard. He would critically examine the pieces of boulder (assumed at first to be solid rock *in situ*) brought up by the boring apparatus, and would compare their structure with such rocks as he knew to be *in situ* on the banks of the valley or watercourse, and if they were dis-

\* Min. Proc. Inst. C.E., vol. lix. (1889), p. 66.  
† *Id.* vol. lxxiv. (1883), p. 116.



similar in lithological character his suspicions would immediately be roused, unless he had good reason to suppose that such a change might be expected. Generally speaking, however, the structure of the boulder would be a sufficient guide to enable him to positively assert, at once, that it was not *in situ*, but had travelled from afar, and that, therefore, the engineer was not dealing with solid ground. He might even be able to indicate the main mass of rock, many miles away, from which the boulder had been derived.

We might give many other cases in point, but enough has been said to show the absolute necessity of an accurate geological knowledge of the surroundings of a proposed storage or impounding reservoir site.

In excavating loose materials in forming the banks of large reservoirs, it is important to observe a proper angle of rest for the slopes (as in the case of railway cuttings, and the like), otherwise slips are sure to result. Certain rules have been framed to assist engineers in regard to this point, and although these are unquestionably useful in some instances, many cases could be quoted to the contrary. The mechanical admixture of a deposit, and as to whether it be pure clay, sandy clay, marl, sandy marl, or what not, no doubt has a great deal to do with the determination of the angle at which such deposits may lie at rest, but their dip or inclination from or towards the inside of the excavation, together with their power of absorbing and retaining water, and other things of a kindred nature, have also to be taken into consideration. The water can usually be drained off, but certain strata have local peculiarities which cannot be provided for in this way, and it is not until several slips and failures that these can be successfully combated against. It will be useful, however, to quote the opinion of Mr. Baldwin Latham on this subject. It has occurred to him, he says,\* that the stability of a bank might be determined roughly by dividing the percentage of the water it would hold by weight by twelve, which would represent the horizontal distance that should be given to a bank to one of vertical, in order that it might be absolutely stable; so that a clay soil holding 50 per cent. by weight of water should have an internal slope of one in four; and sandy soils varying from thirty-three to twenty-five, or twenty, or even less, the rate of the slope of the inner side exposed to the water might be very much less. Of course, the rule referred to gives a scope within the angle of repose of the material itself. In constructing an impounding reservoir in Oxford clay some years ago, Mr. Latham found it necessary to make a slope of one in five, before he could get the embankment to stand.

In certain situations plastic clay, such as that found in our lower Tertiary beds, requires even a greater angle of repose than 1 in 5. We remember seeing the slips of this material in the Park Hill cutting, at Croydon, during the formation of the line there, even although such a gentle slope as this was allowed. The engineer can obtain much information on the angles of repose of different kinds of strata by examining their behaviour in natural sections; but of course considerable allowances must be made in putting these observations into practice, as the artificial treatment of the materials by draining, making them into suitable linings for reservoirs, &c., alters the natural conditions under which they would remain stable.

**Lifts.**—The new Hôtel Métropole now being erected opposite the West Pier at Brighton is to be fitted with a complete system of elevators, consisting of two suspended hydraulic passenger lifts, each to raise eight persons, and running from basement to the sixth floor, a height of 96 ft., the cars being raised by four steel wire ropes and special patent safety apparatus and governor gear; one hydraulic luggage lift, five hydraulic service lifts, one hydraulic kitchen lift, two direct-acting basement lifts, four hand-power dinner and service lifts, and one hydraulic collar lift of special design, from cellar to yard level. The hydraulic lifts are to be worked by water from a tank at the top of the building, which will be delivered into the tanks by two double-cylinder direct-acting steam pumps, with all the necessary pipes and connexions. The whole of this plant will be constructed and erected by Messrs. R. Waygood & Co.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

15,601. Electric Bell-push Fittings. C. J. Harcourt.

The improvement, which is the subject of this invention, consists in arranging the construction of electric bell-push fittings so that two materials may be used instead of only one, in such a way as to facilitate manufacture and ornamentation. The frame which carries the non-conductor carrying metallic contact pieces is made of metal, but the front portion is left open, and kept in position by means of a shoulder or "set-off," made in the interior of the metallic frame. There is also a ledge or seat, against which may rest a disc or other-shaped body, secured in its position by the metal surrounding, it being pressed tightly around the circumferential edge. A central hole is left to receive the ordinary push-piece.

16,187. Moulding Bricks. M. Bowring.

In order to obviate the handling of the bricks, this invention uses a rising mould with automatic action, actuated by the revolving table, and suitable gear used with brick-making machines.

16,688. Open Fireplaces. G. C. Brodie and another.

By grooves and plates actuated from behind the stove, the space through which the air passes to the chimney is contracted. The plates also act as draw-plates, and induce rapid combustion. By lowering the sliding-plate, however, to nearly its full extent, an amount of air may be admitted to the fuel only sufficient to keep up a low or smouldering combustion.

10,646. Stoves and Ranges. E. Calone and others.

It is claimed that the kitcheners made under this specification are specially improved for broiling purposes. The smoke, cinders, gases, ashes, and the odour of the cooked meats are carried away from the cook, while the clear heat radiates upon the substances to be cooked, so that they retain their flavour free from noxious influences. This is arranged by special arrangement of flues with dampers or doors to regulate the draught, and a sliding top with adjustable lids or covers.

12,484. Feeding Apparatus of Frame-saw Machinery. J. Wurster.

This invention relates to means for regulating the feeding of saw-frames. The feeding-rollers which carry the log forward are intermittently rotated from a friction or other wheel moved at each stroke of the frame. In order to give a greater or less amount of feed to the logs, means are arranged whereby the stroke of the eccentric or crank can be easily altered, even while the saws are at work.

12,620. Wood-block Flooring. T. Charteris.

In order to make a rigid floor, the blocks of which it is composed are by this invention dovetailed and related together. Tongues are used, and the blocks are further held by suitable cement, which enters the cavities formed by the dovetail grooves.

## NEW APPLICATIONS FOR PATENTS.

Oct. 1.—15,385, W. Whitham and F. Dawson, Combined Bolt and Door-prop.—15,411, D. Gill, Perforating and Fixing Scales.—15,419, G. Waller, Air-tight Cover for Drains, &c.—15,430, J. Brooks, Sash-fasteners.

Oct. 2.—15,484, O. Elphick, Syphon Flushing Apparatus.

Oct. 3.—15,509, C. Martin, Electric Bells.—15,510, G. Notton, Filtering Cisterns, &c.—15,518, W. Sturmer, Mortice Locks and Latches.—15,523, G. Connell, Ventilators.—15,524, F. Berry, Electric Bells.—15,538, E. Wren, Screw.

Oct. 4.—15,585, J. Easby, Automatic Apparatus for Waterclosets.—15,593, A. Brookes, Veneers.—15,603, J. Austin, Sash-fasteners.

Oct. 5.—15,638, P. Nicolas, Stop for Doors and Windows.—15,639 and 15,640, W. English, Warming Rooms and Buildings.—15,669, J. Easley, Artificial Asphalt.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

12,366, F. Robinson and E. Hodgson, Hearses, Stoves, Fireplaces, &c.—13,225, J. Oates, Painters' Brushes, &c.—13,373, R. Wilford, Automatic and Screw Fastenings for Sliding Windows.—13,791, J. and W. Davis, Ridge Capping and Tiles.—13,847, J. and H. Wilson, Decorating Ceilings and Walls.—13,984, E. Hoyle, Double-threaded Screw for Wood.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to Opposition for Two Months.

14,377, J. Kaye, Fastenings for Exit and other Doors.—15,461, D. Burns and J. Cairns, Regulating and Fixing Fanlights, Ventilators, &c.—15,605, L. Barber, Ladder.—16,053, C. Huelsner, Fireproofing Device for Walls, Ceilings, &c.—17,563, W. Lindsay, Fireproof floors.—17,693, R. Furstenberg, Waterproof, Fire, and Weather Resisting Material for Roof Coverings.—13,635, T. B. Bradley, Lifting and other Latches.—13,880, M. Griswold and W. Atterbury, Sheet or Window Glass.

**The Hygienic Cement Syndicate, Limited.**—The prospectus of this company will be found in our advertising columns.

## RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

Oct. 7.—By A. THOMAS, FEYER, & MILLS. Wootton Bassett—The Beaufort Brewery, f, and Sixteen Public-houses ..... £15,250

By A. CHANCELLOR. Petersham—The Residence known as "Church House" ..... 1,100

Oct. 8.—By DEBENHAM, TAWSON, & CO. Holloway-rd.—Nos. 718 and 720, u.t. 70 yrs., g.r. £42, r. £155 ..... 1,630

Hampstead-rd.—Nos. 226, 231, and 233, u.t. 19 yrs., g.r. £30, r. £183 ..... 1,050

By WESTON & SON. Briston—1 to 8, St. Lawrence-rd., u.t. 70 yrs., g.r. £31, 10s., r. £232 ..... 1,550

7 to 13, St. Lawrence-rd., u.t. 70 yrs., £36, 15s., r. £264 ..... 1,725

By REYNOLDS & RASON. Islington—63, Essex-rd., f, r. £23 p.a. ..... 625

Bethnal Green—11, Wood-st., f, r. £23 p.a. ..... 610

By BALY, NORMIS & HADLEY. Forest Gate—162, Osborne-rd., u.t. 93 yrs., g.r. £5, 12s., r. £28 p.a. ..... 280

Lower Clapton—27, Mayland-st., u.t. 89 yrs., g.r. £7, r. £33 p.a. ..... 280

Stepney—18, Cayley-st., u.t. 10 yrs., g.r. £12, r. £45 p.a., 74, Eastfield-st., u.t. 50 yrs., g.r. £6, Limehouse—52, 54, and 56, Repton-st., and land 2, John's-gds., u.t. 25 yrs., g.r. £22, 10s. Bernonsey—1, 2, and 3, Bombay-st., u.t. 81 yrs., g.r. £25, Shoreditch—28, 29, and 30, Wallington-st., u.t. 81 yrs., g.r. £39 p.a. ..... 300

Oct. 10.—By J. & R. KEMP & CO. Holborn—49, Red Lion-st., f, r. £115 p.a. ..... 2,000

"The Wheatsheaf" public-house, f, r. £26 p.a. ..... 1,400

By E. RICHARDS & CO. Wandsworth—125, 127, and 129, St. James's-rd., f, r. £28 ..... 1,590

85, 101, 103, and 123, St. James's-rd., f, r. £150 ..... 1,780

17, Althorpe-rd., f, r. £40 p.a. ..... 543

Clapham—15, Newcomen-rd., f, r. £25 p.a. ..... 280

By C. C. & T. MOORE. Mile End—27, St. Peter's-rd., u.t. 41 yrs., g.r. £3, 10s., r. £34 ..... 215

Shadwell, Twine-court—A plot of copyhold land ..... 300

By Messrs. CHADWICK. Sawbridgeworth—"The Hamptons" with grounds, f ..... 625

By E. STIMMON. Islington—105, Balls Pond-rd., u.t. 14 yrs., g.r. £4, r. £40 ..... 175

Briston—35 and 36, Thornton-st., u.t. 35 yrs., g.r. £6, r. £52 ..... 400

23 and 25, Evandale-rd., u.t. 24 yrs., g.r. £5, 2s., r. £38 ..... 515

Old Kent-rd.—19 and 23, Clifton-crescent, f, e.r. £48 ..... 600

By WORSFOLD & HATWARD (at Dover). Dover—50, York-st., f, r. £27 p.a. ..... 450

River, near Dover—23 to 26, River-st., f, r. £23 p.a. ..... 120

Freehold cottage in Lower-rd., r. £5 p.a. ..... 485

Two plots of f. land, ..... 350

Freehold cottages ..... 456

F. meadow, about 4 acres ..... 300

Pythome—Two cottages, and 1 a. 3 r. 13 p., f ..... 240

Oct. 11.—By R. W. SCORRILL. City of London—12, Pancras-lane, f, r. £350 ..... 6,800

[Contracts used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; e. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

## TUESDAY, OCTOBER 23.

University College (Gower-street).—Mr. Hugh Stannus on "The Distribution and Application of Ornament with Reference to Surface, Material, Construction, and Purpose." II. 5 p.m.

## WEDNESDAY, OCTOBER 23.

University College (Gower-street).—Professor R. S. Poole on "Medieval Architecture." II. 5 p.m.

**The Great Bridge Across the St. Lawrence.**—The work of constructing the great bridge across the St. Lawrence, near Quebec, will shortly be begun. The bridge is to be built upon the cantilever principle, and will be 440 metres in length, and have a height above water at high tide of 124 metres. The main span will rest upon granite pillars about 150 metres from the shore, being brought down to a depth of 12 metres into the river bed. The total cost of the bridge is estimated at about 2,000,000, and when finished there will be no break in the track of the Pacific Railway from the borders of the Atlantic to the Pacific Ocean. **Wesleyan Chapel and Schools, Cleckheaton.**—A new Wesleyan Chapel and Sunday Schools, erected in Whitcliffe-road, Cleckheaton, at a cost exceeding 6,000, has just been opened. The building has been erected from plans prepared by Mr. W. H. Howorth, of Cleckheaton. The chapel will seat 850 people; the schoolroom, which is underneath the chapel, provides accommodation for 850 scholars, exclusive of seven class-rooms, library, and kitchen.



## Miscellaneous.

**Registration of Plumbers in Scotland.**—Sir Alexander Christian, in the absence of the Lord Provost, presided over a large public meeting, held at the Freemasons' Hall, Edinburgh, a few days ago, for the purpose of promoting the National System of Registration of Plumbers. Among those present were General Sir Murdoch Smith, Director of the Science and Art Museum; Professor Crum-Brown, Principal Grant Ogilvie, of the Heriot Watt College; Dr. Littlejohn, City Medical Officer of Health; several members of the Corporation, medical men, architects, sanitarians, as well as representatives of the plumbing trades (masters and operatives), and the general public. Dr. Littlejohn said he had no hesitation in asserting that the registration system both deserved and enjoyed the support of the public. A notable feature in the registration movement was that it was making plumbers join together in a common effort to improve their education as a body. Professor Crum-Brown spoke strongly in favour of technical education classes. He said they were necessary to the efficient training of plumbers, because they enabled the men to understand the reason for doing the things they were taught to do in the workshops. Principal Grant Ogilvie endorsed the views of Professor Crum-Brown, and added that it was useless to set up a standard of qualification for the plumbers if they did not also give them the means of qualifying themselves. The Clerk of the Plumbers' Company, London, said he was glad to be able to state that organizations for carrying out the National Registration System were now widely established throughout the Kingdom, and that already about 5,000 plumbers were enrolled on the Company's Register, while in most of the districts classes were available for the practical and theoretical instruction of plumbers. On Saturday last a meeting with the same object was held at Galashiels.

**Church of the New Jerusalem, Glasgow.**—A new church, which has been erected at Crosshill for the Church of the New Jerusalem, has just been opened. It is built of dark red sandstone, and the style of architecture is Early English of the lancet period. The principal front to Queen's Drive has a gable, about 60 ft. in height, flanked by massive buttresses, which rise the full height, and terminate in pannelled and moulded pediments. The entrance-door occupies nearly the whole lower portion of the front, and has a richly-moulded archway. The doorway is flanked by buttresses with moulded niches, and at each side is a small lancet-window, lighting the vestibule. Over the entrance three tall lancet-windows, recessed under a deeply-moulded arcade, and separated by circular shafts, occupy the full breadth of the gable, the apex of which is enriched by cusped panneling, and terminates with a carved cross. Internally the church is cruciform in plan, consisting of a wide nave roofed in a single span, double transepts on each side, and a semi-circular apse. Heavy moulded stone arches, supported on clustered stone piers, divide the transepts from the nave, and the dividing arch at the apse is also of dressed stonework. The pulpit, which is oak, pannelled and cusped, is placed at the side of the apse. Besides the church, the building comprises a hall, seating 250 persons, vestry, choir-room, committee and library-rooms, cloak-rooms, kitchen, stores, &c. The buildings were designed by and erected under the charge of Mr. John E. Wilson, A.R.I.B.A., Glasgow.

**Tayport Sewerage.**—The Commissioners of Tayport, near Dundee, recently advertised an open competition, and they finally selected a scheme designed by Mr. W. H. Radford, C.E., of Nottingham, as the most suitable and practicable for the sewerage of their district. The scheme consists of a system of pipe sewers, gravitating to two sea outfalls in the Firth of Tay. Advantage is taken of the natural falls of the district, and the sewage can be discharged at all states of the tide. Ample inspection, ventilation, and flushing arrangements are provided. Mr. Radford will be engaged to superintend these works.

**The Surveyors' Institution.**—The first ordinary general meeting of this Institute the session 1889-90, will be held on Monday, Nov. 11, 1889, when the President, Mr. E. P. Squarey, will open the session with an address.

**The Electric Telegraph foreseen by a Rector of Bath 228 years ago.**—The Rev. Canon Jackson, of Leigh Delamere, Chippenham, sends to the *Bath Chronicle* the following interesting contribution:—"Joseph Glanvill, sometimes called 'Sadducismus Triumphatus Glanvill,' Rector of Bath from 1666 to 1672, was a learned writer upon abstruse and mystical subjects, but in a style of which it is not always easy to catch the meaning. In one of his Treatises called 'The Vanity of Dogmatizing,' printed in 1681, chapter xxi., he is speaking of 'supposed impossibilities, which may not be so.' In the concluding sentence of the following passage he seems to have anticipated the Electric Telegraph:—'But yet to advance another instance. That men should confer at very distant removes by an extemporary intercourse is a reputed impossibility; but yet there are some hints in natural operations that give us probability that 'tis feasible, and may be compassed without unwarrantable assistance from demoniacal correspondence. That a couple of needles equally touched by the same magnet, being set in two dials exactly proportioned to each other, and circumscribed by the letters of the alphabet, may effect this 'magnale' [i.e., important result], hath considerable authorities to avouch it. The manner of it is thus represented. Let the friends that would communicate take each a dial: and having appointed a time for their sympathetic conference; let one move his impregnate needle to any letter in the alphabet, and its affected fellow will precisely respect the same. So that would I know what my friend would acquaint me with, 'tis but observing the letters that are pointed at by my needle, and in their order transcribing them from their sympathetic index as its motion directs; and I may be assured that my friend described the same with his; and that the words on my paper are of his inditing. Now though there will be some inconvenience in a circumstance of this invention, in that the thus impregnate needles will not move to, but avert from, each other (as ingenious Dr. Browne hath observed), yet this cannot prejudice the main design of this way of secret conveyance: since it is but reading counter to the magnetic informer, and noting the letter which is most distant in the Abecedarian circle, from that which the needle turns to, and the case is not altered. Now, though this desirable effect possibly may not yet answer the expectations of inquisitive experiment, yet 'tis no despicable item, that by some other such way of magnetic efficiency, it may hereafter with success be attempted, when magical history shall be enlarged by riper inspections; and 'tis not unlikely but that present discoveries might be improved to the performance.'"

**The North Sea-Baltic Canal.**—Work on the great canal now being constructed across Holstein from the North Sea to the Baltic has been actively carried on along its whole length during the summer and autumn with some 6,000 men, and it is estimated that about half of the work has been done. A number of large steam excavators are employed in the work. The price of excavating and removing the earth has varied from 8½d. to 10d. per cubic metre. The work is divided into four sections, the administrations of which are situated at Brunsbüttel, on the Elbe, Burg, Rendsburg, and Kiel. At the Baltic end the canal, which will be at Holtenau, near Kiel, and from thence to Grünthal, the highest point, the work is well forward, but less so on the portion Grünthal-Elbe. At Grünthal is the watershed between that river and the Eider, which the canal follows throughout most of its course, and here a great embankment, 75 ft. in height, is being constructed, along which the railway and main road through Holstein will pass. The total length of the canal, from the latest surveys, will be 98 kilometres, the depth 8.5 metres, and the surface width 60 metres. It might be mentioned that the engineering difficulties are not proving great, the chief ones being the enormous masses of boulders found in the soil, which have to be blasted to pieces. The canal is to be fortified at several points. The cost is estimated at 7,300,000*l.*, of which Prussia contributes 2,500,000*l.*, and the German Empire the remainder. It should, however, be pointed out that workmen's wages in Germany are very low, amounting on the canal only to 3s. 6d. per day of twelve hours in the summer, and less in winter. Although undertaken for strategic reasons, it is evident that the "Suez Canal of Northern Europe" will become of great commercial importance.

**The English Iron Trade.**—We have had another very considerable rise in the English iron market during the past week, business continuing most active. There has been great excitement in the Glasgow warrant market, prices having advanced by leaps and bounds, the gain on the week being 2s. Scotch makers' iron is from 1s. 6d. to 2s. 6d. a ton higher, according to brand. Middlesbrough pig has jumped up 3s. 3d. a ton, and Bessemer pig 2s. 6d., while in Lancashire and Midland pigs the gain ranges between 2s. 6d. and 6s. a ton. Notwithstanding these advances, trade in pig iron is animated. Manufactured iron is fairly active at the higher prices declared at the quarterly meetings, and from the North a further advance is reported. Tin plates are held firmly, at slightly advanced rates. Steel works are still booking large orders. Prices of steel, with the exception of rails, are not higher, but very stiff, rails being 2s. 6d. dearer. Shipbuilders continue busy, but very little fresh work is being secured. Engineers are still doing a good business.—*Iron.*

**Sanitary Earthenware and Appliances.**—From Mr. Thomas W. Twyford, of Cliffe Vale Pottery, Hanley, we have received a very useful and admirably got-up illustrated catalogue of sanitary earthenware and appliances manufactured by him. It is accompanied by a price list. Many of Mr. Twyford's appliances, such as the "Units" Wash-out Closet, for instance, are so well known for excellence and efficiency that we need say nothing here about them. The catalogue and price-list will be found very complete, and exceedingly useful for reference by architects and builders.

## PRICES CURRENT OF METALS.

		£.	s.	d.	£.	s.	d.
TIMBER.							
Greenheart, B.G.	ton	7	0	0	7	15	0
Teak, E.I.	load	12	0	0	12	0	0
Regino, U.S.	foot cube	0	2	0	0	2	0
Asi, Canada	load	3	10	0	3	10	0
Birch	"	3	10	0	3	10	0
Rim	"	4	0	0	4	0	0
Fir, Danisic, &c.	"	2	0	0	2	10	0
Oak	"	2	10	0	2	10	0
Canada	"	5	10	0	5	10	0
Pine, Canada red	"	3	0	0	3	0	0
" yellow	"	3	10	0	3	10	0
Lath, Danisic	"	10	0	0	10	0	0
St. Petersburg	"	5	0	0	5	0	0
Wainscot, Riga, &c.	log	2	15	0	2	15	0
Deals, Finland, 2nd and 3rd	"	3	10	0	3	10	0
" 4th and 3rd	"	7	0	0	7	0	0
Riga	"	7	0	0	7	0	0
St. Petersburg, 1st yellow	"	11	0	0	11	0	0
" 2nd	"	10	0	0	10	0	0
" white	"	7	0	0	7	0	0
Swedish	"	8	0	0	8	0	0
White Sea	"	9	0	0	9	0	0
Canada, Fir, 1st	"	18	0	0	18	0	0
" 2nd	"	11	0	0	11	0	0
" 3rd, &c.	"	8	0	0	8	0	0
" Spruce, 1st	"	7	0	0	7	0	0
" 2nd	"	7	0	0	7	0	0
New Brunswick, &c.	"	6	10	0	6	10	0
Battens, all kinds	"	8	0	0	8	0	0
Floors, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th	"	0	11	0	0	14	0
Second	"	0	8	0	0	10	0
Other qualities	"	0	8	0	0	7	0
Oak, Cuba, 1st	"	0	0	0	0	0	0
Honduras, &c.	"	0	0	0	0	0	0
Mahogany, Cuba	"	0	0	0	0	0	0
St. Domingo, cargo average	"	0	0	0	0	0	0
Mexican	"	0	0	0	0	0	0
Tobacco	"	0	0	0	0	0	0
Honduras	"	0	0	0	0	0	0
Box, Turkey	"	15	0	0	15	0	0
Bahia	"	14	0	0	14	0	0
Satin, St. Domingo	"	0	0	0	0	0	0
Porto Rico	"	0	0	0	0	0	0
Walnut, Italian	"	0	0	0	0	0	0

## METALS.

Iron—Pig, in Scotland	ton	0	0	0	0	0	0
Bar, Welsh, in London	"	6	10	0	7	0	0
" at works in Wales	"	8	0	0	6	10	0
" Staffordshire, in London	"	7	10	0	8	0	0
COPPER.							
British, cake and ingot	ton	47	0	0	48	0	0
Best selected	"	48	0	0	49	0	0
Sheets, strong	"	56	0	0	0	0	0
Chili, bars	"	43	0	0	0	0	0
Yellow Metal	lb.	0	8	0	0	0	0
Lead—Pig, Spanish	ton	12	5	0	12	0	0
English, com. brands	"	12	12	0	0	0	0
Sheet, English	"	14	0	0	0	0	0
Tin—Bancs	ton	92	10	0	0	0	0
Billion	"	91	0	0	0	0	0
Strait	"	90	10	0	0	0	0
Australian	"	91	10	0	0	0	0
English Ingots	"	94	10	0	0	0	0
Zinc—English sheet	ton	25	10	0	26	0	0

## OILS.

Linseed	ton	21	0	0	21	5	0
Cocunut, Cochin	"	27	10	0	0	0	0
Ceylon	"	27	0	0	0	0	0
Palm, Lagos	"	23	10	0	0	0	0
Rapeseed, English pale	"	30	10	0	0	0	0
" brown	"	29	0	0	0	0	0
Cottonseed, refined	"	23	0	0	0	0	0
Tallow and Oleine	"	21	0	0	40	0	0
Lubricating, U.S.	"	5	0	0	8	0	0
refined	"	7	0	0	12	0	0
Archangel	"	0	15	0	0	15	0



## COMPETITION, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Offices, &c.	East Barnet Valley Local Board	Not stated	Nov. 18th	i.

## CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Laying Patent Stone Channel on Concrete	Mortlake Highway Bd.	H. Richards	Oct. 21st	xii.
New Buildings for Water Supply	Haste County Asylum Committee	E. J. Hildred	Oct. 22nd	ii.
Main Drainage Extension	West Ham Council	Lewis Angell	do	xii.
Supply of Flints and Hoggin	Midle End Vestry	J. M. Knight	Oct. 23rd	xii.
Cast-iron Water Pipes	Gt. Yarmouth Council	J. W. Cockrell	Oct. 24th	ii.
Making Roads and Drains, Tubridge Wells	Estate Owner	P. Pomfret	Oct. 25th	xii.
Grants	Hastings Corporation	H. E. Palmer	do	ii.
Main Drainage Extension	Broadstairs, &c. L. B.	Lewis Angell	Oct. 26th	xii.
Main Intersecting Sewer	West Ham Council	Lewis Angell	Oct. 26th	xii.
Alterations, &c., Baker's-row Infirmary	St. Helen's Health Com.	G. J. C. Brown	Oct. 26th	xii.
Brick and Concrete sewer	Whitechapel Union	Bruce J. Capell	do	xii.
Alteration at Town Hall	Lewisham Bd. of Wks.	Official	do	xii.
Construction of Branch Railway, Heanor	Trustees, All Saints, Poplar	Clarkson	Oct. 30th	xii.
New Schools	G. N. R. Co.	R. Johnson	Oct. 31st	ii.
Courts of Justice, Police Offices, &c.	Barclay School Board	Senior & Clegg	Nov. 11th	xii.
Fire Alarm Poles, &c.	York Corporation	H. A. Matar	do	xii.
Filling in the New Public Wharf, Silvertown	South Hornsey Loc. Bd.	Official	Nov. 12th	ii.
Officers' Quarters, Shorncliffe Camp	West Ham Council	Lewis Angell	Not stated	ii.
Police Station and Strong Rooms, Garston	War Department	Official	do	xii.
	Lancashire County Council	G. Holme	do	ii.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor	Kettering Local Board	200 <i>l.</i> , &c.	Oct. 26th	xvi.
Inspector of Nuisances	Exmouth U.S.A.	140 <i>l.</i>	Oct. 28th	xvi.
Superintendent, Main Drainage Pumping Station	London County Council	200 <i>l.</i> , &c.	do.	xvi.

## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursday.]

CHERTSEY.—For new wing to "Huntington," Chertsey. Messrs. Bean, Burnett, & Eldridge, surveyors, 14, Nicholas-lane, E.C. 4.  
Nymeth, Chertsey (accepted).....2945 0 0

CLAYBURY (Essex).—For the erection of the superstructure of the new Asylum at Claybury, Essex, for the London County Council. Mr. G. T. Hine, architect.—

H. Lovatt, Wolverhampton	£377,680 0 0
G. W. Trollope & Sons, Pimlico, S.W.	377,600 0 0
J. Fell, Leamington	368,700 0 0
B. E. W. Tatkinson, Whitehall, S.W.	361,481 0 0
J. Mowlem & Co., Westminster	351,480 0 0
J. Longley & Co., Crawley, Sussex	340,668 0 0
E. Neill & Sons, Manchester	340,519 0 0
Perry & Co., Bow, E.	343,627 0 0
J. T. Chappell, Finsbury, S.W.	338,338 0 0
E. Gabbitt, Liverpool	337,945 0 0
W. Brass & Son, 47, Old-street, E.C.	337,777 0 0
S. W. Tatkinson, Whitehall, S.W.	335,976 0 0
Belham & Co., 155, Buckingham Palace-road, S.W. 1	259,000 0 0

\* Recommended by the Asylums Committee for acceptance.  
† Withdrawn, as containing an error of about £70,000.

COULSDON (Surrey).—For erecting buildings to afford additional accommodation at the County Asylum for pauper inmates at Cane-hill, Coulsdon, Surrey, for the London County Council. Mr. Howell, architect.—

H. Lovatt, Wolverhampton	£86,000 0 0
Perry & Co., Bow, E.	86,947 0 0
E. Gabbitt, Liverpool	86,950 0 0
J. Mowlem & Co., Westminster	86,381 0 0
B. E. W. Tatkinson, Whitehall, S.W.	83,885 0 0
Peto Bros., Pimlico, S.W.	82,447 0 0
John Fell, Leamington	80,500 0 0
S. W. Tatkinson, Whitehall, S.W.	80,319 0 0
J. Longley & Co., Crawley, Sussex	79,950 0 0
W. Brass & Son, 47, Old-street, E.C.	79,763 0 0

\* Recommended by the Asylums Committee for acceptance.  
CRICCIETH.—For extension of sea walls, &c. Mr. Thomas Roberts, Assoc. M. Inst. C.E., engineer.—

G. Williams, Harlech	£485 0 0
Williams, Carnarvon	440 0 0
E. Williams, Bangor (accepted)	423 0 0
[Engineer's estimate, £444.]	
FELIXSTOWE.—For new stabling and coach-house	
Mr. C. Maw, The Gables. Mr. John S. Corder, architect, Wimbourne House, Ipswich.—	
Durrant	£285 0 0
Ward	188 0 0
Theobald	155 0 0
Orford	155 10 0

EAST HAM.—For the construction of sewage outfall works, tanks, engine-house, boiler-house, stores, chimneys, shaft, and cottage for the East Ham Local Board, Essex. Messrs. Charles Jones and W. H. Savage, Engineers.—

J. W. & J. Neave	£15,000 0 0
L. Bottomley	15,151 0 0
W. Greger	15,300 0 0
Perry & Co.	15,768 0 0
G. Bell	15,300 0 0
T. Adams	15,414 0 0
J. Jackson	14,838 0 0

\* Deduct, if part of foundations are omitted.  
† Accepted.

GRAVESEND.—For the erection of new tower, copper-house, cellars, &c., at the Wellington Brewery, for Mrs. E. Walker. Mr. Arthur Kinder, architect, Suffolk House, Laurence Pountney-hill, Cannon-street, London, E.C. 4. Quantities by Mr. Alexander H. Kinder, 34, Clement's-lane, London, E.C. 4.

Herbert Stiff, Dover	£3,638 0 0
W. & E. Wallis, Gravesend	3,498 0 0
C. Wallis & Sons, Maidstone	3,312 0 0
Wall Bros., London	3,319 0 0
Milton & Wallis, Gravesend	3,048 0 0
W. H. Archer, Gravesend (accepted)	3,038 0 0

HAMPSTEAD.—For erecting additional swimming baths, for the Commissioners. Messrs. Spalding & Cross, architects.—

J. Allen & Sons (accepted)	£8,690 0 0
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HARLESDEN.—For erecting Baptist chapel in Acton-lane, N.W. Mr. Charles Bell, architect.—

J. Allen & Sons (accepted)	£5,250 0 0
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HARLINGTON (Middlesex).—For erecting new police-station, with stabling and cottages, for the Receiver for the Metropolitan Police District. Mr. John Butler, F.R.I.B.A., Surveyor for the Metropolitan Police.—

Lodge	£3,770 0 0
Garlick & Horton	3,490 0 0
Arves & Co.	3,470 0 0
Brass & Son	3,429 0 0
Perkins	3,200 0 0
Holland & Hansen	3,199 0 0
Hart Bros.	3,177 0 0
Grover & Sons	3,176 0 0
J. T. Chappell	3,173 0 0
Scriveners & Co.	3,170 0 0
Ansell	3,165 0 0
Lorden & Son	3,144 0 0
Lathby Bros.	3,120 0 0
A. & B. Hanson	3,095 0 0
Farnside & Son	2,832 0 0

LONDON.—For the erection of new premises, Charing Cross-road, for Messrs. Elliott Bros., in extension of their existing premises. Quantities supplied.—

Kirk & Randall	£18,064 0 0
Mowlem & Co.	12,630 0 0
Bywaters	12,272 0 0
Perry & Co.	11,898 0 0
Leavre & Son	11,925 0 0
Grover & Son	11,767 0 0
Peto Bros.	11,735 0 0
Fatman & Co.	11,473 0 0

LONDON.—For erecting business premises in the Charing-cross-road, W.O. Mr. E. Fabian Russell, architect. Quantities supplied.—

C. W. Burgess	£10,800 0 0
Holloway Bros.	9,744 0 0
Wm. Smith	9,637 0 0
B. E. Nightingale	9,580 0 0
Simpson & Son	9,530 0 0
Grover & Son	9,348 0 0
Fatman & Fotheringham	9,173 0 0

LONDON.—For the erection of workroom for women, at the Workhouse, Harrow-road, for the Guardians of Paddington. Messrs. A. & C. Harton, architects, 16, Leadenhall-street. Quantities supplied.—

White & Son	£2,081 0 0
W. Johnson	1,839 0 0
J. Martin	1,854 10 0
R. Edwards, Junr.	1,824 0 0
Simmonds	1,818 0 0
F. Dupont	1,784 0 0
J. Edmunds	1,735 0 0
Shillitoe & Son	1,730 0 0
G. E. Todd	1,694 0 0
G. Stephenson	1,693 0 0
Flew & Co.	1,683 0 0
J. Hole	1,678 0 0
Whitehead & Co.	1,660 0 0
J. O. Richardson	1,550 0 0
R. Cox	1,538 0 0
Gibbin & Son, Pickering - place, Baywater (accepted)	1,595 0 0

LONDON.—For the erection of South Tottenham sorting office, for Her Majesty's Office of Works. Mr. Henry Tanner, architect.—

H. Faulkner	£1,577 0 0
E. Hughes	1,475 0 0
Hart	1,468 0 0
Barrett & Power	1,436 0 0
Marriott & Co.	1,416 0 0
Whitehead & Co.	1,395 0 0
Mollett	1,335 0 0
Godfrey & Son	1,297 0 0
E. Wood & Son	1,280 0 0
Brown & Sweetland	1,230 0 0
J. O. Richardson	1,229 0 0
Lobb & Oliver	1,187 0 0
Dabbs	1,178 0 0
Anthony	1,145 0 0

LONDON.—For alterations to Nos. 62 and 63, Queen-street, E.C. Messrs. Bean, Burnett, & Eldridge, surveyors, 14, Nicholas-lane, E.C. 4.  
Grover & Son.....£1,469 0 0  
J. C. Ramsey (accepted).....1,126 0 0

LONDON.—For additions, &c., to Clerkenwell Police-court, King's Cross-road, for Her Majesty's Office of Works. Mr. John Taylor, architect. Quantities supplied by Messrs. Welch & Atkinson.—

J. O. Richardson, Albert Works, Peckham, S.E. (accepted)	£1,567 0 0
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LONDON.—For the erection of new padded rooms, &c., at the Infirmary, Brook-street, S.E., for the Lambeth Guardians of the Poor. Mr. T. W. Adwinckle, architect.

Aldridge & Pegg	£1,044 0 0
Barrett & Power	1,000 0 0
Blow & Blow	953 13 8
Garlick	927 0 0
Edwards, Junr.	919 0 0
Hooper	890 0 0
Pennack	890 0 0
Dabbs	888 0 0
Norris & Luke	854 0 0
J. O. Richardson	877 0 0
Staines & Son	845 0 0
Whitehead & Co.	825 0 0
Lobb & Oliver	850 0 0
Mills (accepted)	798 0 0
Veale	739 0 0

LONDON.—For additions, &c., to Worship-street Police-court, Finsbury, E.C. 4, for Her Majesty's Office of Works. Mr. John Taylor, architect. Quantities supplied by Messrs. Welch & Atkinson.—

J. O. Richardson, Albert Works, Peckham, S.E. (accepted)	£1,635 0 0
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LONDON.—For the enlargement of Gravel-lane Schools, for the School Board for London. Mr. J. T. Baley, architect. Quantities supplied by Messrs. Arding, Bond, & Buzard.—

Parker	£1,250 0 0
Longley	1,241 0 0
Downs	1,190 0 0
Goodman	1,134 0 0
Williams	1,122 0 0
Charteris	1,100 0 0
Holloway	1,070 0 0
J. O. Richardson, Albert Works, Peckham (accepted)	1,029 0 0

LONDON.—For rebuilding the "Shakespeare" tavern, Goswell-road, for Mr. Walter Knight. Mr. J. T. Alexander, architect, 40, Great James-street, Bedford-row.—

Oldrey	£2,080 0 0
Chappell	1,921 0 0
J. Beale, Westminster Bridge-road	1,845 0 0
* Accepted.	

LONDON.—For rebuilding premises at 292, Grange-road, Brompton, S.E., for Messrs. J. T. Oakley & Co. Mr. J. B. Balls, architect. No quantities supplied.—

J. O. Richardson, Albert Works, Peckham (accepted)	£1,279 0 0
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LONDON.—For sundry additions and alterations to No. 405, Kennington-road. Mr. J. A. J. Woodward, architect, 10, Crown-villas, Kennington Oval.—

John Beale, Westminster Bridge-road (accepted)	£235 0 0
[No competition.]	

LONDON.—For works at Nos. 5, 7, and 9, Bangor-street, Notting-hill. Mr. T. Turner, surveyor:—  
 Batters.....£1,193 0 0  
 Bird.....875 0 0  
 Nash.....875 0 0  
 Tappin.....455 0 0

LONDON.—For alterations and repairs at 131, Long-acre. No quantities. Mr. H. S. Bready, surveyor:—  
 H. Fearman, Charles-street, Hatton-garden.....£125 17 6  
 J. Freight, Brixton-hill.....115 10 0

NORTHAMPTON.—For new Masonic Hall and Club, in Princes-street. Mr. John T. Ingman, architect, Northampton. Quantities by Mr. Walter Shaw:—  
 Conford.....£1,251 0 0  
 Wingrove.....3,684 0 0  
 Reynolds.....3,590 0 0  
 Martin.....3,540 0 0  
 Green Bros.....3,558 0 0  
 Hawin.....3,530 0 0  
 Beardsmore.....3,520 0 0  
 Woodford.....3,456 0 0  
 Fisher.....3,381 0 0  
 Archer (accepted).....3,344 10 0  
 [All of Northampton.]

NORTHAMPTON.—For new factory in Dunster-street, for Mr. James Collier. Mr. John T. Ingman, architect, Northampton. Quantities by Mr. Walter Shaw:—  
 Fisher.....£1,815 0 0  
 Wingrove.....1,804 0 0  
 Green Bros.....1,775 0 0  
 Martin.....1,774 0 0  
 Sharnan Bros.....1,700 0 0  
 Heap (accepted).....1,683 0 0  
 [All of Northampton.]

PWLLHELI.—For kerbing, paving, and metalling Penlan-street. Mr. Thomas Roberts, Assoc. M. Inst. C.E., engineer.  
 Jones & Williams, Pwllheli.....£400 0 0  
 Williams, Carnarvon.....448 0 0  
 Jones, Llanbedrog.....420 0 0  
 Williams, Bangor.....393 0 0  
 E. Williams, Pwllheli (accepted).....366 0 0  
 [Engineer's estimate, £413.]

SEVENOAKS.—For the superstructure of a house at Sevenoaks, for Mr. William Hemmatt. Messrs. Salomons & Steinthal, architects, London and Manchester. Quantities by Mr. Alfred Boxall, 6, John-street, Adelphi:—  
 Holland & Hansen.....£18,417 0 0  
 Mansfield & Sons.....16,190 0 0  
 Kinnison & Sons.....16,111 0 0  
 Wiltshire.....15,990 0 0  
 Patman & Fotheringham.....15,683 0 0  
 Baker (accepted).....15,637 0 0

SHAMLEY GREEN (near Guildford).—For alterations and additions to cottage, for Captain Briscoe. Mr. T. C. Barralet, architect, Bridge-chambers, Richmond:—  
 Soole & Son.....£465 0 0  
 Holden Bros.....448 0 0  
 Brown.....431 0 0  
 Oades Bros.....375 0 0  
 Carman, Richmond (accepted).....370 0 0

SOUTHWARK.—For erecting block of industrial dwellings, Mint-street, Borough. Mr. W. G. Shoobridge, architect, 158, Strand, W.C.:—  
 W. & F. Croker (accepted).....£1,490 0 0

STAINES.—For the erection and completion of a pair of villa residences in Laleham-road, Staines, for Mr. E. W. Chapman:—  
 John Munday, Wimbledon (accepted) £720 0 0  
 [No competition.]

SUDBURY.—For alterations to brewery-house for Messrs. Oliver Bros. Mr. John S. Corder, architect, Wimbourne House, Ipswich:—  
 Wanford (accepted).....£300 0 0

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## TO CORRESPONDENTS.

R.E.C.—A. & C. H. (next week).—"Doubtful" (we cannot undertake to answer questions which amount to a request from the writer that we should teach him his own trade. As to the latter part of the query we should say that actual cubical amount of excavation should be taken, and extra labour in making slopes estimated per superficial yard).—G. R. J. E.  
 All statements of facts, time of issue, &c. must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline to publish anonymous communications.  
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 We cannot undertake to return rejected communications.  
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 Oak Wood (Tapestry) Doors, from 1s. per foot super.  
 Walnut or Mahogany, from 1s. 3d. per foot super.  
 Ditto with Heavy Mouldings, 5d. ft. extra.  
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Offices & Warehouse: 76, CHEAPSIDE, London; Manufactories, Wharncliffe Works, Arlington-st., London, N.



## ILLUSTRATIONS.

The Palais des Arts Libéraux, Paris Exhibition: Central Block.—M. Formigé, Architect	Double-Page Photo-type.
Design for a Town Church.—By Mr. E. A. Hill.—View and Plan	Double-Page Photo-Litho.
South Elevation and Cross Sections of Mr. Hill's Design for a Town Church	Two Single-Page Photo-Litho's.
Sketches (" Wayside Notes ") in East Anglia.—By Mr. John S. Corder	Double-Page Photo-Litho.

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## Concrete Floors.

**I**N the following article it is proposed to examine the views put forward in a voluminous series of letters which have recently appeared in our pages on the use of thin, flat concrete floors. Mr. Frank Caws appears to have demonstrated in practical work that such floors can be constructed cheaply, and that they have proved safe. If this is really the case, there is no doubt the achievement is one of which Mr. Caws may well be proud. We may acknowledge this frankly, and at the same time express our gratitude to Mr. Caws for coming forward to give an account of his work, without committing ourselves to the peculiar theoretical views which he has adopted in defence of his practice.

Now, *prima facie* there is no reason to doubt that flat concrete floors can be safely built and used. Concrete is a material now well understood. The engineer uses it in structures of the largest and most dangerous description. Large dams, for instance, have been constructed entirely of concrete and are supporting enormous water-pressure without any sign of weakness or decay. It is true that in these cases concrete is in compression. Its use in tension is much rarer. But apart from the possibility of cracks there is no reason why its tenacity should not be relied on as fully as its resistance to crushing. Portland cement is of extraordinarily uniform properties, and if the concrete is properly made and used in sufficient thickness, we see no reason in the properties of the material itself, why it should not be used in tension as well as in compression. Some difficulty may arise in its use from what an engineer would call its deficient toughness, but this may be discussed at a later stage. The primary question to settle is, how much concrete must be used to secure adequate strength, when the concrete is so employed that it has fair play. When we know how much concrete is necessary, it is possible to decide whether it is cheaper than any other material, and in what cases it is advantageous or the reverse.

No structure on which the lives of people depend ought to be constructed unless its real strength is known, or unless it is an exact copy of a similar structure known to be safe.

If Mr. Caws would publish a table of the floors he has actually built, and which have stood the test of time, that would enable us to build exactly similar floors, which we could trust to be safe on good though not entirely satisfactory grounds — grounds not entirely satisfactory, because the margin of safety would be still unknown. But when Mr. Caws gives rules for the dimensions of floors of any size, he is going far beyond his actual experience, and it becomes imperative to examine whether his rules are based on any sound theory. They may fit the cases of his actual floors and yet be entirely untrustworthy in other cases. No one ought to use such rules till he is satisfied they are scientifically defensible. Mr. Caws must not complain, therefore, if we criticise stringently his theoretical views.

The first point to look to is the data on which the working stress of concrete in tension is determined. Mr. Caws states that the tenacity of neat cement (in small briquettes made with quite special skill) is 250 to 500 lb. per square inch. The strength of the aggregate used in making the concrete is roughly taken at one-fifth of the strength of neat cement; no exact data being given at all. Lastly, the strength of concrete of one cement to four aggregate is given at two-fifths of the strength of neat cement, again without any exact data. Now we will venture to say that no engineer would venture to build a foot-bridge without more knowledge of the strength of his materials than this. Nor is this all. In starting from experiments on the breaking of briquettes by direct tension, a wrong and misleading starting point is chosen.

The breaking weight of a square bar, say of cast iron, placed on supports and loaded in the middle is

$$W = \frac{2}{3} f \frac{b d^2}{l}$$

where  $f$  is the breaking tenacity of the iron. If we put in this formula the value of  $f$  derived from tension experiments on the same iron, we arrive at a totally erroneous result. It is well known that the value of  $f$  from transverse tests is double that derived from tension tests. If Mr. Caws wants a value of the breaking tenacity to use in bending formulas, he must obtain it from direct experiments on bending. We know at the moment no experiments, either by direct tension or by bending, on concrete similar to that of Mr. Caws. But there are many experiments on cement mortar, which may be

taken for the present as sufficiently similar to concrete to furnish provisional values of  $f$ . For instance, Gilmore gives from experiments on the breaking of bars  $3\frac{1}{2}$  by  $2\frac{1}{2}$  on supports  $4\frac{1}{2}$  apart, the bars being 320 days old, the following values:—

Pure portland cement	$f = 1152$
1 cement + 1 sand	948
1 " + 2 "	713

These are values about double what the same cement carried in tension. The following values are from Bauschinger. The bars for transverse stress were  $4\frac{1}{2} \times 2\frac{1}{2}$  on supports  $10\frac{1}{2}$  apart. Briquettes for tension were made at the same time. We select a few of the results for bars and briquettes sixteen weeks old:—

Composition.	Tenacity from Tension Experiments.	Tenacity from Transverse Tests.
Cement A... 1 C+0 Sand	256	939
1 C+3 S	185	484
1 C+5 S	149	370
Cement C... 1 C+0 S	455	1,351
1 C+3 S	213	611
1 C+5 S	185	526
Cement R... 1 C+0 S	427	1330
1 C+3 S	256	700
1 C+5 S	199	469

The tenacities are in lbs. per sq. in., and it will be observed that there is a very wide difference between the tenacity in tension experiments and that in bending experiments. Why there is this difference we need not stop to explain. It has long been recognised. It is only necessary to insist that the value of the stress to use in bending formulae must be derived from bending tests.

If we take the cement mortar with 1 C + 5 S as representing provisionally good concrete of 1 C + 4 aggregate, it would appear that the breaking tenacity in bending experiments is above 500 lbs. per square inch, or 72,000 lbs. [say 32 tons] per square foot. With a factor of safety of 4, the safe working stress in tension would be 18,000 lbs. per square foot. This value will be used presently. We may mention, in passing, that Mr. Caws' data of 400 lbs. safely carried on a 1 ft. square plate, 1 in. thick, gives a slightly less value of the working stress.

Now we come to the formula connecting the dimensions of a plate with its strength. Grashof obtained on perfectly rational principles for a square plate, fixed at the edges, uniformly loaded, and not strained beyond the elastic limit, the equation,

$$p = \frac{4}{8} \frac{f t^2}{s^2}$$

For materials like wrought iron, which



stretch a good deal before breaking, this formula probably cannot be used at all as a breaking weight formula. With such materials the plate becomes an inverted dome before fracture is reached, and the conditions of stress are altered. The structure is strengthened by its change of form. But for materials like concrete, which do not greatly change form, the equation may be used to find the breaking weight, always provided that  $f$  is obtained from experiments on bending.

Before proceeding further, it may be pointed out that the formula leads to this result for a square slab. The slab will be exactly *three times as strong* when fixed round its four edges, as it is when supported at the ends and used as a simple beam.

This formula Mr. Caws rejects on about the most singular ground ever urged in a serious discussion. He thinks it is impossible to believe that a  $\frac{3}{4}$  in. iron plate 10 ft. square, and fixed round the edges, will not carry more than about two tons equally distributed besides its own weight. It is not possible to discuss with due gravity an objection of this kind. Rejecting Grashof's rule, Mr. Caws sets to work to find a rule of his own. His reasoning is not reducible to any mathematical form, and is not of a kind that any one accustomed to discuss mechanical questions could possibly accept. Still, as at first stated, there was a kind of coherence in the reasoning. Mr. Sutcliffe very acutely fixed on Mr. Caws some absurd results logically deducible from his reasoning. Then Mr. Caws, as we think, somewhat shifted his ground, and became much less intelligible and coherent. When Mr. Caws speaks of arriving at "pastures new to constructional literature, pastures new and trackless, where the blind may lead the blind," it is impossible not to recognise that in that region no formulas can be found which can be trusted for structures on which people's lives depend. When finally, in his last letter, Mr. Caws talks about the "square slab of three times beam strength," he has abandoned his own formula, and returned to the previously-rejected Grashof formula.

It will, perhaps, clear up matters a little if we examine to what results the Grashof formula leads. Since in a concrete floor the weight of floor itself is a large part of the load, it is well to separate in the formula the dead weight and the accidental load. Let the weight of the concrete be  $w = 120$  lbs. per C. ft.; the load on the floor =  $p = 84$  lbs. per sq. ft.; the safe working tenacity of the concrete =  $f = 18,000$  lbs. per sq. ft.; the side of square slab =  $s$  feet; its thickness =  $t$  feet. Then, by Grashof's formula,

$$w s^2 t + p s^2 = 4 f t^3$$

or putting in the chosen values  
 $120 s^2 t + 84 s^2 = 72,000 t^3$

This reduces to

$$t = \frac{s^2}{1200} + \sqrt{\left\{ \frac{s^2}{900} + \left( \frac{s^2}{1200} \right)^2 \right\}}$$

in round numbers. From this we have calculated the following cases:—

Case I.	Floor 6 ft. square	$t = 2.76$ inches
Case II.	" 10 " "	$t = 5.11$ "
Case III.	" 12 " "	$t = 6.46$ "
Case IV.	" 20 " "	$t = 12.93$ "

The only examples Mr. Caws gives of safe floors are (see second article) a floor of 6 ft. slabs on the footway of a bridge which were 3 in. thick. This may be compared with Case I. Next, a floor 10 ft. square and 4 in. thick, which may be compared with Case II. Lastly, a floor 22 ft. by 12½ ft. and 13 in. thick, which may be compared with Case III. Mr. Ferguson mentioned a floor of the Atrium Vestæ at Rome, 20 ft. in span and 14 in. thick, which may be compared with Case IV. Now in all these cases there is close agreement between the thicknesses arrived at by a perfectly independent process which allows a factor of safety of four, and the thicknesses given as used in practice, and we have taken all the cases for which we have data.

It is not our province to say at present whether all these floors are as safe as they

should be. It is possible the tenacity of the concrete has been taken too high, or the factor of safety too low, or the load on the floor too small. What is clear, is that the cases given by Mr. Caws afford no ground for discarding Grashof's rational formula.

In answer to an inquiry, Mr. Caws has very courteously sent particulars of the largest floor he has yet constructed. This is 30 ft. by 19 ft. and 7 in. thick. The floor is obviously thinner than would be given by Grashof's formula with the safe stress taken at 18,000 lbs. per square foot, which we have assumed to give a factor of safety of four. We shall, therefore, deal with it in a different way. Taking the breaking tenacity of the concrete at 72,000 lbs. per square foot, which has been assumed all through, and using Grashof's formula for rectangular plates, we find that a floor 30 ft. by 19 ft. by 7 in. ought to carry 157 lbs. per square foot before breaking. Deducting from this the weight of the floor, 70 lbs. per square foot, the breaking load is 87 lbs. per square foot. While, then, there is no reason for expecting this floor to break with a less load than 87 lbs. per square foot, it appears to us to have a most dangerously small factor of safety. A load of 87 lbs. per square foot on this floor would be nearly 24 tons. We should not like to have 24 tons permanently carried. The floor in question, if we understand Mr. Caws rightly, is only in course of construction, and has not yet received the test of time under actual loading.

If concrete floors are to be built safely they must be built by persons well acquainted with the properties of Portland cement. Further, the strength of the concrete must be determined by direct experiment on bars of concrete broken transversely. Till that is done, no one can tell the real margin of safety of any floor.

As to the possible increase of strength from making the concrete richer on the soffit, the influence of cracks, the danger of settlement of the walls, and many other points, something may, perhaps, be said at another time. If we might venture a suggestion it would be to make the lower layer of the floor of good cement mortar, made with clean washed sand, and above that to put ordinary concrete.

Broadly to repeat our view, it is that the breaking strength of a floor ought to be known, not guessed at. That a floor of a certain thickness stands is not enough, for the margin of safety is unknown. Lastly, further experiments on the concrete used are necessary.

Mr. Hyatt has made during the course of the correspondence various protests in regard to the necessity of iron in combination with concrete in order to supply the tensile strength in which concrete is deficient. These protests have been made in rather vague and general terms, and only a knowledge of what Mr. Hyatt has published some time since on the subject enables us to guess that he refers to a system in which light iron bars are embedded in the lower portion of a slab of concrete to give it the tensile resistance in which the concrete is deficient. If that is what is referred to, we fear the method is likely to prove illusory. We see no reason to expect that the iron and concrete will act together in resisting strain; before the iron comes into play the concrete will have failed, and the iron will merely be, perhaps, a temporary safeguard against an immediate disaster.

Since the greater part of the foregoing article was written, we have received a long letter from Mr. Caws admitting that he was wrong in various points on which persons with clearer heads have been trying to convince him. We cannot waste space in printing further letters from a correspondent who never seems to be sure of his own meaning for twenty-four hours together: it will give our readers a sufficient idea of the extent of these aberrations if we mention that Mr. Caws now says, referring to his argument as to the strength of concrete slabs on page 75-76 *ante*, that when he said increase the size to "10 ft.

square" he should have said "10 square feet"; and upon this mis-statement he proceeded to build a serious argument as to the strength of slabs!

Had Mr. Caws's original paper been a merely speculative one we should never have published it at all. When he informed us that he had ascertained by actual practice that concrete slab floors could be safely built of much larger span than was usually supposed; that he had so built them and they were doing well; of course that put the matter in a rather different light; and we thought the experience of an architect who had done it worth publishing, and gave him space to give it in his own way and on his own responsibility. His practical experience and facts are still of value as far as they go; but in his theoretical reasoning he appears to have got into hopeless confusion.

## SIR WILLIAM SIEMENS'S GAS-AIDED DOMESTIC FIRE.

By Dr. W. POLE, F.R.S.

**I**N the present strong competition between gas and electric lighting, laudable efforts are being made to extend the use of gas for heating purposes; and among these, its application to the domestic fireplace has been attempted on a somewhat extended scale. The usual plan is to abolish the ordinary fire-grate and to substitute a special apparatus in which jets of coal-gas mixed with air are allowed to play on pieces of asbestos or pumice-stone, which, after a time, become heated, and so radiate off heat into the room.

About 1880, the late Sir William Siemens, whose name is so eminent from his wonderful heat inventions, took up the subject, as one of great public interest, and I am surprised that more attention has not been given to the valuable improvements he proposed. These were first described by him in an article in *Nature*, Nov. 18, 1880, having the title of "A New Cure for Smoke." In his later years he was constantly urging the use of gaseous fuel, and after describing the advantages he had realised with it in manufactures, he said:—

"There seems no *a priori* reason why analogous results should not attend its application on a smaller scale, even down to the means of heating our apartments, which, although a small application in each individual instance, amounts, in the aggregate, to the largest of all the uses of mineral fuel."

He had, of course, studied the "gas fires" above alluded to, but he remarked that they were very expensive, both in construction and in gas consumption; gave insufficient warmth; were cheerless in appearance; produced heat of an unpleasant character; and often gave out disagreeable smells.

His thoroughly practical mind and great experience led him to go upon a different tack. He saw that a far more likely plan to succeed was to retain the general plan of the ordinary fireplace and fuel, but to bring in gas as an adjunct to it, and he accordingly devised a plan for this purpose.

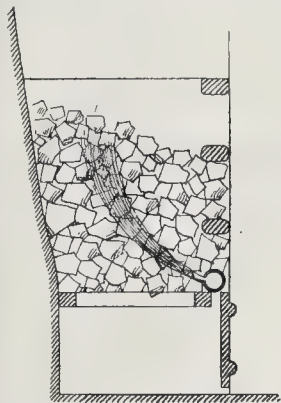
It should be explained that at that time the "Smoke Abatement" movement was active, and, as the title of his paper showed, he made his invention conform to that object. He proposed to construct a grate in which jets of ordinary coal-gas should play among coke, the combustion of the two going on together, and being supplied by a peculiar contrivance with heated air. Thus was formed a smokeless fire of great heating power. Many were made under the inventor's directions which answered perfectly, and it is strange that some enterprising manufacturer has not thought it worth while to promote their sale.

My object, however, now is to call attention to a somewhat simplified form of the invention. The hot-air provision requires an entire reconstruction of the lower part of the fireplace. This is rather expensive, and good housewives object to the mess and trouble of such changes. Moreover, the arrangement offers some obstruction to the free removal of the incombustible residue of



ash, which with ordinary gas-coke is sometimes very considerable, and the retention of which impedes the combustion and spoils the brightness of the fire.

The simplified plan leaves the grate exactly in its original state, just as made for an ordinary fire. Then all that is to be done is to put at the front of the grate, between the two bottom bars, a piece of iron gas-tubing pierced with a few holes pointing obliquely upwards, so as to throw, when supplied with gas, jets of flame into the body of the fire.\*



This is an exceedingly simple thing; and if gas is already laid on in the room, a gas-fitter may do it in a few hours, and for a few shillings, without making any mess or giving any trouble whatever. The holes may be about the size of a knitting needle, and about 1½ in. apart. And there must, of course, be a cock placed in an accessible position to turn the gas on or off, or to regulate it at pleasure.

This is "Siemens's gas-aided domestic fire," for it is really in every respect an ordinary fire, only with the power of aiding it when desired by Siemens's gas flames.

Now let us see what this aid is worth:—

1. In the first place it enables coke to be used. This is a better fuel in many respects than raw coal; it makes a steadier, more compact, and more enduring fire, and gives out no smoke or soot. It is difficult to keep coke alive in an ordinary grate, unless the burning mass is large, and the draft powerful; but with the addition of the gas it burns perfectly, in any quantity, and, in fact, as is well known, the gas resupplies to the coke the hydrocarbons which had been abstracted in the gas-works, and so restores the original elements of the fuel, but in an improved and refined form.

I have found, however, that it is advantageous to have a small supply of coal to use in addition to the coke, by which the use of the gas may be much lessened, and, indeed, often stopped altogether; as the mixed fuel will make an excellent, pleasant, and economical fire without it. A little experience will soon give instruction on this point. It is worthy of notice that the coal when burnt in combination with the coke and the gas, makes much less smoke than when alone. This is easily accounted for. The cause of the production of so much smoke from the coal in an ordinary grate is the low temperature at which its decomposition is effected; here the particles of coal are enveloped in hotter surroundings, and the combustion is more complete.

2. The reduction of smoke from the fire is not only an infinitesimal contribution to the general "Smoke Abatement" movement, but it is an advantage to the householder himself. It diminishes the spread of dirt in the room (for it is seldom that all the products of the fire go perfectly up the chimney), and it either abolishes, or, at least, much lessens the

frequency of the great nuisance of chimney-sweeping.

3. The gas gives the facility of lighting the fire at any moment without the usual "laying" of wood and paper. This laying is ordinarily an enormous domestic trouble, involving the previous emptying and cleaning of the grate; and it is often most annoying, when a fire is unexpectedly wanted, to have to wait while the operation is being performed. It is often a chance, too, whether the fire will ignite or not, and if it does not, it has to be laid over again. But with the gas, nothing need be done but to put fuel in the grate and turn on the gas, when the lighting of the fire is speedy and certain. A very common case when a little fire is desired in a bedroom on going to bed at night, and again on getting up in the morning. After the night's use, the ordinary fire must be "laid" again before it can be lighted the next day, which is so great a trouble as usually to forbid the practicability of the arrangement. But with the gas addition nothing can be easier.

4. With this plan a fire never need go out; a little of the gas aid will suffice to check this proverbial natural tendency, and the fuel will go on burning till exhausted, and even then the gas will keep the grate warm. Hence "stirring" or "poking" the fire becomes a work of supererogation, or, at least, is only wanted at long intervals to help the exit of the dead ashes through the bottom grating.

5. With this arrangement the grate need never be emptied, except occasionally for housewifely cleaning. With the ordinary fire it is customary to empty the grate before every new laying, when a great deal of valuable fuel in the shape of "cinders" goes to the dust-hole. With the gas arrangement all that is necessary is to rake out the incombustible white ash, leaving the carbonaceous cinders behind, to be burnt with the new fuel. This is a great source of economy.

6. The gas gives altogether a new power over the fire,—namely, that of its regulation according to what is wanted. This, with an ordinary fire, is impossible, except in a very imperfect and extravagant way; but only experience can give an idea what an admirable and delicate power of adjustment is given by the little gas-tap. It is not so much the gas itself that is regulated as the influence of the gas upon the fuel. It acts as a sort of blow-pipe; when full on, the combustion is highly active, but the stimulus can be lowered to any extent, or entirely withdrawn. The combined use of coal and coke greatly facilitates this power of regulation. If this fire is required to be steady for a considerable time, a judicious mixture of the two fuels, with just a *souspçon* of the gas to prevent any tendency to go out, will give a far steadier and more durable fire than the ordinary one; but if it is wanted only for a short time, and then to be lowered, it should be chiefly coke and gas, which will be more sensitive. Suppose, for example, the case where a room has to be left for some hours, the fire not being wanted; the gas can be turned so low that the fuel will scarcely consume at all; but still will remain so hot that on coming to the room again, and simply turning on the tap, in a few minutes the fire will be fully restored.

For bedrooms, in cold nights, and most especially in cases of sickness, such a convenience is invaluable. A low fire, burning steadily all night, with a kettle of water on the hob or the trivet, would often be found a great blessing. And there are numberless other cases where a small fire, which will burn for a long time without attention and without danger of extinction, would be most desirable. This cannot be obtained at all under the ordinary régime, but with the Siemens arrangement it is the simplest thing possible.

7. But we may go further. The gas arrangement may be made of great use even without the fire. In winter, when several fires are burning, and doors and windows are closed, the whole atmosphere of the house becomes subjected, by the action of the fires,

to a slight exhaustion, and every chimney where there is no fire is liable to have a down-draught into its room, bringing with it dirt, foul air, and smells from adjoining chimneys. The usual remedy is to "shut the register," if there is one; but this is only an imperfect provision, as it is never anywhere near tight. In this case a slight use of the gas alone will keep a proper current up its own chimney, and will give a gentle warmth in the room, at very little cost, and no trouble to anybody.

8. Then even in summer, the gas is still useful. Everybody knows that a chimney is the ordinary and often the only ventilator for rooms; but in summer when there is no fire, the chimney, having no motive power to give it a current, does not act. In this case, as in the last-mentioned, the gas may be used to give a current up the chimney, a screen being provided and hung on the front of the grate, like a fire-guard, to prevent the heat radiating into the room. This arrangement accompanied by a window open an inch or two at the top, will ensure a gentle but most healthy change of air being constantly kept up in the apartment night and day. Moreover, the gas is then at hand, always ready for any accidental heating purpose that may be required.

9. It seems to me (though perhaps it may be thought a rather fanciful idea) that a fire which has all these capabilities becomes an object better worth intelligent care and attention than formerly. An ordinary fire is considered a rough, coarse thing, only fit to be left to the clumsy treatment of footmen and housemaids, except when the authorities may choose to amuse themselves by poking it (either from the bottom or the top, as the sex may determine). But in this contrivance there is really something interesting to observe, and something intellectual to do, which will well repay a little thought and skill; while, at the same time, there is no compulsion in the matter, and if it is not done the house is no worse off than before.

It will naturally be asked at what cost all these advantages can be gained? As already stated, the outlay for the construction is exceedingly small. There is only a word or two to be added about the current expenditure. In the first place this must naturally be much less than for the asbestos or pumice-stone "gas fire," in which the whole heat must be furnished by the gas; seeing that in the plan here recommended the coal and coke form the efficient fuel, to which the gas is only a subsidiary aid. I find that in a grate I have, of moderate size, the six jets when blazing fully on will consume about 20 cubic feet of gas per hour; but this is only exceptionally necessary, to light or quickly to strengthen the fire; the gas is often shut off entirely, and we may estimate say 10 feet as an ample average; this will cost in London about one third of a penny per hour.

I do not think that this would be a very high price to pay for the advantages named; but it must be recollected that there is a large set-off to be made for savings. In the first place, there is the use to a large extent of coke, which is more economical than coal; and then there is much economy in the saving of the cinders; in the easy regulation of the fire, according to demands, particularly by keeping it low; and, still more, in the power of extinguishing it when not wanted, with the option of lighting it again at a minute's notice. These savings cannot be put in definite money value, but they will certainly reduce materially, if not cancel entirely, the cost of the gas.

Some people have thought that the small holes would soon be stopped up by fine ash. Experience negatives this fear, and it would seem that generally the current of gas through them suffices to keep them fairly open. It is, however, desirable to have a bent prick at hand by which they can be cleared at any moment; and the tube itself should be connected by a screw, so that it may be taken off occasionally to be cleaned, or may be renewed when burnt or worn away.

To sum up:—

The addition of the gas aid to a fire gives many great advantages for comfort, con-

\* It would be an improvement to sink the tube below the bottom of the grate, but this would require some reconstruction.



venience, and usefulness in domestic economy. It is no patent, no monopoly; it requires no new grate, but only a small addition to the ordinary one, which any good gasfitter can fix quickly and at small expense.

It does not interfere with the use of the grate in the ordinary way.

The increased expenditure for gas is very small, and is largely compensated for by increased economy of fuel in many ways.

WILLIAM POLK.

Athenaeum Club, October, 1889.

#### NOTES.

**T**HE second Congress of the National Association for the Advancement of Art is to be held at Edinburgh next week, under the presidency of the Marquis of Lorne, who will deliver the opening address in the Queen-street Hall at 8.30 on Monday evening. As before, the Congress will be divided into Sections of Painting, Sculpture, Architecture, and Applied Art; to which is added "Museums and National and Municipal Encouragement of Art," a section the scope and motives of which seem rather vague. As before, "combined meetings" of sections have been favoured a good deal, whether wisely or not may be doubted. Perhaps they may have the effect of inducing one set of artists to take more interest in the work of another set; as a rule painters care nothing for sculpture nor sculptors for painting, and both are indifferent to architecture. The Friday morning combined meeting of sculpture and architecture, in which Mr. J. D. Sedding, who reads the first paper, is to speak of the "Sources of Architectural Expression" independent of aid from sculpture, may bring a little new light to sculptors as to what architecture means, which most of them have not an idea of. The sculptors will have their say in the matter, of course, in the person of Mr. Stirling Lee, an able sculptor whose efforts to decorate a great building have been most unworthily treated (not by architects, however, who have supported him). Mr. Honeyman and Mr. Whall contribute papers to the same meeting on the general subject of artistic co-operation. A combined meeting of the Painting, Sculpture, and Applied Art sections on Thursday treats the subject of "Function of Texture in the Arts," a subject the significance of which is only, we might say, of rather recent discovery, and in which architecture certainly is also to some extent concerned. In the Architectural section on the same morning, Mr. Statham is to discourse on "Architectural Mouldings;" Mr. David MacGibbon on "Scottish National Architecture," to which, as our readers know, he has given a good deal of attention; and Mr. Campbell Douglas and Mr. G. S. Aitken on the "Architectural Education of the Public," a subject on which there is certainly a good deal to be said. On Wednesday morning the subject of "Municipal Legislation in reference to Architecture" is to be treated of by two architects who certainly ought to know something about it viz. Sir James Gowans, the Dean of Guild of Edinburgh, and Mr. Blashill, the Architect to the London County Council. Mr. William Morris, Mr. Crane, Mr. Cobden Sanderson, and Mr. Starkie Gardner lecture respectively on "Dyeing," "Decoration and Illustration of Books," "Bookbinding," and "Application of Enamels in Decoration." It is to be regretted that the Association have not followed the lead of last year in securing an artist as President. There seems indeed too much of the amateur element in the programme. In the British Association, of which the National Art Association claims to be the parallel, it is a *sine qua non* that the President should be an eminent man of science; and the President of the Art Association should be an eminent artist, — painter, sculptor, or architect.

**F**ROM an advertisement which appears in our columns to-day, it would seem that there is a desire on the part of an English

company to repeat the folly of the Eiffel Tower on a larger scale in this country. Prizes are offered for the best and second best designs for a tower not less than 1,200 feet in height, and a jury is named to decide on their merits, including some eminent engineers who we should have thought would have better consulted their own position and the dignity of the profession by keeping aloof from so foolish a business. If it were a scheme which was to be of any real use to the world when completed, it would be a different thing; but we take it the matter is simply a commercial speculation. The experience of the Eiffel Tower has led to the belief that foolish people will pay enough for the amusement of going up an abnormally high tower to render it a remunerative investment. Possibly, however, the "Tower Company, Limited," will be disappointed to find that the Eiffel Tower has exhausted so much of human curiosity on the subject as would furnish an adequate return for the outlay. It is melancholy to see Englishmen following the lead of France in a foolish piece of brag, (which, let us remind them, was universally condemned and opposed by the most educated and intellectual section of Frenchmen); and if they succeed in getting the tower built, we sincerely hope they will lose by it.

**W**E publish in another column a letter from Messrs. A. & C. Harston, including a quotation from the *Law Times*, in regard to a recent decision of Justices Denman and Hawkins (the Lord Chief Justice dissenting) in reference to the true interpretation of the Metropolitan Building Act as to the permitted projection of shop fronts beyond the main wall of the building, and whether it is a permission to encroach to any extent on the public footway. The Court ruled that it was not so, and that the intention of the Act was merely to legalise the projection of woodwork beyond the face of the wall, which is prohibited in other buildings. The *Law Times* thinks the decision wrong and regrettable; and our correspondents, Messrs. Harston, argue that sections xiv. and xxvi. of the Building Act, read together, only amount to the admission of woodwork projecting beyond the wall, if there is ground belonging to the owner on which it can project. We are perfectly satisfied with the decision of the Court, which the *Law Times* seems to think will be detrimental to the architectural effect of our streets. We should rather think the contrary, as the discouragement of the kind of cradling supposed to be necessary in front of shops is a decided gain. But we believe, on a careful consideration of the wording of section xxvi., that both the Court and Messrs. Harston are in the wrong as to the original intention of the Act, and that it *did* intend to authorise shops to encroach, to the limits defined, on the public footpath. It must be remembered that this enactment is thirty-five years old, and that when it was made there was a general belief that no shop could be complete without its wooden pilasters and cornice; and we believe the concession was made to avoid what would be thought a hardship on shopkeepers who wanted to beautify their fronts in what was then considered the orthodox way. Otherwise, why should there be distinction drawn between the amount of projection allowed in a street of less or of greater width than 30 ft.? It was a very undesirable piece of legislation, and we are glad that its fortunately ambiguous language has left the chance for a judge to practically reverse it; but we have very little doubt that the original intention was what Lord Coleridge and the *Law Times* believe it to have been.

**T**HE suggestion made by the President of the Architectural Association, in his opening address, in favour of more systematised co-operation between the Association and the Institute, has often been made before, but perhaps it is more likely now than at any previous time to develop into something practical. Mr. Stokes is, in our opinion, quite

justified in his recommendation to raise the terms of subscription of the Association; a step which would at once put much greater power for good into its hands; and the Association is now in a very different position from the time when the small sum of half-a-guinea was settled as the subscription. The advantages offered by the Association to its members are immensely greater now than formerly, and the raising of the subscription would in turn enable them to be still further extended, especially in the way of providing educational lectures by competent professors. As Mr. Stokes implies, the Association has now arrived at that degree of development and complication in its work when the voluntary system cannot much longer be depended upon; and it is desirable that the valuable educational work it is doing should be established on a firm and permanent basis.

**T**HE Municipal Engineer of Rome, Signor Narducci, has completed the exploration and cleansing of the ancient and famous Cloaca Maxima, on which he has made some important studies and observations, leading to the conclusion that the Cloaca Maxima did not begin, as was generally believed, in the centre of the Roman Forum, but under the Forum of Augustus, in the very spot where the last excavations were made. In fact, all the water coming from the Quirinal, Viminal, and Esquiline hills runs into the Forum of Augustus. The higher part of the great sewer, which has been, so to say, recently discovered, is similar to the lower part both in size and shape; the interior is also of the same construction, being built of volcanic tufa, similar to that of the Tarpeian rock. Many of the blocks are more than 5 ft. in length and 3 ft. in thickness. It is covered with vaulted masonry, and the whole is still in such an excellent state of preservation that visitors can have easy access to the newly-discovered part, which has been thoroughly cleared.

**T**HE repairs which were commenced four months ago in the Loggia dei Lanzi, in Florence, have been almost brought to an end. Many pieces of *pietra serena*, forming parts of pillars, of ornaments, and of the splendid cornice, have been replaced by new stone, as the old had been greatly damaged by frost and rain. The beautiful bas-relief of bronze, by Benvenuto Cellini, which decorated the pedestal of Perseus's statue, placed in a conspicuous part of the Loggia, has been removed to the National Museum in the Palazzo del Podestà, as it was exposed to serious danger of damage in its first position. A bronze copy, cast in the foundry of the brothers Galli, is now being placed in the Loggia, instead of the original.

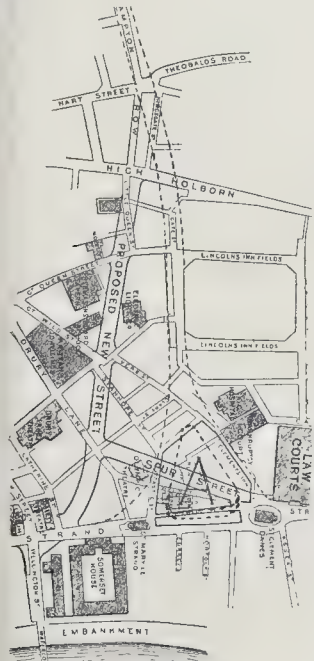
**A** COMMITTEE of the town of Siena is having some important repairs executed in the magnificent church of St. Francis, built by Agostino and Angelo di Siena in the year 1326. The church was barbarously turned into a barrack in 1859, and since then it had been abandoned up to this day. The present repairs are intended to restore it to the artistic splendour which it enjoyed in the Middle Ages. Anciently the citizens of Siena who were most worthy of their country's esteem were buried in this church. The new scheme of decoration of the church has been finished, many windows have been inserted; the principal of which is the large window in the choir, which was executed in Germany. Many of the chapels are also undergoing repair at the expense of the families connected with their history.

**I**T appears that the ultimate fate of the fine block of buildings called St. Andrew's Halls, in Glasgow, to the unprosperous condition of which we referred in a paragraph in June last, remains still undecided, but there is now some prospect that the property will be acquired by the Corporation as a permanent public institution. A special committee, some time ago appointed to consider the matter in all its



bearings, presented at last week's Council meeting, as the result of their deliberations, a strong recommendation in favour of the purchase. The original cost for building and fitting amounted to 107,000*l.*, and according to the terms of the offer made by the proprietors, along with the right of pre-emption, the City may become owner at an outlay of something under 40,000*l.* It will be necessary, before the purchase can be carried out, to obtain the sanction of Parliament, and the Committee have recommended that the Corporation, in applying for any powers prospectively required by them during next session, should include this matter of the St. Andrew's Halls. This report was favourably received by the full Council. Building is unwontedly active in Glasgow at present, and property values have risen considerably since the offer was first made, so that in the eyes of the public the temptation to acquire is now more powerful than it originally was. The main or grand hall of the block is the only thoroughly suitable place in the West of Scotland for gatherings of the first rank, political or otherwise, and during the past twelve years it has been the scene of all the principal occasions of the kind arising in Glasgow. The building was the design of the late Mr. Sellers, architect of the Glasgow Exhibition buildings, and is a fine example of modern Classic architecture.

**A** CORRESPONDENT, "A. E. H.," sends us the following variation on the County Council plan for a new street, the dotted lines showing the proposed alternative. It is worth consideration, as it



provides a good joining into the Strand, and a fine site for a new building, flanked effectively by the two churches, with less expensive demolitions near the Strand, and taking what is admitted to be the less costly line of route through Lincoln's-inn Fields.

**T**HE Paris Exhibition seems to be more than keeping up its success to the last. The *Semaine des Constructeurs* of the 19th gives 385,000 as the number of visitors on the Sunday preceding, the highest number of admissions in one day that has been recorded. It is mentioned in the same journal that, besides the retention in their present position of

three of the great buildings—the Palais des Beaux-Arts, the Palais des Arts Libéraux (of which an illustration appears in our present number), and the Galerie des Machines, there is a probability that some of the minor structures, though they will have to be removed from the Champ de Mars, may be permanently re-erected elsewhere. A memorial has been addressed to the Municipal Council of Paris praying them to obtain from the State the "rustic" pavilion of the Forestry Exhibition, to be erected permanently in the plain of Daumesnil, in the Bois de Vincennes, as a building for a museum of specimens of timber. There are other buildings worth much more architecturally than this, such as the pavilion of the Argentine Republic, which it is to be hoped will not disappear from the face of the earth altogether.

**T**HE collection of drawings of birds by Mr. Marks, on view at the Fine Art Society's rooms, is mainly, as he tells us in his preface, the result of frequent morning visits to "the Zoo" during the past summer months. It is therefore a collection of sketches made in a brief time and for a special object, and must not be judged as representing the artist's finished work, though here and there are some drawings more highly finished than the majority. The collection is a charming study of the expression and manner as well as the plumage of birds; the latter, indeed, being mostly only indicated broadly and not treated in minute detail. Among the very best are some of the slighter ones done on brown paper, especially the row of macaws (31) as we have all seen them in a row on their open-air perches at the Gardens. The swans do not seem to have received full justice; the purity of their plumage is hardly conveyed, and the neck of the swimming one in No. 25 looks a little stiff and wooden, though of course the curve in which the swan's neck is drawn in regulation picture-book illustrations is a convention, and not the habitual posture of the neck. We do not know that the humour of the humorous sketches is of very much value, except in the case of "A Learned Judge" (10), the Tantalus Stork, where the humour is that of the natural expression and appearance of the bird, and would strike one as much in the real animal as in the drawing. "Dominicans in Feathers" (36) is the same kind of thing that Landseer used to do with dogs, putting a grotesque human expression into them which is never really seen in life. Mr. Marks did it admirably in "St. Francis Preaching to the Birds" but it was hardly worth doing again. A remark in his preface is worth note; a protest against "the way in which drawing is taught in schools and academies." "Bitterly," says the artist, "have I lamented the want in my earlier artistic education of being set to draw objects in motion, or to cultivate the memory for forms and lines. In my time, at least, no attempt was ever made to train the memory, and I can conceive of no system more baneful, or one more ingeniously contrived to teach a student how not to draw in the larger sense, than setting him down before an antique statue, and allowing him to spend weeks and even months on its delineation."

**C**IRCULARS have apparently been largely sent round to the architectural profession during the last week or two, headed "O'Brien Thomas & Co.," drawing attention to a number of "high-class marble chimneypieces" which the firm are desirous of clearing out in order to make room for other works. These are to be offered "at 50 per cent. discount instead of the usual 20 per cent.," but the real point of the statement is indicated in the closing paragraph:

"The offer of special disc. 50 per cent. on these few lines could only be allowed to you personally (or to a builder) as we never charge lower than retail prices to private individuals."

If this were addressed to persons in the trade, it would of course be a perfectly proper and ordinary form of business advertisement;

but as a circular addressed to architects it is a most improper one. Such an offer is felt by architects of position and repute to be an insult, as it is in reality an invitation to them to throw over the interests of their clients and to act in the tradesman's interest, and (worse still) to do this in order to secure a profit for themselves. Any architect who did that would be acting in a dishonourable and unprofessional manner. If the firm who have sent out the circular referred to are not aware of this, they will perhaps make a memorandum of it for the future. If they have acted through mere ignorance, and wish to withdraw their circular and apologise to the architects to whom they have sent it, they can do so through our columns next week.

#### THE FUTURE OF THE ARCHITECTURAL ASSOCIATION:

##### THE PRESIDENT'S ADDRESS.\*

WHO that cares for his profession, and has watched the varied growth of its numerous branches, has not dwelt, at least briefly, upon the subject of education for our architects of the future, and has not perchance smiled as he thought how hundreds are yearly pitchforked into their profession with little or no special knowledge of its requirements, and little or no aptitude or fitness of mind for the special calls which will inevitably be made upon their individuality.

Architectural practice of to-day requires, perhaps rather more than in times gone by, that an architect, besides being an artistic, should be eminently a practical, man—two qualities which, it must be admitted, are rarely found in the followers of the other arts; for although our architect forefathers were great engineers and wonderful constructors, yet I very much doubt whether they had to contend with the thousand and one troubles and trials of the modern practitioner, who is expected to keep at his finger-ends all manner of small details, as well as large, connected in any way with his profession.

The architects of days gone by were undoubtedly fine fellows, but it is not enough simply to study what they have done, or left to some extent undone, and go and in our simple way do likewise, as far as in us lies; but we must also study the requirements of the age we live and move in, and the possibilities and capabilities of certain materials and things almost, if not quite, unknown to our forefathers.

Thus we see that no small things are required of the young man who wishes to become an architect; and such a one should first ask himself, Do I possess the varied qualifications required of me? Have I anything of the artist within me?—that is, have I a soul capable of being touched by a beautiful sight, a beautiful sound, or a beautiful thought? Is my one desire to throw myself, heart and soul, into my work for the sake of the work, and for the love of the work, quite forgetful of self? Have I a love for overcoming difficulties? Do I recognise the fact that I shall be called upon to meet, face to face, unaided, practical difficulties in construction, that must be mastered by myself and not delegated to others?—that common sense, above all things, will be required of me?—and that constant observation on my part will be necessary, if I am to keep myself *au courant* with the multifold requirements of a restless age? And, lastly, he should ask himself, Can I think out for myself the best way of meeting certain given requirements with readiness? Can I grasp a situation, and am I tolerably clear-headed? If the aforesaid young man can, without unduly taxing the elasticity of his conscience, answer in the affirmative all the foregoing questions, then he may be said to be a fit and proper person to enter the ranks of the architectural profession, not otherwise.

Having entered our ranks, however, it will be clearly seen that it is of the utmost importance that his technical education should be taken in hand at once, and carefully directed.

Our present system of placing a young man in an architect's office as a pupil is an excellent one in theory, but in practice not quite so good. The principal is generally too busy to give much, if any, special attention to his pupil, and frequently openly tells the parents of his would-be

\* Delivered by Mr. Leonard Stokes, A.R.I.B.A., at the opening meeting of the Association on the 18th inst., as elsewhere mentioned.



pupil that if their son comes into his office he will simply have to shift for himself and "pick up" what little knowledge he can. The parents, knowing no better, assume it is all right, and article their son, often to find that what they were told is too true, and that their son has indeed to "pick up" what he can.

The Architectural Association was, no doubt, established to help the student, both in his pupillage and in his subsequent stage of "assistant," to acquire a little more knowledge than was generally to be learned in an average office. It is now, however, beginning to be felt that what may be called "the picking-up system" is far from satisfactory, and, in order to pass the examination now happily established by the Royal Institute of British Architects, it is necessary to acquire, somehow or other, considerably more knowledge than can be "picked up" in an ordinary office. The Association undoubtedly helps considerably, but does not go so far,—I am sorry to say,—towards fulfilling this very desirable object as I, for one, should like to see.

Now, this being so,—and as I am addressing these remarks to those who have already cast in their lot, whether rightly or wrongly, happily or unhappily, with numerous other of their fellows in what really is one of the finest professions that exists,—I will endeavour, as far as I am able, as I feel your President should, to point out wherein we may improve ourselves, and by what means we can best improve those of our neighbours who are open to improvement, this latter being one of the main reasons for the existence of the Architectural Association. For, although our methods may be open to criticism and capable of improvement, as I shall hope presently to show, yet what other profession is there which has in its midst a body of men, doing to the best of its ability, and on voluntary principles, the educational work—at least the greater portion of the educational work—of the profession to which its members belong? But, perhaps, this very fact that no other profession works on our lines may tend to show that we may not ourselves be working in the very best possible way; as, although a minority may, no doubt, sometimes be in the right, yet the presumptive evidence is undoubtedly in favour of the opposite conclusion. However, as mere self-praise is no recommendation, and feeling one's own nest is equally objectionable, I will simply lay before you some of my thoughts on the working of this Association, and more particularly, of course, upon the serious side of our work, for although our *Conversations* and our *Soirée* help to draw us all closer together, yet I do not propose to examine that side of our programme this evening, although many pleasant and useful features may, no doubt, be found in it.

But, before laying these thoughts upon possible improvements in the Association before you, I will say a few words upon things as we find them, as changes, however desirable they may be, cannot be worked out in detail and brought to perfection without occupying a considerable amount of time. We must therefore, content ourselves this session with things as they are, hoping for better times to come with another session.

Sitting as I do, and have done for some considerable time, on your Committee, I have naturally heard numerous suggestions for the improvement of, and various complaints of the shortcomings in, several of the classes. But I can tell you this much, that where the members of a class have put their shoulders to the wheel, and worked hard and well, they have always derived considerable benefit from their connexion with the class. Let me, therefore, recommend each one of you to work as hard as you can, and grumble as little as you can, during the coming session. They say that a man is never really happy without a grievance; then make up your minds to be unhappy—yet to work. If all the classes to which you belong do not happen to be arranged exactly as you like, show by your work in them that you are capable of making the best use of such advantages as are laid before you, and then, if you will think the matter over, submit your views, by all means, to the Committee, showing in a practical way how you consider such and such class could be improved, and I will answer for the Committee that such views shall receive careful and prompt consideration. But you must not forget that many of your Committee are busy men, and, therefore, cannot devote more than a reasonable amount of their time to the affairs of this Association. . . .

It will be within your knowledge that a special committee has been recently appointed to consider and report upon the whole working of this Association, with a view to pointing out in what direction or manner it can be improved and developed. I take it that most of you will agree with me when I say that there is not much doubt that this Association is open to considerable improvement; otherwise, how is it that, when a member wishes to go up for the Institute Examination,—for which our course is intended to be a direct preparation,—we find that, instead of availing himself of the opportunities offered in this Association, he goes to a private institution to obtain the instruction he requires? Surely, this would not be the case if the Association was really carrying out the work it has set itself to do? This special committee has not, however, got very far with its labours, yet I venture to predict that it will suggest some considerable alterations in our methods of working. For it is beginning to be seen that, besides testing the individual capabilities of candidates presenting themselves for examination, the Institute Examination is also testing tolerably severely the various sources from which the candidates derive their instruction. As long as there was no test of this sort, we could continue our work in the hope, and with the belief, that we were doing really good work. But when we find that others are before us, surely it is time to put our house in order. What particular alterations the special committee will suggest, no one knows, and time alone will show; but, unless something tolerably drastic and complete is suggested, and carried out, I very much fear we shall find that our occupation, little by little, will slip away from us. You must excuse me if I lay my misgivings before you in their bald simplicity; for I cannot help thinking that if we boldly face the dark side of the picture, we are much more likely to effect improvements, than if we only half acknowledge to ourselves that a dark side really exists at all.

Let us at once then proceed to examine ourselves and find out where the shoe pinches, and what remedy, if any, had better be applied. Turning to our "Brown Book," we find there set forth the various reasons why the Association was founded, now some forty-seven years ago. They are as follows:—1. To afford facilities for the study of civil architecture. 2. To advance the profession. 3. To serve as a medium of friendly communication between members and others interested in the progress of the art.

Looking further into "methods" and "rules," we find mention of papers and discussions, of a library, of classes and lectures, and of visits to works and buildings; but we see no mention of salaries or fees for the lecturers and visitors (although we do find that something over £100 a year is given by the Association to members attending the various classes, &c.). Well, and how has this voluntary system answered? Very satisfactorily, will be the reply; and I shall be the last to deny it,—up to a certain point. So did the old stocking, but it has given way to the savings bank; and I venture to think that we have ourselves now reached that point when we ought well to consider the advisability of abandoning our trusty old friend the stocking, and adopting something less cramping, realising a little better results on the capital and labour sunk in the undertaking.

In its early days, when the Association numbered some two or three hundred members, our present voluntary system may have,—and no doubt did,—worked admirably; but since then our numbers have quadrupled, and I venture to say that of late years our system has been strained to its utmost, and has, to those who look closely into its workings, shown evident signs of giving way. Now, how is this? Well, there are various reasons, in my opinion, which I will give you one by one; and I must ask you to examine these reasons, and to face boldly whatever conclusions they may lead you to come to. If you will do this, and still remain of the opinion that our present system is the best we can adopt under the circumstances, then do not listen to any suggested changes. But if, on the other hand, you agree with me that a change is desirable, then I shall look to every one of you to assist in carrying out such a change.

1. It is against human nature to give away gratis that which we have taken some time and trouble to acquire for ourselves. Some disinterested people will do it, no doubt, with more or less regularity; but I am afraid it does not come naturally to many of us. My views may be

pronounced sordid,—and so they may be; but men must live, as they will tell you for themselves; and I am simply stating facts as I find them.

2. Neither does it come naturally to us to value at their true value those things which we acquire for nothing, or with next to no trouble or expense. Getting a thing for nothing induces us to value it accordingly.

3. In the voluntary system, we almost entirely lose all semblance of regular system. The man who gives his services will not be dictated to by another who is only acting in a similar capacity; and we must, therefore, take what we can get, in the way it is offered, and be thankful. If, however, you were to pay your instructors, your committee could decide what was required, and request the lecturers or visitors to act accordingly.

4. In casting about for voluntary helpers in a field naturally somewhat limited,—for, as I have already told you, even visitors and lecturers must live, and, in order to live, must look for a *quid pro quo*, in one form or another, for the time and labour spent in or upon a class or course of lectures,—as a natural result, the powers that be have sometimes to appoint men who might not be considered the most suitable if there were a salary attached to the post.

5. In order to obtain suitable visitors for most of the classes, it was arranged some few years back that each visitor should only be asked to attend on two or three evenings during a session. This had the desired effect of inducing men to become visitors; but has it not had this bad effect upon the classes,—that the visitors individually never get to know the members of a class, and the members of a class never know their visitor?—continuity being thus lost, loss of interest is the result, since the class practically degenerates into a series of independent meetings.

6. In our voluntary system we work the willing horse, and to such an extent as to interfere unreasonably and unfairly with his private prospects. It is to our honorary secretaries that I more particularly refer. How they get through their work in the admirable manner in which they do I cannot conceive, and I do not even wish to suggest that the work could be better done,—as I know it could not. But I do wish to assert that it is not fair or just to expect any man to give up his time, often whole days together, in the way that our secretaries are apparently expected to do. Some of our other officers have very hard work to do, and, to their credit, manage to get through it admirably; but our honorary secretaries are overworked, and should be relieved without delay.

Having pointed out a few of the reasons why, in my opinion, the voluntary system is open to objection, I wish to call your attention to the fact that several of your past Presidents have dwelt in their opening addresses upon the fact that our system was capable of considerable improvement, and hinted, more or less strongly, that some serious steps should be taken to achieve such improvement.—Mr. Gotch calling "our present system of teaching a stop-gap, and desiring that the function now fulfilled by the Architectural Association on the voluntary system should devolve upon an authority recognised by the profession," and Mr. Slater "doubting whether voluntary work is adequate or the best."

I should here like to remind you also of the fact that *we*, as a nation, and it to our interest to make ourselves responsible for the elementary education of the community. Therefore, should not the smaller *we*, as a profession, recognise the desirability of becoming responsible for the technical education of our students. I do not mean that simply *we*, as an Association, should do what little we can, but I mean that the whole profession, through its representative body or bodies, should take the matter in hand, and do its utmost to forward architectural education.

The Royal Institute of British Architects is the one body that represents, far more than any other body in the three kingdoms, our profession; but what do we find it doing for education? It certainly has instituted a series of examinations for those who wish to join its ranks; and it hopes by so doing that in time membership of the Institute will carry more weight with it; and that, recognising this to be the case, the public will look more and more to the Institute for information and guidance in matters architectural. This, of course, all tends indirectly to raise the tone, and also the standard of education in the profession; but it



is not in itself education. Therefore, I think I may say that the Institute as a body is doing nothing directly to educate the younger members of the profession. It has, however, lately called into existence a new class of members,—or rather revived an old one,—viz., "Students"; but, as far as one can tell, from what it makes known to the public, the Institute does not at present, at any rate, propose to instruct (!) these students in any way, but simply to examine them at certain stated intervals.\*

Now, as we recognise fully the importance of making our body as thoroughly representative and efficient as possible, and being by experience conscious of the magnitude of the undertaking, and feeling that the support, both moral and otherwise, of the elder body in the profession would be of the greatest value to us, should we not approach them on the subject, and endeavour to obtain their co-operation and assistance in this great work?

The late Mr. Street was in his latter days anxious to see our Association and the Institute working more together, instead of in separate grooves, as they now are, and in his admirable opening address to the Institute in 1881 he referred to the subject at some length, the following being short extracts from his remarks:—

"The Architectural Association is in so many respects working in a groove which runs parallel to our own, that I can never avoid feeling that some means might and ought to be devised for enabling that active body to join us. . . . Some such plan might be devised by which our juniors might, under their own government, be training themselves until they gradually fall into their places among us. . . . I should, above all things, like to see their connection with us, established together, with full liberty of self-government as to all those educational arrangements which they at present appear to manage admirably and prize much. . . . What chance there may be of doing anything in this direction I know not, but nothing would give me more pleasure during my term of office than having to assist in any such fusion of the two bodies as might be found practicable."

I am fully alive to the fact that Street's suggestion was not received with favour by the Association at the time, and that the matter was dropped. But that was eight years ago, and since then some of our leading members who were at the time opposed to the idea have changed their views on the subject, and now see that considerable advantages might be derived by following some such scheme as Street proposed. We also must not forget to allow for eight years' change in the two bodies themselves, and, in fact, in the whole situation. What was then desirable is now doubly so, for the reason that architectural education is recognised now to be of far greater importance than ever.

Strictly speaking, the Institute, as the acknowledged representative body of the profession, is the proper executive for carrying out whatever work the interests of the profession at large call for,—educational or otherwise. But if it will acknowledge and help the Association in such a way as to practically endow it with the authority of the whole profession, then the Institute might be said to be, at any rate, contributing very largely to the work of architectural education.

The Architectural Association has hitherto been the chief, and, so far as concerns London, I may say the only educational society in the profession. Now, as the Institute is evidently alive to the importance of professional education, and as we are clearly of the same opinion, would it not be well if the two bodies could join hands and work together, instead of separately, for this their common object? By so doing, I believe they would form the means of establishing, and effectually maintaining, a comprehensive system of architectural training, based upon experience in such work, and endowed with the moral and material support of our whole profession.

The Association, as an independent society would, of course, still continue to do good work, as it has done in the past, and the Institute would not have to apply for any new charters; we should simply undertake to do conjointly what it would be much harder and more inconvenient to do separately with equal efficacy, viz., forward the technical education of our profession.

\* It appears to us very questionable whether the Institute is called upon to be, or could by any possibility be, a teaching body. It was not founded with any such object. There is nothing abnormal in its position in this respect. It is analogous in this respect to the University of London, which is a purely examining body. The Institution of Civil Engineers (noted in the next article) is a teaching nor an examining body, but it nevertheless exercises a great influence in keeping up the standard of professional ability.—E.D.

The reasons for our working together for educational purposes being that we find the task has outgrown our voluntary efforts, and they presumably wish to advance the cause of education further than they can do simply by the system of examinations now coming into operation.

Having suggested that the Institute and the Association should work more together in the future, I will endeavour to show you what advantages would accrue to us from such an arrangement. But, first of all, it would, of course, be necessary that the Institute should agree to work with us. They might decline in '89 to have anything to do with us, as we did in '81 to have anything to do with them; but I hope and believe they would not come to any such conclusion.

In appointing our visitors and lecturers, we should, if we were working with the Institute, be able to draw them from either our own list of members or from theirs; and, besides this, we should be in a position to offer them fees,—as I shall point out presently,—which, if not adequate in themselves all at once to repay the lecturers for all the time and trouble expended, yet might make it worth their while to accept such posts, when taken in conjunction with the fact that such offices were filled by the nominees of both the Association and the Institute, thus reflecting a certain distinction upon the holder thereof. It would be considerably to our advantage if we could thus get a stronger list of visitors and lecturers to help in the Association. Men who have a gift for, and who are prepared to make a business of, teaching are much wanted in our profession, and such a body of men might be called into existence under some such system as I am suggesting.

Again with the Institute to help us, we might reasonably expect to be able to collect enough money, either in capital to endow certain Chairs, or in yearly subscriptions, to support the same. In our city we have numerous very wealthy companies which exist ostensibly for the benefit of certain trades. Unfortunately we have no Worshipful Company of British Architects, but if it were pointed out to the companies that do exist—viz., the Ironmongers, the Blacksmiths, the Dyers, the Glaziers, the Goldsmiths, the Plumbers, the Carpenters, the Paperstainers, the Plasterers, the Turners, the Tylers and Bricklayers, &c., &c.,—that it really is to the architect to whom they look for good designs and good construction, surely they might assist in educating the man to whom they eventually turn for help. What is the use of registering a plumber if an architect designs bad plumbing, and will have it carried out? or of giving a certificate of proficiency to a carpenter if the architect provides him with a design unsuited to the material in which it is to be executed? There must also be many in the profession who would help us if they felt confidence in us; and I maintain that greater confidence would be placed in us if it were known that the Institute was in some way officially connected with us.

We might also reasonably expect the Institute to help us with its purse, for, although I am perfectly aware that at present the Institute is not too well off, yet, with a little judicious saving in its expenditure, it might find that it could help pretty effectually. And I fancy that if the Institute felt that we should be glad of its assistance, it would very soon be able to offer us such assistance, in the shape of funds to pay lecturers' fees for certain courses of lectures, and in all likelihood all they would require in return would be to have some voice in the appointment of such lecturers, leaving all matters of detail in the hands of the Association and the lecturers.

Having pointed out how we should gain by being recognised and helped by the Institute, I will direct your attention to what we should do for ourselves in the way of raising funds,—for funds we must have, if we are to carry on our work in a satisfactory, and not merely in an amateurish manner. Letters on the subject of raising money for the Association have appeared of late in the professional papers and in our own *Notes*; but, though I admire the writer's enthusiasm and energy, I cannot agree with all his views on this subject. However, if he can only enable us to raise half the sum he mentions, we shall do very well indeed to begin with.

But, before asking others,—except perhaps the Institute,—to help us, I think we certainly ought to show that we are in earnest ourselves, and in order to do this we should raise our

annual subscription to a guinea. Our present subscription of half-a-guinea is quite inadequate to carry on all the works we now have in hand. It is also ridiculously small when compared to the subscriptions paid to other somewhat similar professional societies. . . .

With more funds at our disposal the library might be improved. We have, no doubt, a very valuable collection of books, but we should possess many more duplicate copies of the recognised text-books of the profession. Besides this, we ought, I think, to be able to open the doors of our library for more than the two or three hours a week which they are now open. And if a series of afternoon classes could be established, which members who were in their articles, or who happened to have time at their disposal, could attend, it would be no inconsiderable advantage to many of our members, who are expected at present to cram all the work they do at the Association in as over-time. . . .

Something in the nature of a drawing-school would also be a valuable adjunct to this Association, but would require considerably more funds to keep up than are at present available. And that something of this sort is required I feel quite certain.

I have now shown you, as far as the limited time at my disposal will allow me, the defects of our present voluntary system. I have tried to insist that if we are to pose before the world as a teaching body we should adopt more efficient methods than our present ones, and I have given you the opinions of some others on this subject. I have likewise tried to show you the folly of our trying single-handed to cope with an undertaking of such magnitude, and have suggested that we should,—with the concurrence,—work with, and obtain the assistance of, the Royal Institute of British Architects in this work. I have shown you how we should gain by accepting the assistance of the one body that really represents the whole profession. I have suggested ways for obtaining funds, for carrying out various improvements, and also for systematising, consolidating, and thereby greatly strengthening the work we are now doing in the profession. I have pointed out in these suggested means for raising funds that we may confidently look for help to others, but insisted that we ought to show that we ourselves are in earnest by first doing what is obviously necessary,—viz., raising our annual subscription; and, having done all this to the best of my ability, I now call upon each one of you, as members of this Association, upon each member of the Royal Institute of British Architects, as belonging to the one body that really represents the profession at large, and also upon every architect outside these two societies who has the smallest degree of sympathy with our undertaking and love for his profession, to unite and to the best of your ability help forward the great cause of architectural education.

[For some notes of the discussion which followed, see p. 295.]

**Institution of Mechanical Engineers.**—An ordinary general meeting of this Institution will be held on Wednesday, October 30, and Thursday, October 31, at 25, Great George-street, Westminster, by kind permission of the Council of the Institution of Civil Engineers. The chair will be taken at half-past seven on each evening, by the President, Mr. Charles Cochran. The following papers will be read and discussed, as far as time permits:—(1) "On the Results of Blast-Furnace Practice with Lime instead of Limestone as Flux," by the President; (2) "Description of a Rotary Machine for Making Block-Bottomed Paper Bags," by Mr. Job Duerden, of Burnley, communicated through Mr. Henry Chapman; and (3) "Further Experiments on Condensation and Re-Evaporation of Steam in a Jacketed Cylinder," by Major Thomas English, R.E., Superintendent, Royal Carriage Department, Woolwich.

**The Association of Municipal and Sanitary Engineers and Surveyors.**—The following gentlemen, having satisfied the examiners at the examination held in London on the 4th and 5th inst., have been granted certificates of competency by the Council of the Association, viz.:—Messrs. Miles Aspinall, Cardiff; Henry Bucknall, Stratford-on-Avon; F. S. B. Gaffney, Athleage; H. B. Noakes, Cambridge Wells; T. Preston, Bradford; and T. Thomas, Neath. The next examination will be held in London in April, 1890.



## THE LONDON COUNTY COUNCIL.

The weekly meeting of the London County Council was held on Tuesday last in the Council Chamber, Guildhall, Lord Rosebery in the chair.

**Tenders for New Building Works.**—The Asylums Committee presented the following report, the acceptance of which was moved by Mr. P. M. Martineau, the Chairman of the Committee:—

"Your Committee have to report the steps which they have taken in pursuance of the resolution of the Council of June 25 last, authorising them to provide additional accommodation at the County Asylum for pauper lunatics at Cane-hill, Coudon, Surrey, by the enlargement of such Asylum, in accordance with the plans approved by the Secretary of State and in accordance with the estimate already approved by the Council.

Your Committee caused advertisements to be issued, inviting tenders for the execution of the works, and they have received the following tenders:—

Mr. H. Lovatt, Wolverhampton .....	£96,000
Messrs. Perry & Co., Bow, E. ....	89,947
Mr. E. Gabbutt, Liverpool .....	89,950
Messrs. J. Mowlem & Co., Westminster, S.W. ....	89,361
Mr. B. E. Nightingale, Albert-embankment, S.E. ....	89,885
Messrs. Peto Bros., Finsbury, S.W. ....	85,447
Mr. John Fell, Leamington .....	89,600
Messrs. S. & W. Pattinson, Whitehall, S.W. ....	80,319
Messrs. J. Longley & Co., Crawley, Sussex .....	79,950
Messrs. W. Brass & Son, No. 47, Old-street, E.C. ....	79,763

Your Committee have caused careful inquiry to be made as to the capacity of several of the firms to carry out works of the extent and nature of those in question, and they recommend—"That the tender of Messrs. W. Brass & Son for the execution of the works for the extension of Cane-hill Asylum, for the sum of 79,763, be accepted."

Your Committee have also to report the steps which they have taken under the resolution of the Council of June 25 last, authorising them to provide an additional Asylum by the completion of the Asylum in course of construction at Claybury, Essex.

Your Committee have prepared an estimate of the cost of erecting the superstructure, amounting to £370,000, which they have furnished to the Finance Committee, and which will be submitted by that Committee for the approval of the Council.

Your Committee have caused advertisements to be issued, inviting tenders for the erection of the superstructure, and they have received the following tenders:—

Mr. H. Lovatt, Wolverhampton .....	£377,690
Messrs. G. W. Trollope & Son, Finsbury, S.W. ....	377,590
Mr. J. Fell, Leamington .....	368,300
Mr. B. E. Nightingale, Albert-embankment, S.E. ....	361,461
Messrs. J. Mowlem & Co., Westminster, S.W. ....	360,890
Messrs. J. Longley & Co., Crawley, Sussex .....	349,668
Messrs. R. Neill & Sons, Manchester .....	346,519
Messrs. Perry & Co., Bow, E. ....	343,627
Mr. E. T. Chappell, Finsbury, S.W. ....	338,333
Mr. E. Gabbutt, Liverpool .....	337,935
Messrs. W. Brass & Son, No. 47, Old-street, E.C. ....	337,777
Messrs. S. & W. Pattinson, Whitehall, S.W. ....	336,975
Messrs. Belham & Co., No. 156, Buckingham-palace-road, S.W. ....	299,000

Your Committee have received a letter from Messrs. Belham & Co., withdrawing their tender, and stating that they had made a serious mistake of about 70,000*l.* in it.

Your Committee have caused careful inquiry to be made as to the capacity of the firms whose tenders were lowest to carry out a work of such magnitude, and they recommend, "That the tender of Mr. E. Gabbutt, for the execution of the work of erecting the superstructure of the Asylum at Claybury, for the sum of 337,935*l.*, be accepted."

A long discussion ensued, in the course of which, with regard to the first recommendation of the Committee, Mr. John Burns moved that it be referred back for further consideration, on the ground that Messrs. Brass & Son did not pay their workmen in several branches of building work the minimum standard rate of wages which obtained in the London building trade, some of their men, he asserted, being paid 1*d.*, 1½*d.*, and 2*d.* per hour less than the

\* We have reversed the order of this and the following list of tenders as they appear in the Committee's report, wherein the lowest tenders appear at the tops of the lists,

recognised London rates. In answer to this and other charges made against Messrs. Brass & Son by Councillor Burns, other Councillors pointed out that by the terms of the contract which would have to be signed by Messrs. Brass & Son, that firm would be pledged to meet the requirements of the Council and the workmen. Eventually it was resolved to refer back for further consideration the first recommendation of the Report of the Committee. Then arose a long discussion as to why the Committee recommended the acceptance of Mr. Gabbutt's tender, when, excluding Messrs. Belham & Co.'s tender, which was withdrawn, there were two other tenders lower than Mr. Gabbutt's. Why, it was asked by some Councillors, was Messrs. Pattinson's tender to be passed over in favour of one amounting to 2,000*l.* more? Other Councillors argued in favour of retaining the work in the hands of a London firm,—either Messrs. Brass or Messrs. Pattinson. It was pointed out that Messrs. Pattinson were in reality a country firm, having only an office in London. Mr. Councillor Martineau, on behalf of the Committee, stated the reasons which induced them to recommend Mr. Gabbutt's tender for acceptance. With regard to Messrs. Brass & Son's tender, the Committee did not know that that firm had tendered for the larger work at Claybury until after they had recommended the acceptance of their tender for the work at Cane-hill Asylum, and, without meaning any disparagement of Messrs. Brass & Son's ability to carry out the work, they (the Committee) thought it would be undesirable that one firm should have both contracts. With regard to the Committee's preference of Mr. Gabbutt's tender over Messrs. Pattinson's, Mr. Martineau explained that, without implying any reflection or imputation upon Messrs. Pattinson's ability and respectability, the Committee had come to the conclusion, after a consideration of all the circumstances of the case, that Messrs. Gabbutt's was the tender to be preferred, even although it was 2,000*l.* higher than Messrs. Pattinson's. In the course of further discussion, several members urged that the work ought to be given to a London firm, on the ground that as London ratepayers would find the money, London trade ought to benefit by finding the labour and materials for the work. It was suggested that Mr. J. T. Chappell's tender, which was only about 400*l.* more than Mr. Gabbutt's, ought to be accepted on this ground. Several members of the Council pointed out, however, that this Protectionist view of the matter could not be entertained, seeing that the Council had laid down the principle of inviting open tenders, without any limitation to London firms. Several members of the Council, in continuing the discussion, expressed surprise that for such large works the tenders were so few in number. Other members replied that the paucity of tenders was due to the extremely onerous,—the too-onerous, as they thought,—conditions of contract. A large sum (20,000*l.*) was demanded as security for the due performance of the work; moreover, many of the largest and most reputable firms in the building trade refused to compete in competitions open to everybody, and others objected to be bound by the wages clause. An amendment, moved by Mr. Eneas Smith, to refer the matter back to the Committee, with instructions to re-advertise for fresh tenders, was lost by 74 votes to 24. Colonel Hughes, M.P., moved another amendment, simply referring the matter back to the Committee for reconsideration, with a view to seeing whether the work could not be given to a London builder. This amendment was lost by three votes,—39 against to 36 for. The motion for the adoption of the Committee's recommendation, accepting Mr. Gabbutt's tender, was then put and agreed to.

**Inspection of House Drains.**—The Main Drainage Committee presented a report recommending "That application be made by the Council in the next session for the following powers:—1. To provide for periodical inspection of drains under houses, by Vestries or District Boards, and for the execution of such works by them as upon such inspection or otherwise may in their judgment seem necessary; a clause to be included requiring that means shall be provided for inspecting and testing house drains. 2. To prevent the construction of basements below the level of sewers, except with the consent of the Council. 3. To prevent buildings being erected in places where there are no sewers, except with the consent of the Council."

These recommendations gave rise to some

discussion, it being contended that the Vestries already had the powers sought for in Clause 1, and that some of them, Kensington, for example, exercised those powers. Mr. Councillor Brereton supported the recommendations of the Committee, on the ground that the existing powers were inadequate and inoperative. The recommendations were agreed to.

**The Alleged Breach of Contract by a Contractor.**—It will be remembered that some months ago\* the contractor for the new sewage outfall works at Crossness, Mr. William Webster, was stated in a report of the Main Drainage Committee to have committed a breach of contract by having "practically sub-let" a portion of the work,—viz., the brickwork, and the Committee then recommended that the penalty provided in reference to this matter (£500) be enforced. By forty-seven votes to thirty-eight, however, it was then decided to refer the matter back to the Committee for further consideration. The Committee, having been sitting upon the matter since May, now reported as follows:—

"Questions having arisen in respect of the carrying out of the contract for the construction of sewage precipitation works at the Crossness Pumping Station, your Committee brought up a report to the Council on April 30 last. The matter was, however, referred back to your Committee with instructions to take evidence, and they therefore invited the attendance of—(1) A deputation from the Building Trades Committee. (2) Mr. Webster, the contractor, with whom came Mr. Hunter Jones, his agent, who spoke as and for Mr. Webster. Your Committee also requested the attendance of Mr. Hart Bennett, one of the Council's assistant engineers, and Mr. Houghton, the superintendent at Crossness, together with the four clerks of works. The transcript of the shorthand writer's notes of the evidence is in the office, and can be seen upon application to the Clerk of the Council. Your Committee have now to report, as the result of their inquiry, that the contractor has made an arrangement with two foremen, who receive a premium on the amount of work done in addition to time wage, but your Committee do not consider that this amounts to sub-letting. They therefore recommend 'That no further action be taken in the matter.'"

A long discussion arose on this matter, following the lead of Mr. Arthur Arnold, who moved the following amendment: "That the recommendation as to alleged sub-contracting or letting of labour upon brickwork at Crossness be referred back to the Committee, and that it be an instruction to the Committee to report as to whether the practice alleged to have been adopted should be sanctioned in the execution of contracts with the Council." Mr. Arnold said he was sorry to have to speak in an adverse sense upon the recommendation of a Committee of which he had the honour to be a member, but his own opinion, formed after the inquiry, was that the arrangement with the foremen was in effect a sub-letting, although it was spoken of as a "bonus" to them. It was stated that the same practice had been winked at for twenty years by the Metropolitan Board of Works; but the Council were not the Metropolitan Board of Works, and he thought it behoved the Council to see that the clauses in their contracts were strictly and entirely adhered to.

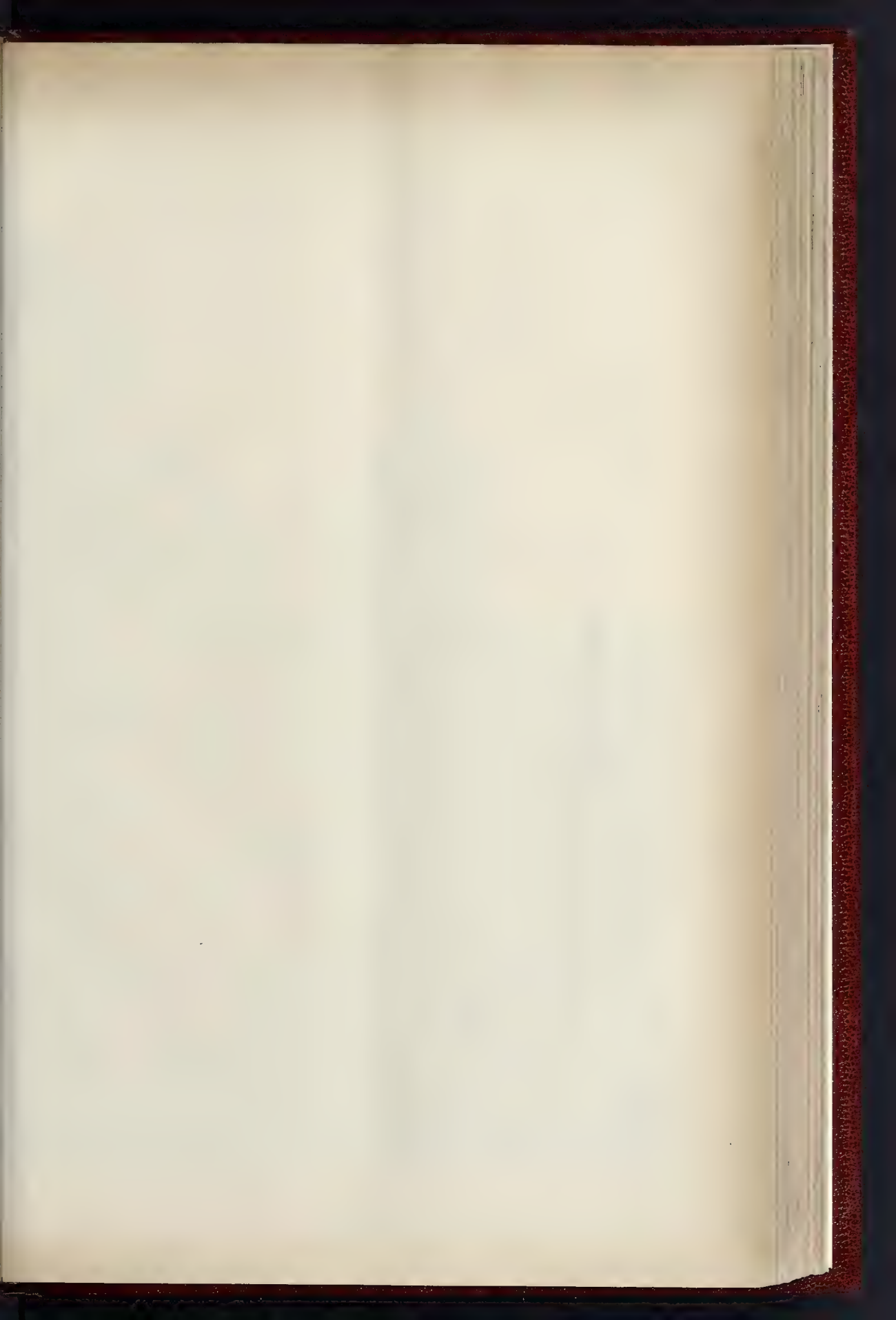
Several members expressed doubt as to whether the practice referred to was within the legal definition of sub-letting, or sub-contracting. Mr. Horsley stating that the late Mr. Firth's opinion was that it was not. Eventually the amendment was carried and the report was referred back.

**Overhead Wires.**—The Highways Committee submitted a report recommending the Council to make application to Parliament for powers to regulate and control overhead wires, and to construct and to compel the use of subways. The report was adopted.

**Public Baths and Washhouses.**—The Sanitary and Special Purposes Committee reported that they had under their consideration the question referred to them as to the advisability of the Council being invested with powers to establish public bath and laundries in all parts of London. The Committee, who had inquired very carefully into this subject, and had prepared a return of the existing baths and laundries in London, were of opinion that this was not one of the questions that pressed most for central ad-

\* See *Builder*, May 4, 1889, p. 341.









ministration, and that it might, at any rate, be properly deferred until such time as District Councils were considered, and they recommended:—  
“That the consideration of the question be deferred accordingly.”

Mr. Phillips moved as an amendment, “That the Council do, in the next session of Parliament, apply for powers to establish public baths and laundries in all parishes or districts where the Act of 1846 shall not have been adopted previously to December 31, 1890, and that copies of this resolution be sent to the local public bodies concerned.” He urged that for the poor of the East-end the question was only second in importance to that of housing them. It was now proposed to defer the question to the Greek Kalends. Out of the seventeen parishes which had adopted the Act of 1846 ten were west of Temple-bar, and the interests of the poor had been grossly neglected. Something should be done by the Council to repair that neglect.

The amendment was lost, and the Committee's report was then agreed to.

*The Proposed Strand Improvement.*—The following notice of motion by Mr. Marsland appeared in the agenda:—

“That whereas the Council has determined by resolution of the 1st October to authorise the Improvements and Parliamentary Committees to take the necessary preliminary measures for the purpose of applying in the next session of Parliament for powers to remove the block of buildings on the south side of Holywell-street, &c.; in order to put the Council in a position to deal with the whole of the new line of frontage to the Strand, to preserve the Church of St. Mary-le-Strand, and to recoup some portion of the expense proposed to be incurred, the Improvements and Parliamentary Committees be authorised to include in the said application to Parliament powers to acquire the land and buildings on the north frontage to Holywell-street, and sufficient land and buildings on the north side of St. Mary-le-Strand Church, to form a practicable roadway with frontage thereto.”

This item was not reached before the Council rose, and therefore it stood over for future consideration.

#### THE ARCHITECTURAL ASSOCIATION.

The first ordinary meeting of this Association for the present session was held on Friday, the 18th inst., in the meeting-room of the Royal Institute of British Architects, Mr. Leonard Stokes (President) in the chair.

No fewer than sixty-two gentlemen were nominated for election as members.

Mr. Cole A. Adams proposed the adoption of the report of the Committee for the past year, which recapitulates the work which has been fully recorded in our columns, and appears in the new “Brown Book,” from which we learn that the Association now numbers 1,100 members.

Mr. Low seconded the motion, which was unanimously agreed to.

Mr. H. W. Pratt next moved the adoption of the balance-sheet, and a vote of thanks to the auditors, Messrs. Reginald Wicks and Max Clarke.

Mr. A. C. Bulmer Booth seconded the resolution, which was also agreed to.

The Chairman proposed a vote of thanks to Mr. J. Douglass Mathews, who for more than twenty-five years had been an officer in one way or another of the Association (applause). For a great part of that time Mr. Mathews had been Treasurer, and had devoted considerable attention to the interests of the Association. Mr. Mathews had now found that he must retire from the post, and the least they could do was to render him a hearty vote of thanks (applause).

Votes of thanks were also accorded to the Entertainments Committee for the trouble they had taken in connexion with the recent *concerts*; to Mr. Burrell, for kindly helping at the last moment; to Mr. Oresswell, for looking after the pictures; to Mr. Fryce, for undertaking the musical arrangements; and to Mr. Earle, for attending to the exhibitors. A similar compliment was further paid to the various firms who had lent objects to decorate the rooms.

The hon. Librarian announced several donations to the library.

The Chairman then presented the prizes

gained in the last session. The following is the list:—

*A.A. Travelling Studentship.*—Awarded to A. E. Bartlett; second, P. D. Smith.

*A.A. Medal and 10l. 10s.*—Awarded to E. A. Hill.

*Essay Prize and Silver Medal.*—Awarded to C. H. Strange. Hon. mention, G. W. Sadler.

*Architectural Union Company's Prize.*—First, not awarded; second, A. W. Cleaver.

*Cates Prize.*—A. C. Walker.

*Sketch-book Title Page.*—Not awarded.

*Elementary Class of Design, Sec. I.*—First prize, J. R. Stark; second, R. Enoch.

*Elementary Class of Design, Sec. II.*—First, J. S. Stewart; second, H. A. Saul.

*Elementary Class of Construction.*—First, H. J. Leaning; second, A. T. Walsley.

*Elementary Class of Colour Decoration.*—First, H. Drury; second, L. Sargent; Class prize, J. D. Scott.

*Class of Design.*—First, E. F. Seaman; second, A. W. Jarvis.

*Colour Decoration Class.*—Prize, V. T. Jones; Time sketches, V. T. Jones.

*Class of Construction.*—First, F. R. Taylor; second, F. H. Greenaway; hon. mention, A. O. Breeds.

*Advanced Class of Construction.*—First, C. H. Brodie; second, A. O. Breeds.

*Quantity Surveying Class.*—First, W. J. Wilson; second, H. L. Paterson.

*Lectures on the History of Architecture.*—First, E. Carless; second, M. Garbutt; third, A. T. Walsley; hon. mention, P. H. Adams, Johnson, and Taylor.

*Lectures on Construction.*—First, C. H. Strange; second, J. Murray; third (divided equally), T. Jenner and J. W. Wyles.

The Chairman next delivered his Presidential address, a considerable portion of which we print on another page.

Mr. H. L. Florence proposed a vote of thanks to Mr. Stokes for his able and suggestive paper. He was glad that the address had opened with a reference to the different qualifications necessary for the architects, and the character of the work which came upon the architects of the present day, as compared with the old men. In fact, no one could see the complicated works now progressing everywhere without feeling that the architect of the present day was obliged to have a far wider range of knowledge, and a more intimate acquaintance with all sorts of detail, than were necessary in times past (applause).

Architects were rather given, with the general public, to undervalue their services, and the general public in such cases were apt to take them at their own valuation. In the work that was being carried on in many places there was much that architects might study and learn from, while a great deal might be done for the advancement of architecture generally were architects themselves a little more appreciative of each others' work, and not so apt to give way to a spirit of criticism rather than admiration of what was justly deserving.

In recognising the value of their art they would raise the character of the profession, and the general opinion in which it was held. In regard to the work of the Association, for a long time he had been greatly in favour of a continuance of the voluntary system. There were certain advantages in it which were possessed by no other system of paid instruction. The student learned more readily, for instance, from those who had passed through the same experience, and the method of teaching was also more pleasant.

That, however, applied to some years ago, for the changes that had taken place, and the gradually increasing difficulty of the examinations, had shown him that the old method was now insufficient. That had been felt by degrees for some years, but the present was the first occasion on which the necessity for a change had been so strongly put before the Association (applause). It was the duty of the members to support and endeavour to raise the character of the examinations, and the responsibility of preparing men for those rested with the Association, which first and foremost was a teaching body. At the same time, their means at present were inadequate to do so satisfactorily. Their method of teaching, admirable as it was in many ways, did not comply with all the necessary requirements of the present day. The course suggested of raising the subscription was inevitable, and he was glad also that the Chairman considered the project of a closer union with the Institute one which was capable of being carried out (applause). He had noticed a gradual ap-

proach going on between the two bodies. The jealousies which formerly existed between them had entirely disappeared, and the Institute now looked upon the Association as a society from which its ranks would always be recruited. There was no doubt that the Association was the greatest supporter of the Institute, and if any well-devised scheme were laid before the latter body it would not be received with coldness or hesitation (cheers).

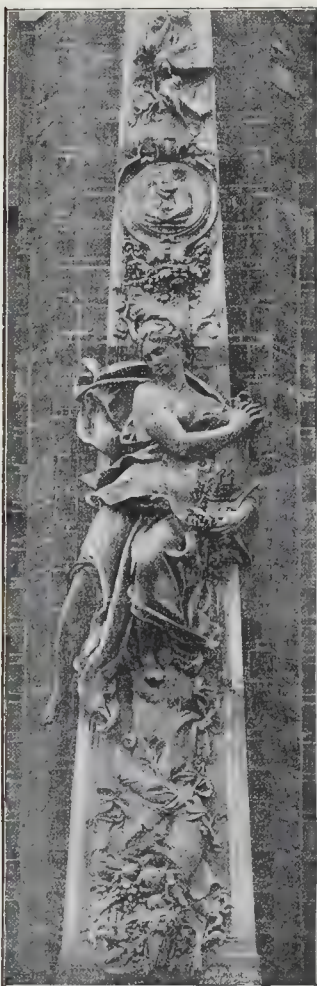
Mr. John Slater, B.A., seconded the motion, and said he felt very much obliged to Mr. Stokes for having made so great a point of the burning question of architectural education, and for having had the courage to advocate from that chair so close an alliance with the Institute. He believed that the effect which the Institute examinations must have on education had been a little underrated. It was no use urging on pupils or their parents the necessity of being educated unless some initial reason were given for it. The mere prospect of what had been called “the grim realities of actual practice” would not be sufficient to induce a student to go through the mill, and educate himself in those numerous subjects which were essential if he aspired to be a thorough architect. But, on the other hand, if a pupil were told that unless he in a few years became a member of the Institute, he would in all probability be severely handicapped in the race for professional success, and be unable to get as much practice as he otherwise would, there would be a strong incentive for him to seek to acquire the education so earnestly desired. The establishment of those progressive examinations would therefore do a great deal towards bringing forward the subject of education and enlarging its range. Speaking as a private member, and without any official authority in regard to the Institute, he entirely agreed with the President that the Institute must before long do something practical towards this question. At the same time it did no good to move too quickly. It had taken several years to get the Examination, and there was a great deal to do before a thorough system of education could be instituted for the great body of young architects now growing up. The Institute, he was sure, would be only too glad to work hand-in-hand with the Association, and to assist it in every possible way towards this great object. He hoped, therefore, that no feeling of jealousy of the Institute would prevent the Association asking and receiving aid from that body (cheers).

Mr. Cole A. Adams congratulated the Chairman on the tone of his address, which had given utterance to thoughts that had been in the minds of several of the older members for many years past. That was particularly the case in regard to the burning question of education. Another important matter was a nearer *approchement* between the Institute and the Association. He could remember the time when such sentiments as the Chairman had had the courage to give vent to would have been met with silence, or perhaps even with opposition. Times, however, had altered, and the feeling which had grown up between the two bodies was one which would become more and more cordial (applause). He hoped that in any new system which might be inaugurated, the voluntary system would be tenderly dealt with, but it must now be supplemented by paid assistance. The voluntary system had benefits which could never be obtained for paid assistance. There were, for example, many talented young men in the Association who were good enough to give their time and aid in acting as visitors to the classes. These visitors brought into the class just the enthusiasm which men felt when they were beginning to mount higher up the steps of the ladder. Such men were unable to accept any post as lecturer, and unless their services could be retained, the Association would lose that most valuable assistance which came from youth, energy, talent, and enthusiasm (cheers).

With regard to the scheme which had been propounded with so much enthusiasm by one of their members, he (the speaker) had for many years indulged a somewhat visionary idea of some day seeing a stately home for English architecture erected in London, and perhaps the beginning of some such scheme had now been inaugurated (applause).

Mr. C. H. Brodie said he had on a former occasion voted against the raising of the subscription, but he would now vote in favour of such a proposal. He believed a closer connexion between the Institute and the Association would come about by itself, because in the





*Sculptural Decoration on the Piers of Main Entrance of the Palais des Arts Libéraux, Paris Exhibition.—M. Gustave Michel, Sculptor.*



course of time probably every member of the Association would be one of the Institute's students, and the time would come when most of the members of the Institute would have passed through the Association (applause).

The vote of thanks was then carried by acclamation, and the Chairman having briefly replied, the proceedings terminated.

*The A. A. Lyric Club.*—The first smoking concert of the A. A. Lyric Club for the session 1889-90 was held at the Mona Hotel, Henrietta-street, Covent-garden, on the 17th inst. Mr. G. Richards Julian, President of the Club, occupying the chair. A capital entertainment was provided, and elicited much applause. Songs were rendered by Messrs. F. Christopher, A. C. Bulmer Booth, Capt. J. Watson, E. W. Knight, A. Thomas, H. O. Cresswell, H. G. Lidstone, and J. D. Scott, and recitations by Mr. Cole A. Adams. Mr. C. D. Imhoff (the accompanist) contributed two pianoforte selections. The next concert was announced to take place at the Mona Hotel on the 21st prox.

*Cheltenham.*—The Corporation of Cheltenham have called in Messrs. Bailey Denton, Son, & North to advise on the measures to be taken to prevent the flooding of basements in the neighbourhood of the promenade of the town from the sewers in times of heavy storms.

### Illustrations.

#### PAIS DES ARTS LIBÉRAUX, PARIS EXHIBITION.

WE give this week a view, taken from a photograph, of the central portion of building for the Palais des Arts Libéraux at the Paris Exhibition, designed (along with its *vis-à-vis* the Palais des Beaux-Arts) by M. Formigé, and which, as already mentioned, is one of the buildings which is to be permanently retained.

The building, which we have described at some length in a general article on the Paris Exhibition, is of terra-cotta and iron mainly. The spirited sculptural decorations on the central piers, modelled by M. Gustave Michel, are illustrated in the accompanying cuts.

At each side of the plate is seen a portion of the wings of the structure, showing how this portion is treated. The square pilasters which flank the large windows are of lattice iron-work painted pale blue and filled in with terra-cotta plaques with a simple surface ornament.

#### DESIGN FOR A TOWN CHURCH.

ARCHITECTURAL ASSOCIATION SILVER MEDAL.

This design, by Mr. E. A. Hill, a member of the Architectural Association, obtained the

Association Silver Medal for this year for an original design on a given subject.

The author has adopted the scheme, now becoming much more common than formerly, of a wide centre area, with narrow side aisles for passage only. The deep buttresses arched over the aisle afford a fine feature externally especially in contrast with the large traceried windows between; the treatment of this part is fine and effective, and it is an effect produced by bold and massive composition and contrast and not by mere decorative treatment.

#### WAYSIDE NOTES IN EAST ANGLIA.—No. 4.

On the 18th of July last the Suffolk Institute of Archaeology made their annual excursion to the churches and places from whose fabrics the details which I have collected on my fourth sheet were taken, though the fragments I have drawn give but little idea of the churches and buildings themselves, it may be of interest if I supplement them by notes which I took on that occasion.

The company started from Stowmarket, and driving through Buxhall, which church was inspected, they reached Rattlesden, a considerable village five miles west of Stowmarket Station. The church is dedicated to S. Nicholas, the sailor's patron, and it is seldom found so far inland, but it may be accounted for at Rattlesden by the fact that the meandering streamlet that now harmlessly ripples through its meadows was once a considerable river, deep enough to float freight-bearing craft, and it is even rumoured that the masonry for the great churches at Bury was floated up this very stream from Stowmarket, and thence conveyed by road to its destination.

Further evidence of the navigable nature of the river exists in the form of an old anchor dredged many years ago from the bed of the stream. The fabric of the church is most interesting, the details are elaborate, and the general character of the decorations indicate no lack of pious patrons for its erection. The nave and tower are Decorated, but the aisles, chancel, clearstory, and south porch are Perpendicular. The nave roof is one of those exceedingly rich hammer-beam ones so frequently found in the Eastern Counties; the angels with expanded wings, most of which have been restored, number sixty-six. On the north wall should be noticed a fine ambury beneath a mutilated canopy, the original hinges remaining. The roof-loft stairs still remain, also a hagioscope and some tabernacle work. A curious feature I have sketched is the way in which the octagon piers, whose sides are hollowed in concave form, are worked into the straight by cusping, which dies out at the bottom. These cusps do not exist on the responds. There is a beautiful font, *circa* 1450, some fine poppy-heads, and the remains of stained glass and frescoes. The church was restored by Sir A. Blomfield, in 1879, and again in 1883.

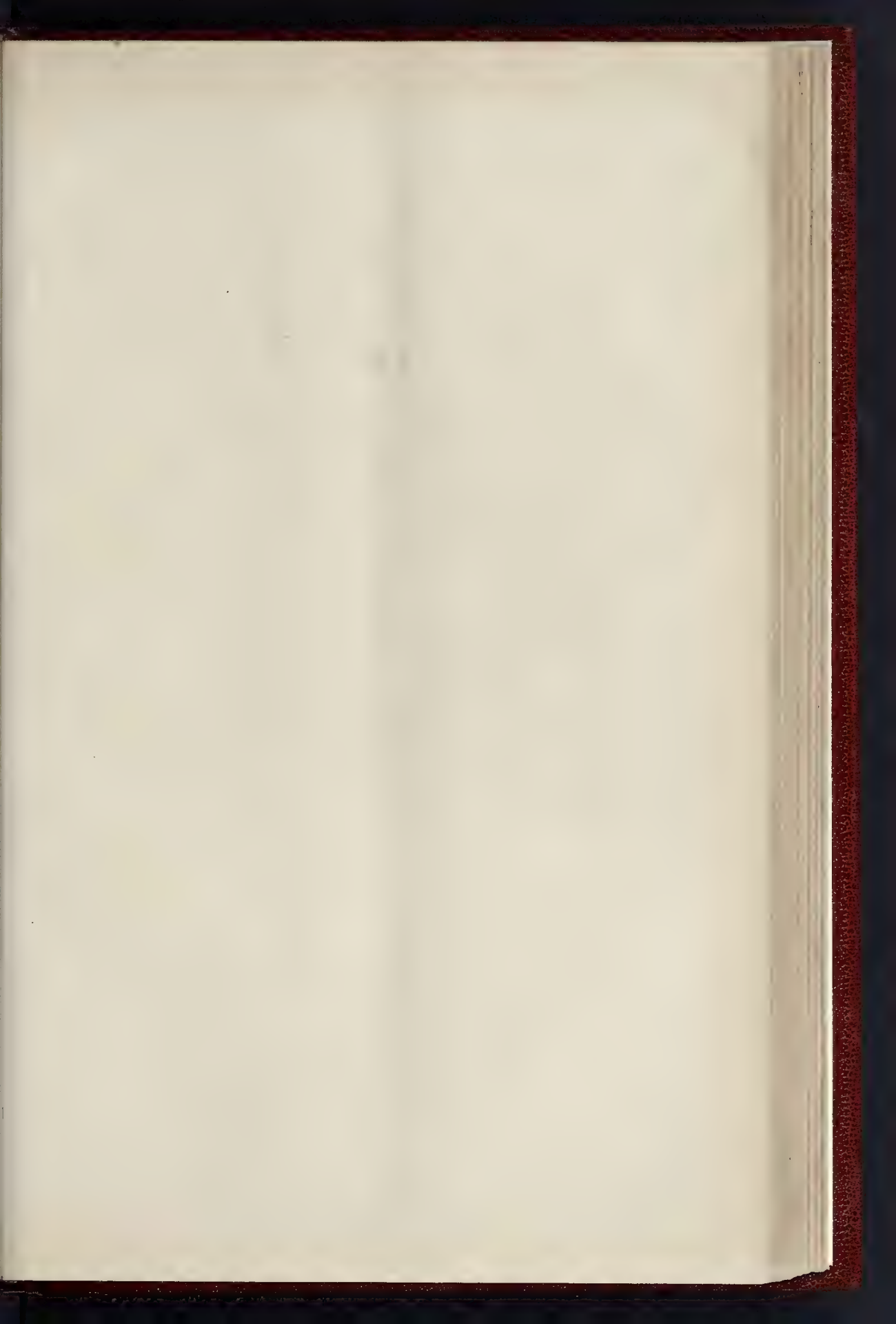
The next stopping-place was Gedding, about seven miles from Stowmarket.

The curious old church at Gedding takes us back very far into the past,—in fact, to the reign of Richard Cœur de Lion, when at the double-moated grange (a sketch of which I was hurriedly enabled to take) resided Sir John de Geddyng, lord of the manor.

In the walls of the church, during a recent restoration, two small Norman windows were discovered. There are signs of a moat round the church, showing it to have been a place of refuge in troublous times. The chancel arch is very narrow, and has cusped apertures flanking it on each side.

In the chancel is a low side window on the south side, called, but I believe erroneously, a leper's window. It seems to me that this theory of lepers worshipping at these low side windows requires confirmation, particularly as the reveal does not play easternwards in this case. Two other theories are extant, and I should be glad if the question could be discussed. One is that criminals and vagrants were confessed and absolved at these apertures; and another, that opposite to them on the wall was a figure in sculpture or painting of the Virgin Mary, that at certain times was worshipped by those passing through the churchyard. The upper part of the tower has been rebuilt in brick, though of ancient date,—probably Tudor. The view of Gedding Hall shows the porter's lodge and gate-house, the centre large arch being built up; this is in red brick, of Tudor date, though portions of the interior are much older. The whole structure, in its ruinous and ivy-clad condition, forms a







Brettonham C

CS



Jedding

# Wayside Notes

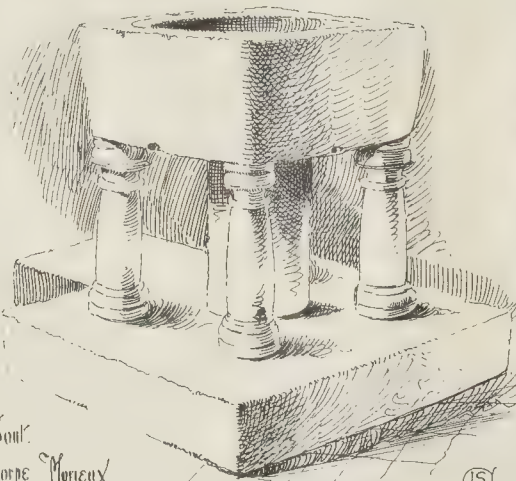
in East Anglia by John St



Jedding Church

CS

Old door  
Jamb  
Water St  
Lavenham



The Font  
Thorpe Morieux

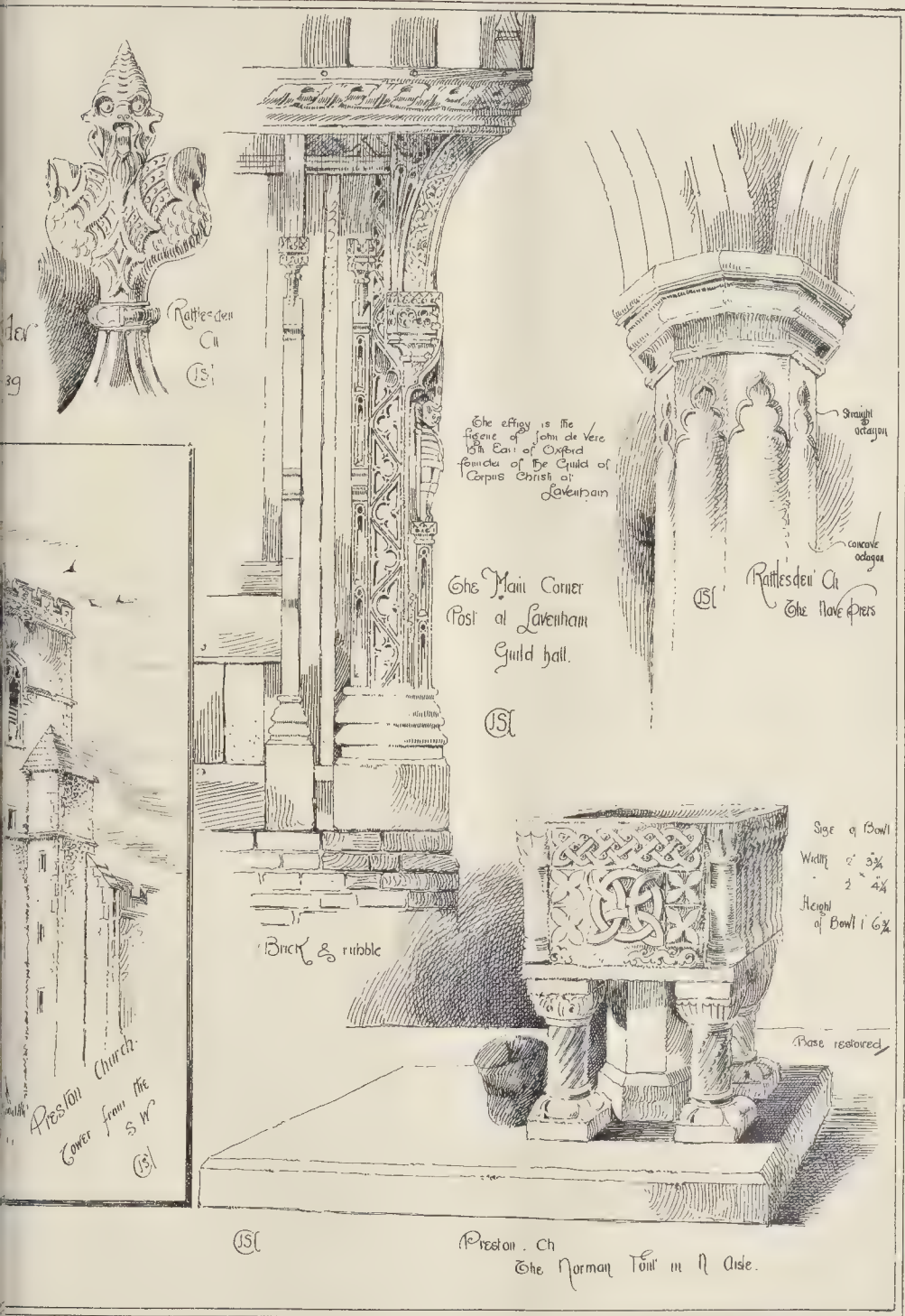
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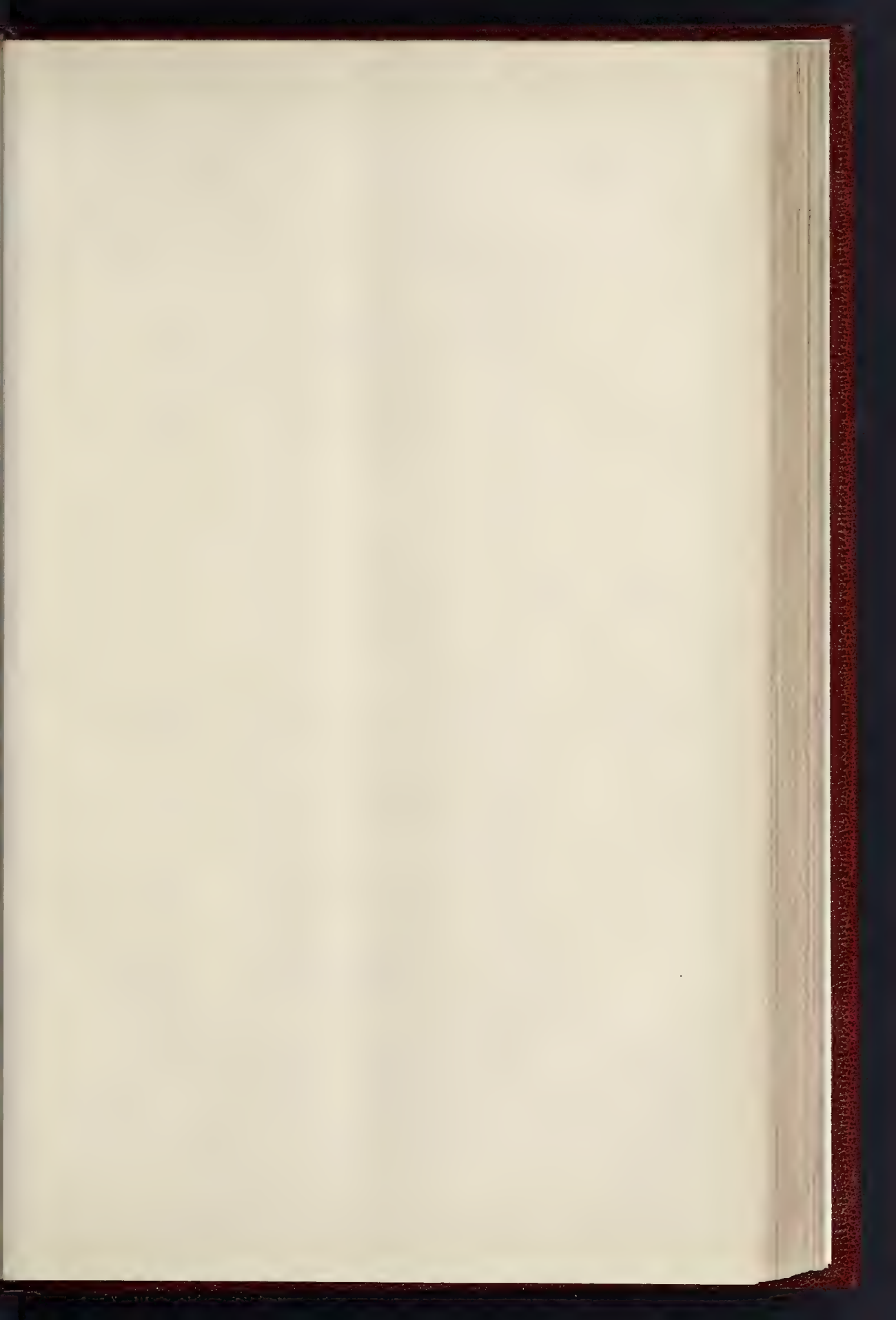




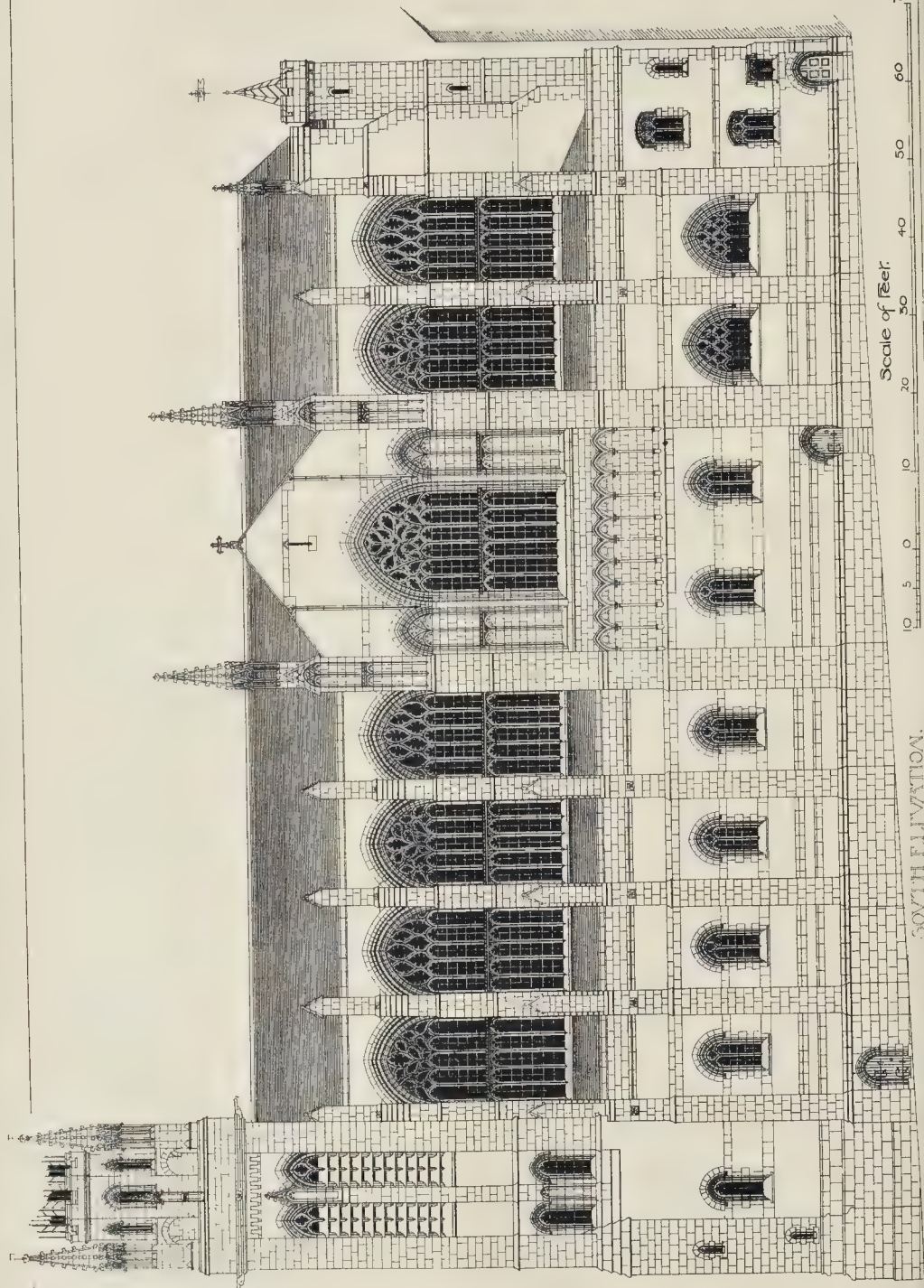








THE BUILDER, OCTOBER 26, 1889.

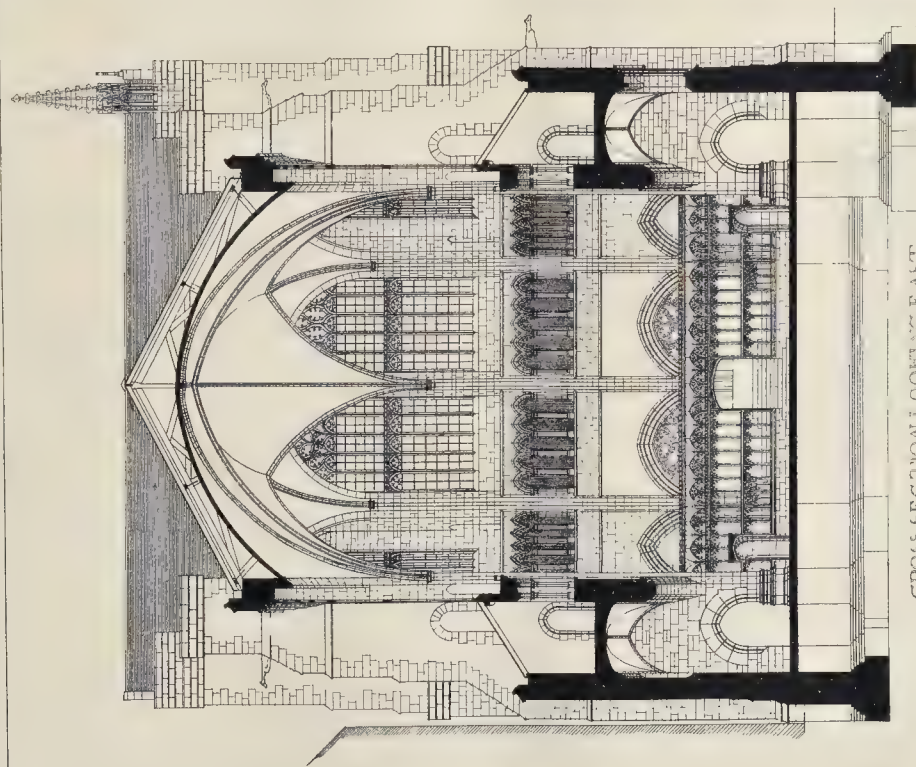


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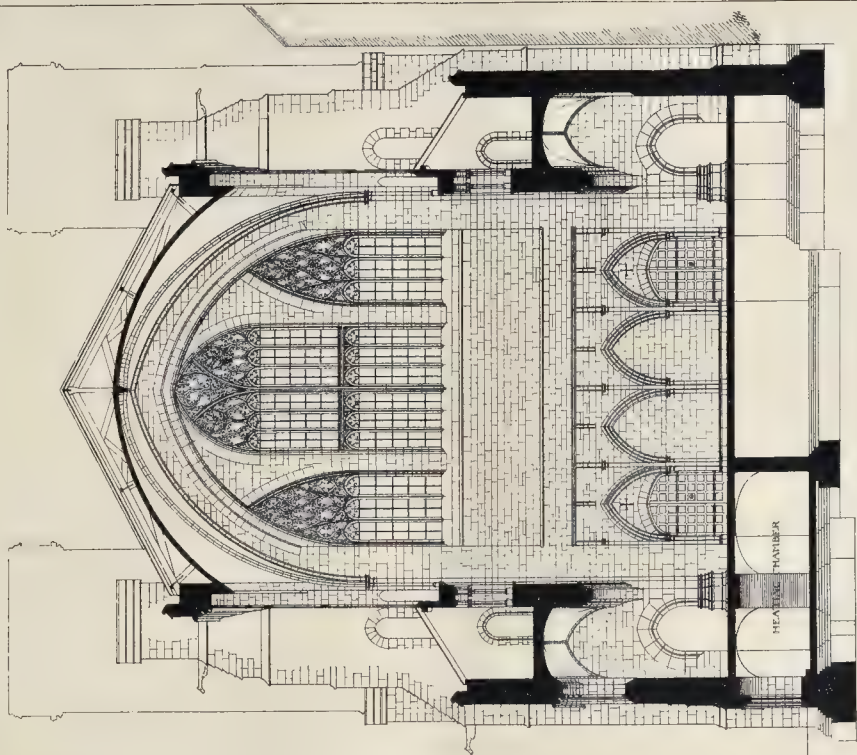
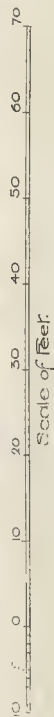
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SOUTH FLIXATION.





CROSS SECTION LOOKING EAST.



CROSS SECTION LOOKING WEST.

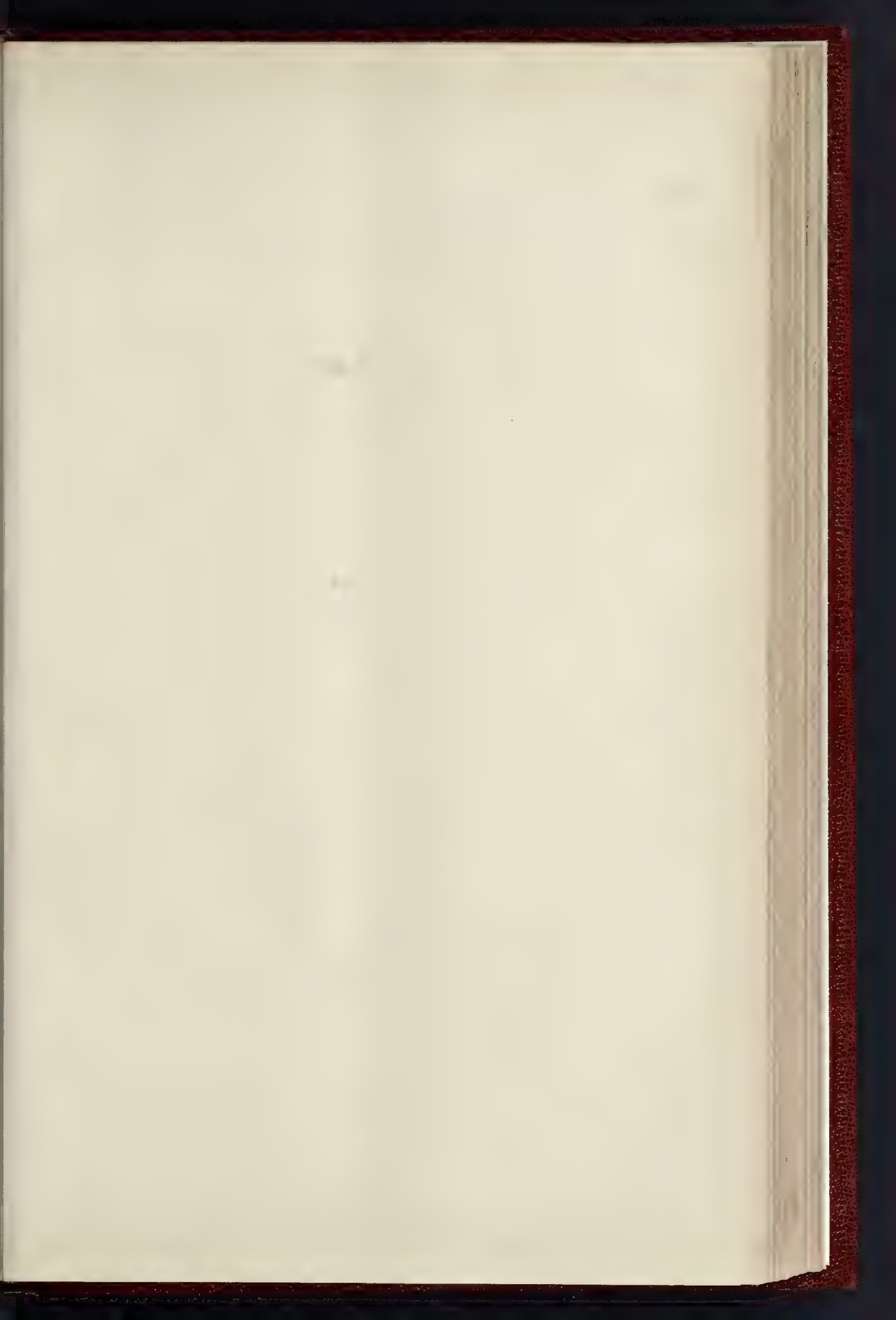
DESIGN FOR A TOWN CHURCH.—BY MR. E. A. HILL.

DESIGNED BY MR. E. A. HILL, ARCHT. & CIVIL ENGINEER, 15, MARK LANE, LONDON, E.C.

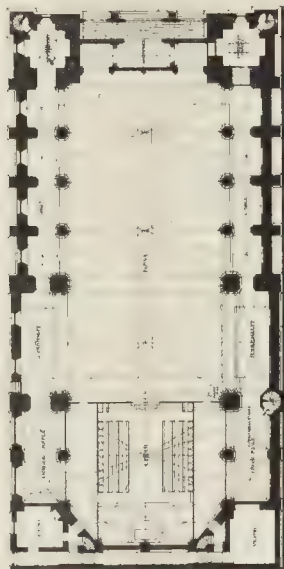
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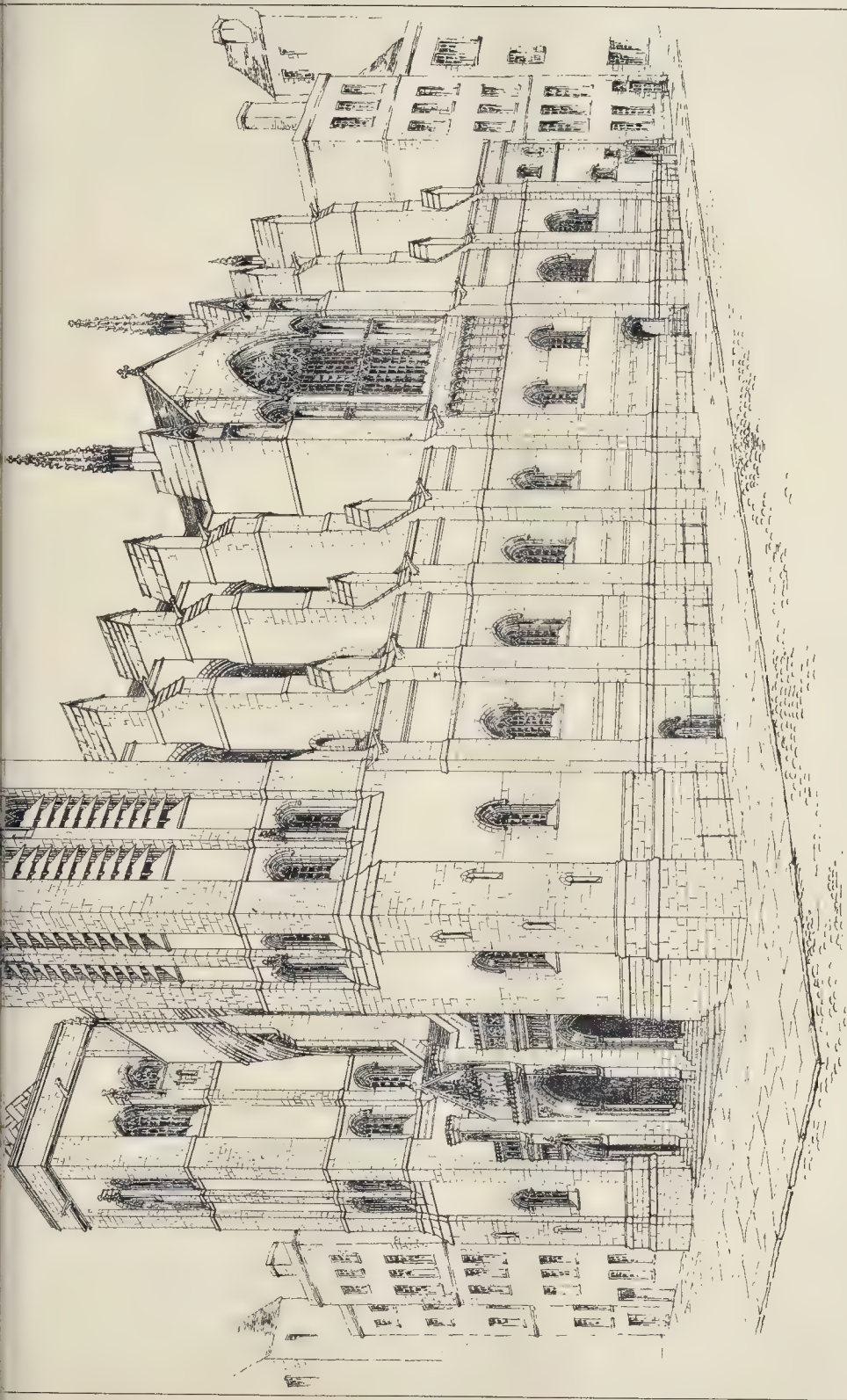


THE BUILDER, OCTOBER 26, 1889.



1/2" = 1'  
 Scale of Feet  
 0 10 20 30 40 50 60 70 80 90





DESIGN FOR A TOWN CHURCH.—By Mr. E. A. HILL.

*Architectural Association Silver Medal, 1889.*

PHOTO. N. 110. CHURCH & 15 22 MARTINS LANE CANNON ST. LONDON E.C.





subject that gladdens the heart of the searcher after the picturesque.

Thorpe Morieux (which gets its name from Hugh de Morieux, of Norman-French extraction, who was lord of the manor) was the next halt, and here the first thing that strikes one on entering the church is its height and unusual dimensions for such a small village. It is dedicated to the Virgin Mary, and consists of chancel, nave, and south porch. Decorated, and west tower Perpendicular. The font is very early, almost Norman, but the mouldings have Early English outlines. Comparison may be made between it and that at Preston, the general arrangement of support being the same.

The floor declines from the west door to the chancel arch—an unusual feature. The south porch is a decorated wooden structure with good traceried sides and carved barge-board. There are three piscinas, a beautiful (Decorated) one in the chancel, another in the south-east corner of the nave, and another in the vestry, placed there at the restoration of the church in 1869. The registers date from 1538, and the communion plate dates from the seventeenth century.

Lavenham was next visited, and its glorious church and its many old buildings hastily examined. The church is so well known, and has been so often treated upon, that I will not dilate upon its beauties. Enough remains in the place to furnish matter for a whole day's excursion. The Guildhall of Corpus Christi was then carefully explored, and I had the honour to read a paper upon it. I illustrate one of its chief glories, the main corner post on which, under a carved and crocketed canopy, stands the effigy of John de Vere, fifteenth Earl of Oxford, founder of the Guild in 1529. He stands on a pedestal or buttress, attired in plate armour, grasping in his right hand a distaff of unspun yarn, indicative of the purposes of the Guild, and in his left a scroll or charter of the Guild. This John, died 1539, is buried at Castle Hedingham Church, beneath a handsome marble tomb, with his wife, Elizabeth Trussell, heiress of Sir Edward Trussell, Knight.

The other sketch at Lavenham is a jamb of a door to a house in Water-street, and represents a huntsman under a similar canopy; the house from which it is taken is a timber-framed building containing some very fine work.

Brettenham, probably the Combretonium of Antoninus, is situated at the head of the little river Breton. Traces of a camp still exist in a field, three-quarters of a mile south-west of the church. The church, a flint and freestone structure, dedicated to St. Mary, has a Decorated nave and Perpendicular chancel, *circa* 1400-32, until which latter date the Earl of Stafford was patron of the living, and his arms appear on shields on the piscina and again on the east end externally. The church was restored and partly rebuilt in 1866. Remains of old pews, porch, chancel, and roof-loft still exist; the font is very old and of good design. There are three monumental coped stones built in under the east window externally.

Preston.—Though this church (St. Mary) was not visited by the Archaeological Society, I illustrate it, as it is in close proximity to those above named. Unlike Brettenham, the chancel is Decorated and the nave Perpendicular, and in the fine clearstory windows are many shields in old glass of old families who held lands in the neighbourhood. The font is especially curious and beautiful, the bowl being pure Norman, and in excellent preservation, though the base is a restoration. In the North porch is an old altar tomb. The church was completely restored in 1868.

JOHN SHEWELL CORDER.

**Robert Boyle & Son, Limited.**—The directors of Robert Boyle & Son, Limited, ventilating engineers, London and Glasgow, have resolved, subject to final audit, to recommend a dividend of 12 per cent., free of income tax, on the ordinary shares of the Company for the year ending September last, placing to the reserve fund one-sixth of the profits earned, and carrying forward 2,352.8s. 5d. The year ended has been the most prosperous since the formation of the Company. The Company have at present some very important contracts, in hand and in prospect, at home and abroad; and plans have been prepared for the ventilation of the Canadian Houses of Parliament, Ottawa, New Municipal Buildings, San Francisco, the new Mormon Temple, and the Mormon Tabernacle, Salt Lake City, &c.

#### THE SCHOOL BOARD FOR LONDON: ITS BUILDING WORK.

At the meeting of the School Board for London on the 17th inst. a deputation of ratepayers and tradesmen waited on the Board with the memorial adopted at the meeting of metropolitan builders, held at Auderton's Hotel, Fleet-street, on Sept. 24 last, and previously referred to in the columns of the *Builder*. The deputation was introduced by Mr. Cook and Mr. Barnes.

Mr. Lawrence Stevens, L.C.C., who led the deputation in support of the memorial, said they had the ratepayers' interests at heart in coming before the Board. What they complained of was that after doing the work for many years as local tradesmen, and they hoped in a satisfactory manner, that that work should suddenly be taken from them and given to large contractors. They asked the Board to revert to the old practice of local repairs being given to local tradesmen. They asked this on principle, as very large ratepayers. As to paying fair wages, the speaker thought it would be found that they probably paid rather above than under the minimum rate.

Several questions were put to the members of the deputation by the Rev. Stewart Headlam, Mr. Hart, Mr. Dellow, Mr. Gover, and Mr. Helby. The answers to these questions were to the effect that they all paid the standard rate of wages; none of them had ever had complaints of the work they had done for the Board; they had no objection to the schedule if the schools were put up into smaller blocks.

In answer to a question, Mr. Stevens said he was aware that most of the great public departments worked under a schedule.

In answer to Mr. Lobb, the deputation objected to the rescinding of the resolution for open contracts, and were in favour of the open system. They objected to this exclusive and close system. They did not know that since 1885 there had been selected builders doing the work of the Board.

In answer to further questions from Mr. Collins, Sir E. Currie, and Mrs. Besant, the deputation did not object to a schedule of prices, but they wanted every builder to have an opportunity of tendering. They wanted perfectly free competition rather than an extended limited competition.

In answer to Mr. Bourke, Mr. Stevens said that on the London County Council they had open tendering. None of the members of the deputation had had an opportunity of tendering on the Board's schedule.

Mr. Lucraft, Mr. Winnett, and Mr. Cook put further questions. In answer to the last gentleman, the members of the deputation said they had not been "blackmailed" by any servants of the Board, as had been stated at a public meeting.

The deputation having withdrawn, Mr. Cook moved that the memorial be referred to a special committee for consideration. He thought that the Board was not only acting contrary to its own interests, but contrary to the interests of the ratepayers generally. He was not entirely wedded to the open contracts system; but advocated a system of a larger number of contractors being appointed to the divisions.

Mr. Barnes seconded. It was a question that could not easily be settled at a Board meeting. He complained of the piecemeal manner in which this subject had been brought before the Board by the Works Committee. He was not surprised at the managers showing chagrin at the Works Committee taking the matter of local tenders entirely into their own hands, when the managers had done the work well and looked after the ratepayers' money most conscientiously. He thought the questioning that day had not been quite fair.

Mr. Lobb said the 2,000 builders in London had just cause for complaint that seven men only were to have all the repairs and painting of the schools, the expenditure of which amounted to about 40,000. per annum; and that twelve men only were to have all the contracts for building new schools and enlargements. A nice piece of patronage for the select few—twenty-one builders only out of 2,000! If for a year only, it was radically wrong in principle and unjust to the building community in London. In June, 1883, he exposed this "close contract" system, and publicly read out the names of the favoured twenty-one builders, who up to May 31, 1883, had received 333 contracts from the Board. He then designated it "one of the greatest abuses of the Board."

The motion to abolish the "close contract" system was on that occasion lost, 18 voting for, and 27 against. Soon after the assembling of the late Board—that was nearly four years ago—he had the honour of carrying the motion for open contracts, provided sufficient security could be given for the due performance of the work. That motion was rescinded on Feb. 21 this year, and this was the cause of complaint of the deputation. It was remarkable that thirty-six members of the present Board voted for rescinding, and only two members—Messrs. Roston Bourke and Laing—supported his amendment for the "previous question." It was also remarkable that Messrs. Barnes, Cook, Hart, and Lucraft, who voted with the majority, should have attended the meeting of builders at Auderton's Hotel, Fleet-street, and denounced the Board for what they themselves had done. The rescinding of the resolution of which the deputation complained was the result mainly of the disclosures with regard to the unsatisfactory manner in which the building contracts had been carried out. The open contract system was saddled with all the inferior material used in the construction of schools, and the scamping of the work. This was all put down to the open contract system, whereas not a single new builder had been admitted to the list. The resolution of the Board had been entirely ignored. Here was the resolution passed by the Board nearly four years ago absolutely ignored by the Works Committee, and yet they were told that the inferior buildings were the result of the open contract system, when up to March, 1888, no less than 411 contracts were in the hands of twenty-one builders. It could not be too widely known that the Works Committee of the late Board totally disregarded the Board's instructions. And then in February last the present Board made that resolution for open contracts the scapegoat for all the irregularities and scamping of work connected with the building department. It seemed almost incredible that for full three years the Works Committee had set the Board at defiance. He appealed to the Chairman of the Works Committee to tell the Board whether it was not a fact that no new builders were added to the list, and yet the only argument used for rescinding the resolution complained of by the deputation was that they had opened the gates to a class of "jerry-builders." He did not want to hamper the present Chairman of the Works Committee (Mr. Helby) in his new plan for better material and good workmanship, but he had gone too far in excluding all but the select few. Mr. Helby deserved the gratitude of the whole Board for his devotion, his energy, and his ability in the discharge of his unthankful task. Rather let them help him in adding to the list, both for repairs and new buildings, at least fifty more names, who shall have a chance in receiving some of the patronage which this great public Board had to give to the builders of London.

The Rev. J. J. Coxhead moved, as an amendment, that the matter be referred to the Works Committee, which was the Committee concerned.

Sir E. H. Currie seconded. He saw no reason for the Board to depart from the usual custom, and to refer this matter to a special committee.

Mr. Lucraft said most of the members of the Works Committee themselves did not really know what had been going on; the thing had been left almost entirely to Mr. Helby. He (Mr. Lucraft) considered this the greatest question that had been before the Board, and hoped that a special committee would be appointed to consider it.

Mrs. Ashton Dilke objected to the matter going to a special committee.

Mr. W. Roston Bourke thought it would be a mistake to send this down to a special committee, as it would practically be a vote of censure on the Works Committee.

Mr. Helby said he quite understood that some of the members of the Works Committee did not know what that Committee had done. These members had other committees to attend while the Works Committee were sitting, but he thought they might have inquired into what the Committee were doing before they made statements in public.

Mr. Sharp was in favour of the matter being referred to the Works Committee.

Mr. Gover did not understand the change of front in Mr. Helby. In committee last Monday he said it was no use discussing a motion by Mr. Bourke; it could be thrashed out by the Board. To-day he said he would not go deeply



into the matter at the Board meeting; it could be thoroughly gone into in committee.

Mr. Helby said Mr. Gover had misunderstood him that day.

Mr. Hart was in favour of the matter going down to the Works Committee. He did not like special committees. He thought Mr. Helby would do well to admit that he had made a mistake, and take the matter back. He thought the majority of the members of the Board considered that Mr. Helby had made a mistake.

Mr. Barnes would vote for a special committee to consider this matter, as other committees sat at the same time as the Works Committee and this prevented members of that Committee attending, if it was necessary that they should attend one of the other committees.

Mr. Lynn would rather that this matter had been deferred till the Board itself could settle it. He considered that the deputation had been attacked by Mr. Helby in putting questions with reference to that section of the report of the Special Committee on the work of the Works Committee, which contained names of builders who had done the work of the Board badly in the past.

On the motion of the Hon. E. Lyulph Stanley, seconded by Mr. Dellow, it was resolved: "That the question be now put." On a division, the amendment was carried.

Mr. Gover moved a further amendment: "That an answer be given to the deputation in accordance with the decision which the Board will arrive upon on Mr. Bourke's motions."\*

Mr. Hart seconded.

The Rev. R. R. Bristow opposed, because he thought some modifications would be made by the Works Committee, after the light that had been thrown upon the question that day.

Mr. Helby hoped this amendment would be accepted.

This was agreed to.†

#### ARCHÆOLOGICAL SOCIETIES.

*Essex Archaeological Society.*—A quarterly meeting of the Essex Archaeological Society was held at Burnham, on the 15th inst., when a party of about twenty-five visited the Parish Church, which stands about a mile to the north of the town. Here a paper was read by Mr. H. W. King (hon. sec. of the Society), who characterised the church, which is dedicated to the Virgin, as being only exceeded in the county by about six or eight, for spaciousness and stateliness. He pointed out the salient features, calling especial attention to the early twelfth or late eleventh century Norman font of Purbeck marble. The tower is not at its original elevation, having been blown down in the great storm of November 23, 1703, but, considering the times, it was, in Mr. King's opinion, remarkably well restored, although the original fine pointed arch of the west window (Decorated) was necessarily shortened. The Rev. G. C. Berkeley read a communication from the Rev. H. L. Elliot, of Gosfield, on the armorial bearings, &c., carved over the south porch, the shield of Sir Robert Ratcliff, second Lord Fitzwater, with other arms and badges of Fitzwater and Ratcliff families, and of Dunmow Priory. The font excited much interest, on account of its antiquity. The outside of the church having been inspected, and its architectural features described by Mr. G. E. Pritchett, F.S.A., a move was made to the new railway-station, thence along the line to Crizea Place, the well-preserved remnant of a fine old Elizabethan mansion. This house was, by the courteous permission of Mr. Matthews, the tenant, thrown open to inspection. Mr. King made a few remarks on the edifice,

\* Mr. Bourke's motions were as follow:—1. That the Board revert to the practice of publicly inviting tenders by advertisement, as expressed in the resolution of the Board of Dec. 17, 1886.

2. That the following resolution of the Board of Feb. 21, 1880, be rescinded; and that the practice adopted previously in their resolution of Dec. 18, 1880, be reverted to:—

"That tenders be obtained both for general repairs and painting, based upon schedules of prices renewable at the end of each two years, and that firms willing to carry out the work be appointed for divisions or groups of schools. That sub-letting be not allowed."

3. That the words "divisions or groups of schools" in the above resolution of the Board of Feb. 21, 1880, shall be interpreted "divisions or groups of schools numbering not more than six schools in each case, or two groups of schools under the charge of local managers."

The consideration of these motions was adjourned to next week, along with the Works Committee's report on the subject.

† We take the foregoing report from the *School Board Chronicle* of the 19th inst.

and gave a summarised pedigree of the Harris family, stating his belief that the house was built by the second Arthur Harris, "of Woodham Mortimer and Cricksea," who died in 1597. The date 1569 being found on a leaden pipe outside added some weight to this supposition. A walk of a mile along the sea-wall brought the company back to Burnham. The meeting was held in the schoolroom, under the chairmanship of the Rev. J. L. Govett, vicar. Several new members were elected, and after the Revs. H. M. Milligan and G. C. Berkeley and Mr. W. A. Hurrell had explained their exhibits of church plate, local views and sketches, brass rubbings, pottery, &c., Mr. Henry Laver, F.S.A., read a paper on "A Recent Discovery of Celtic Urns at Colchester." The vicar of East Tilbury called attention to some excavations of remarkable interest that had lately been made in his parish. Tons of human bones, containing thousands of skulls and several ornaments, had been unearthed, and he was desirous that the Society should visit the spot. The secretary said that the February meeting would be held at Colchester, but he would endeavour to arrange that the May meeting should take place at East Tilbury. For want of time, a paper on "Church Bells," by Mr. J. A. Sparvel Bayly, was postponed. We are mainly indebted to the *Essex County Chronicle* for the foregoing report.

*Bradford Historical and Antiquarian Society.*—On Tuesday evening, the 15th inst., the annual meeting of this Society was held in the Royal Hotel, Bradford. After tea, the President, Mr. T. T. Empall, took the chair, and called upon the Hon. Sec., Mr. J. A. Clapham, to read the report. There are two hundred members, a balance of £571. 2s. 6d. to the good, and the Society is in a very flourishing condition. The *Bradford Antiquary*, the organ of the Society, has been highly praised, and the excursions of the Society are very popular. The financial statement was made by Mr. Wm. Glossop, the treasurer. Upon the motion of Mr. Arthur Briggs, J.P., seconded by Mr. H. Muir, the report and balance-sheet were adopted, and a hearty vote of thanks passed to the officers and council, upon the proposal of Mr. John Sowden, seconded by Mr. Butler Wood. Then an illuminated address and a Photographic album were presented by the President to Mr. J. A. Clapham for his services to the Society, and he was supported by Mr. Wm. Cudworth, Mr. Wm. Thackray, and Mr. John Lister, M.A., of Shibden Hall. Mr. Clapham suitably replied. A vote of thanks to the Chairman closed the proceedings. There were about a hundred ladies and gentlemen present.

#### NATIONAL REGISTRATION OF PLUMBERS.

UNDER the auspices of the Worshipful Company of Plumbers, London, a public meeting was held in the Philosophical Hall, Park-row, Leeds, on the 18th inst., for the purpose of distributing registration certificates to masters and operative plumbers. Mr. J. Wreghitt Canon, President of the Leeds District Council, occupied the chair, and among the gentlemen present were Sir James Kitson, Bart., Mr. T. Fridgin Teale, Dr. Churton, the Rev. C. Hargrove, Mr. George Wood, Mr. W. B. E. Coles, Mr. W. Braithwaite (hon. secretary), &c. There was a large attendance. Several letters of apology for absence had been received, including one from the Mayor (Alderman Ward), who regretted that he could not be present, and added that he had much sympathy with the movement for the registration of plumbers.

The Chairman said that at a meeting which was held at the Town-hall two or three months ago, the movement was inaugurated in connexion with which they were met. Practically, he believed, all the leading master plumbers in the district, together with a considerable number of operatives, were now registered, and the District Council, which was the local authority to control the movement, entered that night upon the difficult and delicate task of seeing that masters and men alike faithfully performed all the promises endorsed on the back of the certificates which they were about to receive from the hands of Sir James Kitson. The granting of certificates was in itself a very slight matter, but it was a matter of signal importance, in view of the great power for good which it placed in the hands of the central authority. With the existence of these

certificates it became as much to the material interest as it was to the moral interest of plumbers to execute their contracts with a view to the consequences which bad workmanship would have upon them as well as upon their clients. No plumber in future who valued his reputation would be able to dispense with a certificate of registration, and no plumber of repute, he was sure, could henceforth afford to risk the removal of his certificate with all the consequences of the loss of public confidence which such punishment would entail; and he desired to state that the local District Council were resolute in their intention to remove the certificate of any one who should be convicted of doing work dangerous to health, or distinctly in contravention of what they had undertaken. Plumbers who were to be trusted would be distinguished by the possession of a certificate of registration. Those who could not be trusted would be equally marked out in a much less desirable manner by the absence of any such testimonial of character or of skill. In this way it would be secured that the public should have a guarantee that the work which mainly affected their health, with one important exception, would be under the control of men who were competent to perform the task which they had undertaken, and who had every inducement to do their work in a manner which would redound to their own credit. The exception to which he had referred was one of considerable importance. The duty of laying drains still rested with the least-skilled and the worst-paid class of workman,—the ordinary labourer. That defect in the completeness of the work which they had undertaken could easily be remedied if architects combined to specify that this section of building operations, along with the other sanitary arrangements of dwellings, should be entrusted to plumbers. A very great advantage would be gained by this change, because the whole of the building work which in any way affected the public health would be in the hands of one contractor, and that the only one who had as yet given to the public a guarantee of his competency.

Mr. T. Fridgin Teale said it was about twelve years since he gave a lecture in that hall to the Leeds Philosophical and Literary Society on "Dangers to Health in our own Houses," at a time when ignorance about those dangers, ignorance about fittings and the arrangements which introduced those dangers into our houses, was almost universal. At that time he said that there were very few houses that were fit to live in, that was to say, that were free from very serious sanitary dangers. He believed there were very few houses in Leeds at that time which did not possess flaws in their plumbing which would be condemned by almost every plumber that he saw present that night. He moved:—

"That this meeting heartily welcomes the formation in Leeds of a District Council in connexion with the movement for the national registration of plumbers, believing the movement to be one for the public good, and trusts that it will result in the general employment of registered plumbers by public bodies and private employers, thus ensuring the proper fitting of sanitary appliances and a consequent improvement in the public health."

The Rev. C. Hargrove seconded and Dr. Churton supported the resolution, which was adopted.

Sir James Kitson said he was deeply interested in this question as a large employer of labour, and he spoke for all other employers of labour in the town when he said that if they were to maintain their position alongside other towns and counties, they must have the population healthy and strong as well as intelligent. Sir James then distributed 159 certificates—74 to master plumbers, and 85 to journeymen, and a vote of thanks was afterwards passed to him on the motion of Mr. Coles.

The President explained that through the hearty co-operation of the authorities of the Mechanics' Institution they had at the present moment a class in plumbing at work, with a special instructor, which numbered nearly seventy students. The Yorkshire College authorities had also been approached, and had expressed themselves as ready to establish a class in advanced plumbing as soon as they were in a position to say that the demand existed for anything of the kind.

A meeting with the same object in view was held in the Examination Hall of the Merchant Venturers' School, Unity-street, Bristol, on Monday evening, for the purpose of considering the expediency of the registration of plumbers and providing them with special training to enable



em to carry out the important duties they have to perform in connexion with the public health. Mr. G. H. Pope, High Sheriff of the City and Treasurer of the Merchant Venturers' Society, presided over a large attendance, and solutions electing members to form the district council were agreed to.

# PROJECTING SHOP FRONTS:

METROPOLITAN BUILDING ACT, 1855.

SIR.—The following from the *Law Times* of the 12th inst. may interest your London readers:—

"It cannot be denied that the interests of the various vestries and public bodies of the metropolis are keenly looked after by the officials to whose keeping they are intrusted. Point after point is consistently fought against the adjoining owner, till victory at length declares itself on the side of the long purse. A recent instance of this was the case of 'The Vestry of St. Mary's, Islington, v. Edman' (61 L. T. Rep. N. S. 44), which dealt with the question of the projection of shop fronts. The 26th section of the Metropolitan Building Act, 1855 (18 and 19 Vict. c. 122), contains a provision that in a street less than 30 ft. wide, a shop front may project beyond the external wall of the building to which it belongs for 5 in., and in a street of more than 30 ft., for 10 in., and no more. Does this mean that the owner of a building may put out a shop front 10 in. over the public highway; or does it merely mean that, if he chances to be the owner of land between the general line of building and the highway, he may, but not otherwise, he may put out his shop front 10 in. beyond the general line of building over his own land? For thirty years this question has remained undecided, probably because the words of the section are universally accepted according to their plain meaning in the former sense; but recently it has been put in issue by legal representatives of the Vestry of St. Mary, Islington, that the point was arguable, and we regret to say that the opinion of Mr. Justice Denman and Mr. Justice Hawkins, in opposition to that of the Lord Chief Justice, has now affirmed that it is the true construction of the section. Authorities could be cited upon the point, and only argument of which the matter admitted by reference to the objects of the Metropolitan Management and Buildings Act of 1855 (18 & 19 Vict. c. 122), and a comparison of their various provisions. Mr. Justice Hawkins, in delivering the judgment of the majority of the court, founded it on the *prima facie* consideration that it was not by that a private owner would be allowed to project his shop front over the public, and that the Act contained no such express words as would be necessary to convince him that such was the intention of the Legislature. Lord Coleridge, on the other hand, considered that, in view of the extent of the encroachment, and the words of the section that 'any shop front may project 10 in. and no more,' it was the intention of the Legislature to favour trades to the extent. We cannot but think that this was the true view, and regret that the contrary has been held. It has always been the custom for shopkeepers to encroach upon the footway, and in the winding Liverpool local Act, on which 'Gold v. Duckworth' (42 L. T. Rep. N. S. 440), 5 Div. 275) was decided, the matter is made clear by the use of the words 'over or upon the pavement'; nor can there be much doubt that the few words of liberty was a serious curtailment,—a provision by way of compromise,—of the serious wrongs of the public gaze. Again, streets are in a constant state of transition from the residential to the mercantile stage, and it is, we think, in no remarkable that the Legislature, being well acquainted with this, should allow the owner of a shop-house built close up to the street to put out a shop front a few inches over the pavement, and then compel him to demolish and rebuild the whole of his front wall. The decision may add a few inches to the width of our streets, but will only improve either the uniformity or the beauty of their appearance."

It is difficult to realise that there could be any doubt that section 26 does not authorise encroachments on the public ways. An archaizing the whole of this section 26 with on 14 would at once see that although the Act prohibited woodwork being added within 4½ in. of the external face of the walls, yet section 26 read with section 24 was for the express purpose of allowing projections from shops (and has no reference to encroachment on streets), all other projections being specified to be as of fire-proof material. This view of the matter did not appear to have been suggested to the Court. The writer of the article in the *Law Times* comments that encroachments on the public way intended by the Act to be allowed, as an action in favour of trade; and says, if this is not so the owner of a house (which directly

abutted on a street) converting it into a shop would be compelled to rebuild the whole of his front wall. But these views are not tenable when it is known that the conversion of the house into a shop can be effected without any such projection and without the expensive alternative suggested by him.

The repealed Building Act of 1844 allowed wooden projections from front external walls, but prohibited any projection into, or overhanging of, the public way, and provided that the buildings should be set back so that all cornices and projections should overhang the ground of the owner only (Sec. V, Schedule E). Although this is repealed by the present Building Act of 1855, the effect of the substituted sections in the present Act is to continue the allowance of wood projections (as distinguished from fireproof projections) in the cases of shop-fronts, and further allows what the previous Act prohibited,—the regulated projection of (fireproof) cornices, &c., to overhang the public ways. But there is clearly nothing in the Act to authorise the private annexation of the surface of the public streets.

A. & C. HARSTON.

15, Leadenhall-street, E.C.

## IMPROVEMENT IN THE STRAND.

SIR,—I am glad to find from Mr. Brooks Hunt's letter in your issue of last week, that part of my scheme for getting from the Strand to Holborn is identical with that suggested by Mr. Teulon, and adopted by the Board of Works.

This is, I find from the copy at the Institute, the part from the north of St. Mary's, by Newcastle and Houghton streets, to Lincoln's-inn Fields and the exit from the Fields to Holborn. So far from claiming "originality" for this, as Mr. Hunt suggests, I mentioned it as "so simple as to appear inevitable," and "so simple as to need little advocacy."

Indeed, I should be inclined to go further and say that no practical man who studies the site, as it is now, could admit any other plan. In 1882, however, it was quite possible to bring a street from Little Queen-street to St. Mary's.

I have never agreed with that part of Mr. Hayward's scheme for passing through Clement's Inn, but a fine new line of frontage would have been opened up by this route to St. Mary's, but, as I pointed out, this is not now possible.

With regard to the Strand, my scheme differs materially from Mr. Teulon's. I make the road north of St. Mary's serve for the new north road only, whereas Mr. Teulon makes it also a parallel road to the Strand. He has then a long narrow strip of garden left between the two roads, which are at a different level.

I regard this as useless and wasteful, and have simply widened the Strand between the two churches, and have thus obtained a really fine plot of land for building on, instead of the insufficient, narrow piece left in Mr. Teulon's plan.

As I am to have originality thrust upon me, I may as well claim it for the method of getting over the difference of level by turning one end of Newcastle-street to the east, thus avoiding what others have found a serious difficulty.

I repeat, however, that the key to this Strand-Holborn road is the line determined on for the new north road; but I should like to express my opinion that this road will be by no means of so enormous an importance as seems contemplated by some. After all, it only leads to the Strand and Waterloo, since it is not the direct route even to Charing-cross.

There is a fatal fascination about the word "boulevard," which seems to me to run away with people's judgment.

Of course, had I known how far Mr. Teulon's scheme was identical, I should have mentioned it.

RALPH NEVILL.

Rolls Chambers, Chancery-lane, Oct. 22.

SIR,—Mr. Nevill's plan of street from Holborn to Strand is as simple and economical as can well be arranged, if the lawyers and law-makers only agree thereto, though it is rather amusing to read the rival claim of precedence set up for Mr. Teulon's plan, which could be added to by many another, including myself. My old plan of that route was discarded in 1875 for a more ambitious one, to cut out some of the rookeries (and rebuild largely for the very poor), which now turns out to be precisely the line of the Improvements Committee of County Council, except that from the end of the two Queens-streets I turn off diagonally to the widest part of High Holborn, and there are two new cross streets. The question of traffic must really be the govern-

ing idea, and it is certain there cannot be a large north and south traffic crossing Holborn to the centre of the Strand, or there would be indications of it now in crowded streets. Certainly there is a difficulty at end of Southampton-row, because twelve to twenty vehicles have to cross 100 passing at right-angles along narrowest part of Holborn, every few minutes; but the remedy is to widen Holborn, and to divert traffic from such narrow centres. So again at Wellington-street and the Strand.

Any observer of the traffic at these points will find that not 20 per cent. of the vehicles go north and south, but over 80 per cent. do go east and west. If a new road is made it should join diagonally, not at right angles. What is most wanted is a line of street parallel with the Strand, which can only be obtained now by the Carey-street line being carried west to join York-street. True, as Mr. Nevill says, it can "never be a great thoroughfare," nor compete with the Viaduct, but it would make a great "relief" street, 50 feet wide, for all the enormous Strand traffic has to pass (and will have for very many years) through that width near the Adelphi, while Fleet-street is still narrower near the bottom. Yet it is thought advisable in all these plans to omit the relief streets, while adding new streams of traffic from the north.

Let Mr. Nevill add this cross street from Catherine-street to Carey-street, and he will have made a more complete plan for distributing traffic, instead of increasing the difficulty by concentrating it, the fault of most plans for new streets.

B. W. WARHURST.

Chelsea, Oct. 19, 1889.

## "A QUESTION OF FEES."

SIR,—In section 106 of the Metropolitan Building Act, 1855, the section which gives "power to appeal to superior Courts" in every case in which jurisdiction is given, by the said Act, to a justice of the peace against the determination of the said justice so convicting, cases "in respect of fees of a district surveyor" are distinctly excepted. How, therefore, can Mr. Witherington, or any one else, appeal against Mr. Bridge's decision in the case reported in your paper of October 12?

Oct. 21. F. H. C.  
\* \* We have verified the reference to the Act, which is quite correct.—ED.

SIR,—The letter you were good enough to publish last week with reference to the above matter was forwarded to you by inadvertence without my clients, Messrs. Sandon Bros., having seen or approved it, and at their request I wish to withdraw it. They, nevertheless, intend to contest the case.

If you will kindly insert this in your next issue, I shall be much obliged.

W. SECKHAM WITHERINGTON.

79, Mark-lane, E.C., Oct. 23.

## TECHNOLOGICAL EXAMINATION.

SIR,—Having been a candidate in the City and Guild Examination of May, 1889, I venture to ask the opinion of your numerous readers on the following question given in the examination paper on carpentry and joinery:—

"Give a plan and section of a scale, 3 in. to the foot, of a dog-legged staircase, 3 ft. wide, in a hall 7 ft. wide; height of storey, 11 ft. from floor to floor, with a landing at a distance of 3 ft. from the ground. Show newels and line of handrail."

Would this be a dog-legged staircase? I think it would be an open newel staircase. If so, why should such a question be given?

\* \* If it is intended that the two 3-foot flights are to fill the width of the 7-foot hall it clearly is not a dog-legged staircase, as there must be a well one foot wide between the two flights, and a dog-legged staircase is one in which the handrails of the lower and return flight are vertically over each other, and there is no well. According to common custom, therefore, the word seems to have been incorrectly used.—ED.

## BREWERIES.

SIR,—Can any of your readers tell me what is the latest method of working wooden loaves suitable for breweries?

SUBSCRIBER.

\* \* We presume our correspondent means the best method, which is not necessarily the "latest."—ED.

**Induction of the Professor of Engineering at Glasgow University.**—At a meeting of Senate held on the 17th inst., Mr. Archibald Barr, B.Sc., was inducted to the Chair of Civil Engineering and Mechanics. He delivered the usual Latin essay formally prescribed as a trial of ability, dealing with the following subject:—"Quomodo physica ad artes mechanicas adhibenda sint"; and, having afterwards signed the declaration prescribed by statute and the declaration de fidelit, he was admitted to office with the usual ceremony, and took his place as a member of Senate.—*Scottsman*.



## The Student's Column.

WATER-SUPPLY.—XVII.  
LONDON WATER SUPPLY.

HAVING briefly described the origin, quality, and storage of the different kinds of water used for drinking, by both large and small communities, it will be useful to give some account of the nature of supply suitable to special circumstances. Our remarks will be divided into three heads,—water supply to (1) large cities, (2) towns and villages, and (3) mansion and farm-houses.

In order to give as great a scope as possible to the consideration of water-supply to large cities, we shall instance cases where the supplies available for the purpose are as divergent in their nature from each other as may be; and believing that the student will profit by learning something of the methods of obtaining water for great communities on the Continent, we shall not be altogether insular in our observations. But it is natural to commence at home, and in view of the fast-approaching discussion, by the London County Council, of the alimentation of the metropolis, it will be well to firstly consider the water-supply to this great city." (a) in the past, to see what has been done, or was proposed to be done; (b) in the present, to find whether we are deficient in any way in having a copious and good supply; and (c) in the future, to discuss whether any better sources of supply could be profitably and successfully utilised.

Speaking of the past, we may say that the early inhabitants of the metropolis obtained their water from the River Thames as it flowed past, or from shallow wells. These latter were made in gravel, the water being held up by the stiff, impermeable mass of argillaceous substance stretching under London, and known as the London Clay. Professor Prestwich, F.R.S., has shown that the distribution of this gravel over the clay determined the places of settlement of the inhabitants: where there was gravel there were houses; the mass of people did not build on the clay, as water was not obtainable in sufficient quantities therefrom. Old maps of London amply justify this assertion. At an early period, however, the inconvenience attending this state of things seems to have been felt, and subsequently there was a tendency to build along main roads leading from the city. No wonder the inhabitants sought more substantial means of obtaining and supplying water; but it remained for a Dutchman, "Peter Morrye," or "Morrice," to carry out the first most noticeable scheme of supply on a large scale. In the year 1581 a public waterworks was established at London Bridge. A water-wheel, erected under an arch of the bridge, pumped the Thames water through wooden and leaden pipes into the adjacent houses. This, of course, was rather a primitive affair, but speaks volumes of the enterprise of the designer in constructing what was then, no doubt, regarded as rather a speculative concern. The public soon appreciated the advantage derived from this method of supply; but the old London Bridge waterworks was quite incapable of delivering the water to edifices on the higher grounds. Consequently, at the commencement of the seventeenth century, special provision had to be made for these, and for supplying water generally. Sir Hugh Myddelton was empowered to use water from springs issuing from the chalk at Amwell and Chadwell, near Ware, for which purpose he cut an artificial canal, known as the New River, which conveyed it to reservoirs at Clerkenwell, being from thence distributed. Subsequently, the River Lea, close to this New River, was used to supplement the supply.

It would be tedious to chronicle the development of all the other water companies at present supplying the metropolis; suffice it to say, that at the commencement of the nineteenth century we find three more in existence,—the York Buildings, Chelsea, and Lambeth. In the year 1829 the York Buildings Waterworks were abolished. The Vauxhall Waterworks were established in 1805; the West Middlesex and East London in 1808; the Kent in 1810; the Grand Junction in 1811; and the Southwark (being formed by the amalgamation of two old companies situated near London Bridge) in 1822. The last-named company subsequently joined the Vauxhall, thenceforth being known as the "Southwark and Vauxhall Waterworks Company."

The sources whence the New River derived its water have been explained. The East London took theirs from the River Lea, the Kent from the River Ravensbourne at Deptford, and all the other companies from the Thames in the vicinity of the districts supplied by them respectively. The water was pumped directly into the mains without regard to its condition. In 1828, however, the state of the Thames was such that a Commission of inquiry found, although the water of the river was considerably pure, it contained much filth and other extraneous matter. The Commission reported that it would be rendered more wholesome if it were filtered. The companies, therefore, proceeded to devise means of purification. Experience showed that the extraneous substances were largely held in suspension by the motion of the water, so that large "settling reservoirs" were constructed, wherein these particles could subside when left for a time, the water afterwards being conveyed to filter-beds. The nature of these latter has been described in a previous article, and we may now only remind the student that they were made of gravel upon which fine sand rested, and that it was found, on allowing the water to percolate through these materials, a great portion of the dirt in it was left behind on the upper layer of sand. This was the advent, on a large scale, of the improved system at present adopted. About that period, some of the companies, foreseeing the march of events, removed their places of intake to more suitable spots higher up the river. The cost of distribution necessarily became higher, but unquestionably it was good policy. Meanwhile, as the great city was rapidly growing, the river flowing through it became more and more impregnated by foul sewage and filth which the filters were quite inadequate to effectually deal with. It was evident that either new sources of supply must be found, or the places of intake be removed out of the tidal influence of the river. The Lambeth Company, being convinced that the latter was the better thing to do under the circumstances, removed their source of supply to Kingston. The other companies drawing water from the Thames, alarmed at the expense of the operation, remained as they were, doing their best by exercising more care in filtering, until a Royal Commission appointed to inquire into the subject in 1851, instigated an Act of Parliament, passed in 1852, whereby they were all compelled to remove their places of intake to above Teddington Lock, out of range of the tide, and every store reservoir within five miles of St. Paul's had to be covered up. No water delivered by the London companies for human consumption was thereafter obtained from the Thames, or its tributaries, within the tidal influence, though certain rights still remained, enabling it to be drawn therefrom for the purposes of street-watering, &c.

The Kent Company in 1862, finding the water of the Ravensbourne insufficient, or unsuitable for their purposes, abandoned that river, obtaining their supply from wells they had previously sunk into the chalk. Other wells have subsequently been added on the extension of the area supplied. The springs and ponds at Hampstead and Highgate were utilised by a company known as the Hampstead Waterworks, which also sunk a well to increase their output, the whole of which fell into the hands of the New River Company, about twenty-seven years since, but were not much drawn upon.

In 1866 the Rivers' Pollution Commission reported that the state of the Thames was susceptible of much improvement, it being at that time contaminated by the admission of sewage and other obnoxious matters poured into it from the towns and villages on its banks. The Thames was then placed more completely under the jurisdiction of the then existing Conservancy Board, whose duty it was—amongst other things—to see that the surface of the river was effectually scavenged, and that no sewage was admitted into it, or into any tributary within three miles of its junction with the main stream. Salutory measures of a somewhat similar nature were also enforced with regard to the River Lea; and the water of both rivers was in consequence made purer.

Whilst these improvements were in contemplation, public meetings were held to see what steps could be taken for maintaining the volume and purity of the Thames. The water companies were empowered to take 100,000,000 gallons daily from that river, but only 60,000,000 gallons per diem were actually abstracted,

though it sometimes reached to as much as 70,000,000 gallons. Careful gaugings were made above the places of intake at Hampton, and it was estimated that the minimum flow of the river was scarcely above 300,000,000 gallons per day. It was also calculated that after including the water of the Mole, and one or two other streams which discharge into the Thames between the different places of intake, that the minimum flow of the river in 1868 was 320,000,000 gallons inclusive of the amount taken from it by the five water companies. These figures were exceptionally low, however, as will be seen from the following. Between April 1858 and April 1859, the average daily discharge at Kingston was found to be 803,000,000 gallons, and this was the lowest average of eleven years (from April 1855 to April 1866). Some years the daily average was double this quantity. By the way, this is a striking illustration of the extremely variable character of the amount of water obtainable from rivers, and how careful the engineer must be in estimating the quantity available from rivers of small volume.

Another cry was also raised respecting the hardness of London water, which was stated to be much too hard for drinking, and that it was less economical for certain domestic and manufacturing purposes than soft water, a fact to which we have adverted in a previous article. The supply of Glasgow from Loch Katrine, and of the immensely improved alimentation of Manchester, were quoted again and again in proof of the argument for the introduction of soft water to the metropolis. It is not to be wondered at, then, that the authorities sought other sources than those drawn upon, and that fertile brains were actively devising schemes to comply with the public demand,—with what success we shall presently see.

## Books.

Mount Vesuvius: A Descriptive, Historical, and Geological Account of the Volcano and its surroundings. By J. LOGAN LOBLEY, F.G.S., &c. With Maps and Illustrations. London: Roper & Drowley, 1889.

WE have no hesitation whatever in saying that this is the best account that has yet been published in English of what the author correctly terms the "greatest natural wonder of the Italian Peninsula."—Mount Vesuvius. Much of the work is original, and much is not; seeing that so large a portion of it is historical, it is not surprising that the author has had to draw extensively from the scattered observations of earlier writers. Although the general tendency of the work is geological, the pleasant and easy style in which the subject is treated will, not we believe, repel the ordinary reader, and in any event the modern pilgrim to this the only tangible shrine of Pluto now existing on the Continent, is presented with an admirable account of the mountain, no matter what may be the object of his pilgrimage. After speaking in general terms of the Neapolitan volcanic region, and detailing the surroundings of Vesuvius, the mountain itself, the history of its different eruptions, and the geology, the author comes to what is, apparently, the main object of the work,—the elaboration of his hypothesis of volcanic action, which was brought forward at the meeting of the British Association at Bath last year. Naturally enough, he points out that "all the explanations of the causes of volcanic activity, and its varied phenomena which have been advanced by previous authors are . . . unsatisfactory," and introduces his physico-chemical theory in substitution for them. This is hardly the place to criticise the new view, but what we may admit that the author's hypothesis is very ingenious, we should like to have seen compared more at length with the results of modern petrology; and this reminds us that the work does not go so deeply into petrographical matters as it might do. The concluding chapters deal with volcanic products, and the minerals and flora of Vesuvius; whilst a copious appendix contains divers letters of contemporary writers on its ancient eruptions, &c. One of the practical lessons taught by the work is the composition of the different lavas, including those present largely quarried for paving the streets of Naples. The author does not enlarge on the industrial uses of the stone; but we mention that the lavas of 1855 and 1767 are the principal ones quarried. The former



liable to spheroidal weathering; and the same peculiarity may be seen in the material used for paving ancient Pompeii, the cracks being well developed wherever the blocks are exposed. Mr. Lobley's book is printed in clear, bold type, with plenty of margin, and the illustrations are sufficient for their purpose, but vulcanologists will recognise that certain of the plates in it are mere reproductions from other books: it would have been better were this not the case.

**Pumps and Pumping.** By M. POWIS BALE, Assoc.-Mem. Inst. C.E. London: Crosby Lockwood & Son.

The author states that this book is not intended as a treatise upon the construction of pumps, but to serve as a handbook for pump users. The contents include useful notes on the selection, the type of construction, and the practical management of pumps. The author deals with steam-pumps, donkey and other pumps with injectors for feeding steam-boilers, hand-power pumps, centrifugal and rotary pumps, hydraulic rams, and pumps for specific duties, such as are employed in wells, breweries, chemical manufacturing, gasworks and sewage-works, brickworks, farmyards, and contractors' works. His book provides matter in which the literature hitherto published has been too much confined to makers' catalogues, the authors of which are naturally prejudiced in favour of their own patterns and manufactures. To purchasers of pumps this little treatise will prove especially valuable in guiding them when called upon to make choice of a suitable pump for any special purpose. The paragraphs are clear, and are each preceded by a suitable heading, which is indexed at the end of the volume for easy reference. Necessary precautions are added to be observed in fixing and working, and important suggestions made showing particulars to be stated when making inquiries from manufacturers. Various forms of valves are described, and an account is given of methods adopted in insulating the closing of valves, for which the author apologises as being only a passing notice, but which is really very complete and concise; although all attempts to obtain effective insulating have not proved satisfactory. Like other authors, Mr. Bale considers his book would be imperfect without a page being devoted to a table of areas of circles, but we are happy to find in this case that these areas are stated in the best form for non-technical users; the diameters specified, advancing by eighths of an inch, as measured upon any ordinary gauge or rule. A list of formulae and rules relating to pumps, pipes, and water-pressure complete the volume.

**Notes and Observations concerning Railway Rates.** By J. W. GRAY, Manchester and London: John Heywood, Price 1s. Mr. GRAY approaches this subject as one who is taken an active interest in it for a considerable time, during which period he has taken up a position which has secured for him a "very moderate amount of goodwill from other side." The brochure before us is certainly very outspoken and independent, and contains abundant evidence of the writer's acquaintance with railway matters. His view of a present legislation is that the interests of the community at large, for whose benefit railways are supposed to exist, should be paramount to those of merchants, trading associations, the railway companies themselves. He has converted to the late Mr. Grierson's opinion to the principle which must, in the end, govern the rate question, viz.:—"what the traffic will bear." This conclusion is arrived at a study of the effects which would probably follow the adoption of alternative principles. There are but two that are seriously urged, and these are in direct ratio to cost of service, to be fixed in accordance with the principle of equal mileage rates. Following out the able working of these systems from his trial standpoint, Mr. Gray demonstrates that it would undoubtedly enure upon the adoption of either, and it really appears unavoidable that Mr. Grierson's rule must remain the principal factor in determining rates. The simplification once settled, Mr. Gray would in favour of the abolition of nineteen out of every twenty "exceptional" rates, and the making it difficult to obtain any new ones; in which he is hardly supported by the traders who rely on them. On the other hand, railway companies are urged to effect economy by doing with the entire staff of canvassers (who, says, may divert traffic, but certainly create it); to cease making petty overcharges; and

to investigate and settle claims with more promptitude, and with fewer false arguments and subterfuges.

#### CHURCH BUILDING NEWS.

**London.**—The first section of the proposed enlargement of Holy Trinity Church, Upper Tooting, has just been completed, i.e., a new north nave aisle 23 ft. 6 in. wide, with span roof, instead of the former lean-to aisle 12 ft. 6 in. in width. In addition to this, the two eastern-most bays of the aisle have transeptal additions northward, divided from the aisle by two arches. The total increase in the accommodation is for 160 worshippers. The north porch has been rebuilt at the west end of the new aisle, and an exit recessed doorway formed at its east end. The font has also been refixed in a better position, and other alterations made to the seating, necessitated by the new works. The new passages have been paved with solid wood blocks, laid to a special small ornamental pattern. The new windows are glazed with lead lights of cathedral and white glass in geometrical designs. The roofs are open fir timbered of substantial scantling, that to the new aisle having ornamented eaves. Builders' tenders were obtained for additions in two other sections, viz., a new south aisle and new clergy and choir vestries. It is proposed to shortly carry out these works. The materials employed are Kentish rag, Westwood Ground Bath stone dressings, and Bangor slates for the roofs. The church, previous to the additions, consisted in plan of west tower, nave, north and south aisles (with porches), chancel, north chancel aisle, organ-chamber, and vestry. It was erected about thirty-five years since, from the designs of the late Mr. Salvin. The architect to the present work is Mr. B. Edmund Ferrey, F.S.A., and the contractors Messrs. W. H. Lorden & Son, Upper Tooting.

**Tring.**—The interior of the fine old Perpendicular Church at Tring has just been further enriched by the addition of new chancel seats and desks, from the atelier of Mr. Forsyth. They are richly carved in oak from the drawings of the architects, Messrs. Carpenter & Ingelow, and are the gift of a lady in the parish.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

15,223, Window-fastening. S. Russell.

The contrivance which is the subject of this patent somewhat resembles the ordinary form of window-fastening but with a difference, the top fastening being a latch capable of being turned across the two sashes and under a catch on the bottom one. When in this position a thumb-screw, passing vertically through a suitable part of the latch, by being turned, is made to press on an inclined plane fixed in a suitable position on the lower sash, the direction of the inclination being downwards from the outer towards the inner side of the sash. The pressing and sliding action of the screw on the inclined plane forces the top and bottom sashes firmly against the window-frame, drawing at the same time the meeting bars together, gripping tightly the side or parting beads, fastening the sashes, and preventing rattling.

16,468, Skylights and Ventilators. O. Phalp. According to this invention, for ship and shore use, a combined skylight and ventilator is made of an upright circular rim, fixed by a flange or other means to the deck roof, &c., and of a cover reaching nearly to the bottom. In the rim and cover are corresponding openings, which when turned to each other admit air as desired. The apparatus is also suitable as a binnacle cover.

16,846, Glazing. C. W. W. J. & F. Allen. The improvement which is the subject of this patent consists of a sheet brass suspender or clip, inserted between the leaden bar and the purlin. This is turned up at its lower extremity so as to grasp the end of the leaden bar. A better fastening is attained, and the suspenders are specially applicable to the bars employed in the ends and divisions of glass houses. To prevent the drip running along the purlins, the top edge of the purlins is chamfered off, and the moisture allowed to run down inside the glass.

17,257, Colouring Portland Cement. W. Cussons.

According to this invention, Portland cement is coloured green, red, chocolate, yellow, or other colour or tint, by the admixture of oxides of iron or copper in suitable proportions, or metal borings, plainings, or slings.

2,827, Non-slipping Wood Pavement. W. A. Williams.

The foundation of this pavement is a floated concrete bed, and the blocks are creosoted. They are

then laid on the foundation with bevelled end and grain upwards, and half-inch slips are placed between each row of blocks. The said slips are removed after the blocks are in position, and the spaces or cavity nearly filled up with hot cement or asphalt, and the remaining spaces grouted with sand and cement to the bottom of the V joint.

10,014, Door Knockers with Bell Attachment. W. Notting and C. J. Reeve.

According to this invention, suitable mechanism is employed to impart activity to a trembling hammer hung near the bell and actuated by the knocker striking a pin, or knob.

##### NEW APPLICATIONS FOR PATENTS.

Oct. 7.—15,697, T. Kershaw, Door-knobs, &c.—15,713, T. Helliwell, Ventilating Roofs of Railway-stations, Green-houses, &c.—15,717, J. Macky and J. Mitchell, Nails.—15,720, H. Haddon, Sawing Machinery.

Oct. 8.—15,737, W. Timewell, Portland Cement.—15,778, G. Notton, Paint Kettle.—15,790, H. Haddon, Guides for Circular-saws.—15,791, H. Haddon, Band-saws.—15,807, T. Llewellyn, Hold-fast or Cramp for Joiners, &c.—15,825, O. Earl, Outside Shop-fittings.—15,831, F. Moynenberg, Brick and Pottery Kilns.

Oct. 9.—15,854, W. Thompson, Grinding Machines, for Frame-saws.—15,858, F. Robinson, Flushing Cisterns and Water-waste Preventers.—15,884, H. Dixon, Veneering Pianoforte Cases.

Oct. 10.—15,950, J. Thame and L. Jacobs, Portable Buildings.—16,015, E. Johnson, Perforated Pavings.—16,016, D. Kawles and E. Raybone, Sash-fasteners.—16,029, P. Justice, Chimneys and Fire-places.

Oct. 12.—16,078, J. Naah, Constructing Walls of Buildings, Partitions, Floors, Roofs, Ceilings, &c.—16,100, K. Howell and G. Thomas, Hanging Wall-papers, &c.

##### PROVISIONAL SPECIFICATIONS ACCEPTED.

12,757, R. Batey, Window-sash Appliance.—12,926, J. Black, Pneumatic Belts.—13,483, R. Peel, Top Bars for Firegrates.—13,642, F. Cowley, Window-fastener.—13,976, W. Farr, Wood Block Flooring.—14,137, B. Malcolm and W. Pennington, Holding Sliding Windows in any desired position.—14,175, J. Beattie, Ridge Ventilators.—14,182, J. Forsyth and R. Blackett, Adjustable Sash, Stay, and Fastener.—14,310, J. Newnam, Registering Mortice Lock.—14,320, J. McRobbie, Window-sashes.—14,343, W. Dixon, Preparation of Wood Paving.—14,419, T. Widdowson, Raising and Supporting Sashes, &c.—14,590, H. Groves and J. Stewart, Electric Bells.—14,643, W. Torrance, jun., Portland Cement.—14,653, A. Clay, Glazed Bricks and Tiles.—14,853, A. Dunbar, Splitting, Dressing, or Planing Wood.—14,868, A. Plummer and L. Hakeman, Disperser Colouring.—14,889, A. French and J. Gordon, White Lead.—14,936, S. Ainge, Carpenters' Cramp.—14,997, A. Bishop, Burning Lime and Kilns therefor.

##### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to Opposition for Two Months.

14,418, A. Ransford, Automatically-lighting Gas-fittings.—15,653, W. Goadley and G. Burton, Fasteners for Sliding Window-sashes.—17,495, J. Dismore, Incombustible Roof.—17,949, R. Hudson, Metallic Furniture for Gates or Doors.—17,970, W. Lindsay, Window-sashes.—17,991, J. & A. Duckett, Water-closets.—11,281, J. Dean, Water-closets.—14,252, C. Rogers, Screws.

#### RECENT SALES OF PROPERTY:

##### ESTATE EXCHANGE REPORT.

Oct. 15.—By SIMMONS & SON.  
Hambleton, Bucks.—"The Old Wharf" beer-house, and 64 acres, f. .... £3,800  
Shiplake—The Lock Island, area 1a, 2r. 17p., ..... 700  
Cookham—A plot of f. land, 5a. 3r. 36p., ..... 800  
A plot of f. land, 3a. 1r. 4p., ..... 450  
By COOPER & GOLDING.  
Westminster, Young's-pl.—A factory and work-shop and plant, u.t. 6 yrs., g.r. 24 ..... 369  
By FAIRBANK & ELLIS.  
Hackney—I to 8, Gainsborough-rd., and 79, Chapman-rd., u.t. 73 yrs., g.r. 23s. 2d. .... 840  
By C. & H. WHEAT.  
Waltham—I and 2, Queen's-row, f., r. 202 p.a. .... 839  
13 to 16, Queen's-row, f., r. 212 p.a. .... 1,680  
23 to 29, Queen's-row, f., r. 226 p.a. .... 2,900  
Camberwell—36 and 36a, New Church-rd., f., r. 267 p.a. .... 815  
14 to 20 (even), Caspian-st., f., r. 232 12s. p.a. .... 1,180  
Peckham—27, Pitt-st., u.t. 42 yrs., g.r. 23, r. 222 p.a. .... 100  
By FAIRBROTHER, ELLIS, & CO.  
Dulwich—F.g.r. of 212, with reversion in 63 yrs. .... 405  
F.g.r. of 26, with reversion in 74 yrs. .... 140  
F.g.r. of 231, 6a., with reversion in 50 yrs. .... 865  
F.g.r. of 234, 5a., with reversion in 53 yrs. .... 10,676  
F.g.r. of 2352, 15a., with reversion in 84 yrs. .... 7,500  
F.g.r. of 2430, 10a., with reversion in 86 yrs. .... 14,785  
F.g.r. of 248, 10a., with reversion in 86 yrs. .... 1,825  
By P. D. TUCKER (at Stratford).  
Upton-pk.—Twenty-eight plots of f. land ..... 1,098  
Oct. 16.—By A. A. HOLLINGWORTH.  
Forest-gate—202, Osborne-rd., f., a.r. 236 p.a. .... 410  
By DALL & TAYLOR.  
Mile-end—13 and 29, Cadiz-st., and 14 and 40, Shandy-st., u.t. 29 yrs., g.r. 214, r. 230 12s., ..... 205  
By GODDARD, CROCKFORD, & FURNES.  
Chiswick—83, Giebe-st., and 53 and 34, Bolton-gds., u.t. 79 yrs., g.r. 211, r. 232 p.a. .... 699







COMPETITION, CONTRACTS, & PUBLIC APPOINTMENT S.

Epitome of Advertisements in this Number.

COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Waterworks, &c.	Tower Company, Ltd.	500 guineas & 250 guineas	Feb. 1890	i.

CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Waterworks, &c.	Waterworks, &c.	Waterworks, &c.	Waterworks, &c.	Waterworks, &c.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor and Inspector of Nuisances	Exmouth U.S.A.	1402	Oct. 28th	xvi.

PROYDON.—For alterations and additions to No. 57, 58, and 59, Croydon, for Mrs. Fitchard. Mr. J. Williams, architect, 21, New Bridge-street:—  
Pearson & Son ..... £875 0 0  
J. De Vere ..... 629 17 6  
F. Fuller ..... 595 0 0  
J. Horrocks ..... 463 0 0  
E. J. Saunders ..... 454 10 0  
F. R. Docking ..... 403 0 0

INCOLN.—For rebuilding No. 37, Silver-street, Lincoln, as a shop, for Mr. R. C. Carline. Mr. W. Watkins, L.B.A., architect:—  
J. W. Harrison ..... £1,450 0 0  
J. B. Harrison ..... 1,429 0 0  
Otter & Broughton ..... 1,424 0 0  
Wright & Sons ..... 1,374 0 0  
H. S. & W. Close ..... 1,248 0 0  
J. W. Harrison (accepted) ..... 1,181 0 0

INCOLN.—For restoring D'Eyncourt School, Tealby, for Mr. L. D'Eyncourt. Mr. W. Watkins, L.B.A., architect:—  
Otter & Broughton ..... £803 16 0  
J. B. Harrison ..... 784 0 0  
J. W. Harrison ..... 698 0 0  
J. W. Harrison ..... 675 0 0  
Wright & Sons (accepted) ..... 651 0 0

PROYDON.—For the erection of a school to provide accommodation for 1,200 children, and also a pupil teachers' school, on the Lavender-hill site, for the School Board for London. Mr. T. J. Bailey, architect:—  
Clarke & Bracey ..... £27,069 0 0  
T. Boyce ..... 25,440 0 0  
Dove Bros. .... 24,442 0 0  
A. & W. Garner ..... 24,388 0 0  
Kilby & Gayford ..... 24,339 0 0  
Stephens, Bastow, & Co. .... 23,972 0 0  
E. Lawrence & Sons ..... 23,750 0 0  
S. Belham & Co.\* ..... 23,701 0 0  
\* Recommended by the Works Committee for acceptance.

PROYDON.—For the erection of a deaf and dumb school on the Stanley-street site, Deptford, for the School Board for London. Mr. T. J. Bailey, architect:—  
J. Derry ..... £23,214 0 0  
Mather Bros. .... 2,134 0 0  
Holloway Bros. .... 2,088 0 0  
W. Dowson ..... 4,983 0 0  
V. M. Dabbs ..... 1,987 0 0  
Clark & Randall\* ..... 1,954 0 0  
\* Recommended by the Works Committee for acceptance.

PROYDON.—For the erection of a junior mixed school to provide accommodation for 410 children on the Tooting site, for the School Board for London. Mr. T. J. Bailey, architect:—  
Dove Bros. .... £28,778 0 0  
Clark & Randall ..... 6,707 0 0  
Patman & Fotheringham ..... 6,657 0 0  
E. S. Williams & Son ..... 6,492 0 0  
Belham & Co. .... 5,979 2 11  
Stephens, Bastow, & Co.\* ..... 5,939 0 0  
\* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of a Branch Library in Lurline-gardens, Battersea, S.W., for the Commissioners of the Battersea Public Libraries. Quantities by the architect, Mr. Henry Branch, 25, Parma-crescent, Clapham-junction, S.W.:—  
J. Longley & Co., Crawley, Sussex. £2,512 0 0  
B. E. Nightingale, Albert Embankment, S.E. .... 2,163 10 0  
E. A. Hoome, 112, Clarence-road, Lower Clapton, S.E. .... 2,049 0 0  
W. M. Dabbs, Portland-avenue, Stamford-hill ..... 2,023 0 0  
Holloway Brothers, Queen's-road, Battersea ..... 2,009 0 0  
A. R. Flew & Co., 5, Glasbury-road, West Kensington ..... 2,000 0 0  
H. L. Holloway, 180, Queen's-road, New Cross Gate, S.E. .... 1,977 0 0  
Garlick & Horton, 42, Sloane-street, S.W. .... 1,927 12 0  
W. Hammond, 72, York-road, Battersea ..... 1,912 10 0  
G. N. Street & Son, 34, Surrey-lane, Battersea ..... 1,890 14 0  
H. G. Heywood, 44, Bridge-road, Hammersmith ..... 1,821 0 0  
George Stephenson, 173, Bishopsgate-street Without ..... 1,787 0 0  
Lobb & Oliver, New Southgate, N. .... 1,541 0 0  
\* Accepted.

LONDON.—For the enlargement of the Gainsborough-road school, Hackney-wick, by 654 places, for the School Board for London. Mr. T. J. Bailey, architect:—  
Dove Bros. .... £11,599 0 0  
Atherton & Latta ..... 11,596 0 0  
W. Goodman ..... 10,772 0 0  
W. M. Dabbs ..... 10,013 0 0  
E. Lawrence & Sons ..... 10,512 0 0  
Kilby & Gayford ..... 10,430 0 0  
T. Boyce\* ..... 10,391 0 0  
\* Recommended by the Works Committee for acceptance.

LONDON.—For a new school to provide accommodation for 500 children on the site in Cubitt Town, for the School Board for London. Mr. T. J. Bailey, architect:—  
Atherton & Latta ..... £13,744 0 0  
Dove Bros. .... 15,888 0 0  
W. Cabitt & Co. .... 15,798 0 0  
J. Grever & Son ..... 16,640 0 0  
Patman & Fotheringham ..... 15,477 0 0  
D. Charteris ..... 14,675 0 0  
E. Lawrence & Sons ..... 14,578 0 0  
Stephens, Bastow, & Co.\* ..... 13,969 0 0  
\* Recommended by the Works Committee for acceptance.

LONDON.—For tar-paving, &c., the additional playground, and erecting new w.c.'s for the infants' department of the Vauxhall-street School, and carrying out various sanitary improvements to the school, for the School Board for London. Mr. T. J. Bailey, architect:—  
J. Derry ..... £430 0 0  
T. Lindell ..... 391 0 0  
T. W. Haylock ..... 379 0 0  
H. Mallett ..... 381 0 0  
H. Wakley ..... 380 0 0  
W. V. Good\* ..... 349 0 0  
\* Recommended by the Works Committee for acceptance.

LONDON.—For providing a new covered playground for the Boys' Department of the Nynehead-road School, Clifton-road, New Cross, also removing boundary-wall at the west end of the site, and providing wood fence, for the School Board for London. Mr. T. J. Bailey, architect:—  
T. W. Haylock ..... £379 0 0  
J. H. Lyon ..... 390 0 0  
J. B. Gerrans ..... 285 0 0  
H. Bridal ..... 275 0 0  
T. Lindell ..... 245 0 0  
J. Derry ..... 239 0 0  
W. V. Good\* ..... 210 0 0  
\* Recommended by the Works Committee for acceptance.

LONDON.—For new bakehouse and baker's oven at Islington Workhouse, Cornwallis-road, Holloway, for the Guardians of the Poor of St. Mary, Islington. Mr. Wm. Smith, architect, 80, Upper TOLLINGTON PARK, N.:—  
Coombes ..... £493 10 0  
Larke & Son ..... 469 0 0  
Ward & Lambie ..... 432 0 0  
Langham ..... 423 0 0  
Flaxman ..... 393 10 0  
Dearing & Son ..... 389 0 0  
Perkins & Son ..... 380 0 0  
Marriott ..... 365 12 0  
Joselyne, Young, & Co. .... 345 0 0  
Baylis ..... 337 0 0  
Hughes ..... 335 0 0  
Wilkinson ..... 317 0 0  
Gornly ..... 314 18 0  
Aldridge ..... 257 10 0  
Stevens Bros. .... 281 0 0  
Norbury ..... 266 10 0  
Lewin & Son (accepted) ..... 260 0 0

LONDON.—For alterations at the Relief Station, Liverpool-road, N., for the Guardians of the Poor of St. Mary, Islington. Mr. William Smith, architect, 80, Upper TOLLINGTON PARK, N.:—  
Coombes ..... £344 0 0  
Ward & Lambie ..... 320 0 0  
Langham ..... 312 0 0  
Larke & Son ..... 291 0 0  
Dearing ..... 264 0 0  
Flaxman ..... 244 0 0  
Perkins & Son ..... 244 13 0  
Joselyne, Young, & Co. .... 230 0 0  
Marriott ..... 225 10 0  
Baylis ..... 225 0 0  
Lewin & Son ..... 225 0 0  
Norbury ..... 197 10 0  
Hughes ..... 195 0 0  
Aldridge ..... 185 0 0  
Stevens Bros. (accepted) ..... 185 0 0  
Wilkinson ..... 185 0 0

LONDON.—For erecting premises at 61, 62, and 63, South Andley-street, London. Mr. W. Lambert, architect. Quantities supplied by Messrs. W. H. Barber & Son:—  
Woodward ..... £13,921 0 0  
Nightingale ..... 13,612 0 0  
Green & Lee ..... 13,074 0 0  
Bash ..... 12,970 0 0  
Brywaters ..... 12,630 0 0  
Oldrey ..... 12,603 0 0  
Stephens, Bastow, & Co. (accepted) ..... 11,974 0 0

LONDON.—For the erection of shop and premises, Bowry-terrace, High-street, Clapham, for Mr. William Gray. Mr. J. William Stevens, architect, No. 21, New Bridge-street, E.C. Quantities supplied:—  
Frie & Co. .... £1,634 17 10½  
White & Co. .... 1,459 0 0  
C. Green ..... 1,439 0 0  
Frestige & Co. .... 1,439 0 0  
J. Macey ..... 1,355 0 0  
J. Peppitt ..... 1,289 0 0  
L. Whitehead (accepted) ..... 1,255 0 0

LONDON.—For alterations and additions to No. 15, Young-street, for Mr. L. N. Evans, Mr. J. William Stevens, architect, 21, New Bridge-street, E.C.:—  
C. Wall ..... £1,085 0 0  
Leslie & Co. .... 810 10 0  
Frestige & Co. .... 793 0 0  
W. Barkeridge ..... 740 0 0  
C. Crapper ..... 712 19 0  
F. Giles & Co. (accepted) ..... 649 18 8  
C. F. Kearley (withdrawn) ..... 577 18 0

LONDON.—For alterations and improvements at "The Portland Arms," Westmoreland-road, Walworth, S.E. Mr. E. A. Lewcock, 85, Bishopsgate-street Within, E.C., and Mr. Fredk. G. Grierson, joint architects:—  
Ivory ..... £1,385 0 0  
Spencer & Co. .... 1,276 0 0  
A. Davies ..... 1,275 0 0  
G. B. Todd ..... 779 0 0  
H. L. Holloway ..... 720 0 0  
Little & Senecal ..... 696 0 0  
T. Brown ..... 569 0 0

LONDON.—For alterations to 155, Victoria-street, Westminster, S.W., for Mr. T. M. Sutton, Mr. W. Seckham Witherington, architect, 79, Mark-lane, E.C.:—  
Patman & Fotheringham ..... £538 0 0  
Yardley & Son ..... 610 0 0  
Hilkinson ..... 480 0 0  
W. G. Larke & Son ..... 434 0 0

LONDON.—For alterations and additions to No. 132, Orange-road, S.E., for the Council of the Bermondsey Conservative Registration Association:—  
Tyler ..... £745 0 0  
Kipps ..... 724 0 0  
Bulmers ..... 695 0 0  
Russell ..... 683 0 0  
Jas. Greenwood & Son ..... 644 0 0

LONDON.—For additional works at "The Camden's Head" tavern, Bethnal-green-road. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.—  
A. Hood (accepted).....£320 0 0

Gas.  
J. Steadman (accepted).....200 0 0  
Pewtering.  
J. Pringle (accepted).....175 0 0

LONDON.—For improvements at "The Marquis of Cornwallis" tavern, Bethnal-green-road. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.—  
Higgs (accepted).....£200 0 0

Gas.  
J. Steadman (accepted).....110 0 0  
Pewtering.  
Thompson (accepted).....155 0 0  
Refrigerator.  
Newark (accepted).....25 0 0

LONDON.—For pewtering and gasfitters' work at "The Horse and Groom" tavern, 189, Newington-butts, S.E. Mr. R. A. Lewcock, 88, Bishopsgate-street Within, and Mr. Fredk. G. Grierson, joint architects:—

Pewtering.  
J. Heath (accepted).....£189 0 0  
Gas.  
Unger & Co. (accepted).....89 0 0

LONDON.—For the erection of stabling, Station-road, Clapham, for Mr. William Gray. Mr. J. William Stevens, architect, 21, New Bridge-street, E.C.—  
Peppiatt.....£255 0 0  
Creed.....230 0 0  
Fyle & Co. ....198 0 0

LONDON.—For alterations at the "Royal Star" beerhouse, City-road, for Mr. Earter. Mr. J. F. Wesley, architect, 376, Romford-road:—

Trent Bros. ....£395 0 0  
E. W. Wordley .....392 0 0  
Bishop & Webb .....354 0 0

LONDON.—For repairs, &c., 25, Michael's-grove, Brompton, S.W., under the direction of Mr. Farnacott, surveyor, 156, Westminster Bridge-road:—

Roberts .....£157 0 0  
Laphorne & Co. ....123 0 0  
Peacock Bros. ....122 14 0

LONDON.—For new iron drains, "Dececo" water-closets, and complete renewal of all the sanitary appliances and fittings, at 44, Bedford-square, for Dr. Cecil. Mr. Charles Edward Gritton, A.M.Inst. C.E., surveyor, of London:—  
Winnar & Co., 52, Buckingham Palace-road, S.W. (accepted).....£150 0 0

SOUTHAMPTON.—For erecting new Corporation stables, Southampton:—

W. Franklin .....£2,370 0 0  
F. & J. Young .....2,338 0 0  
H. Stevens & Co. ....2,355 0 0  
J. Rowland & Son .....2,398 0 0  
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J. W. Roe & Co. ....2,440 0 0  
J. Crook (accepted) .....2,398 14 6  
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G. Potter, London .....439 11 3  
T. Bloomfield, Tottenham .....431 0 0  
J. Cook, Spalding .....474 0 0  
Marriott & Co., High Barnet .....465 0 0  
W. Wood, London .....480 0 0  
T. Bowley, Tottenham .....440 10 11  
S. Hipwell, Gorefield, Wisbech\* .....395 0 0  
\* Accepted.

WARGRAVE.—For building new house and stables at Wargrave, near Twyford, Berkshire, for Mr. Nicholas, J. Hannen. Mr. W. Kidner, F.R.I.B.A., architect, 23, Old Broad-street, E.C. Quantities by Mr. James Barnett, 90, Cannon-street, E.C.:—

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Scott, London	1,985	329	1,914
Bottril & Sons, Reading	1,680	320	1,880
Watson, Ascot	1,498	297	1,795
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WORTHING.—For new billiard-room and other additions to Colonnade House (caricassing only). Mr. A. Broad, architect, 37, Dugwall-road, Croydon. Quantities by the architect:—

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Sawle, Worthing	622 0 0
Stanbridge, Broadwater	612 0 0
Marriott, High Barnet	608 0 0
Taylor, Brighton	600 0 0
Docking, Croydon	550 0 0
Smith, Worthing	518 0 0
Crouch, Worthing (accepted)	489 0 0
Karris, Sutton (too late)	495 0 0

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#### TO CORRESPONDENTS.

F. R. C.—J. P. (thanks).—G. H. R.—A. W. E.—J. H. If the subject were one that we could take up, we could not quote from a paper three weeks old.

All statements of facts, lists of tenders, &c., must be accompanied by the names and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

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# The Builder.

VOL. LVII. No. 2479.

SATURDAY, NOVEMBER 2, 1889.

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Moscoulin Cathedral: West Front.—Messrs. Carpenter & Ingelow, Architects	Double-Page Ink-Photo.
A Relief in Bronze and Brass by Donatello, at San Antonio, Padua.—Drawn by Mr. Gerald C. Horsley	Double-Page Photo-Litho.
Sketches at the Arts and Crafts Exhibition	Double-Page Photo-Litho.
Decoration of Staircase, 89, Queen's Gate.—Mr. J. H. Eastwood, Architect	Double-Page Ink-Photo.

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### The Art Congress at Edinburgh.



THE second Congress of the National Association for the Advancement of Art has been, as far as it has extended at the moment of writing these words, quite as successful as

that of Liverpool last year, in regard to the interest displayed in the meetings and in the subjects discussed; and perhaps more so in so far as the number of meetings and papers has been kept more within reasonable bounds, which was hardly the case at Liverpool, where there was too obvious an endeavour to dispose of all possible matters for discussion in the whole field of art at one swoop. It may also be said that on the whole the tendency of the papers read has been more practical and less imaginative and speculative. This is certainly the character of the two papers by Sir Jas. Gowan and Mr. Blashill, on the possible influence of municipal legislation on architecture, which we print in the present number; and it was equally the case with the admirable paper read by Mr. Rathbone at the same meeting, on "The Political Influence of Art," a paper really philosophic in spirit and concentrated and to the point in regard to matter and form. This we hope to be able to give entire in another number.

We fear it will be impossible to say that the presidential address on this occasion was in any way comparable to that remarkable though rather pessimist and satirical address which the audience listened to from the President of last year at Liverpool,—an address which sent a kind of thrill through the country, partly of sympathy with its eloquence and enthusiasm, partly of indignation (among those who are somewhat harshly termed "ordinary people") at the low estimate of English taste and knowledge of art formed and published by the President of the Royal Academy. Lord Lorne's presidential address will hardly arouse either enthusiasm or anger in any quarter. But it may claim also the credit of the generally practical character which we have noted in regard to other portions of the proceedings. Lord Lorne made a special point of justifying the holding of such meetings; a subject on which there is no doubt room for difference of opinion. Art is not talking, and some

persons, both within and without the special circle of the art world, doubt whether Art Congresses can do any good. Lord Lorne's position was that the stress of modern life is so absorbing that people almost need to be laid hold of and their attention turned towards the value of art by special preaching on the subject; that a counterblast is required against the influence of the mere struggle for life and the utilitarian tendency of the day. There is certainly truth in this; and though we do not carry too far our belief in the efficacy of art-talks, the most critical auditor may allow that, while they may do good, it is not easy to see that they can do any harm to art. A good many who attend them may be led to think more and see more clearly on the subject of art than they have thought and seen before; and at the worst it is a pleasure to people who already care about the subject and have it at heart to discuss it with those who have a kindred interest. The argument that it is to our commercial interests as a nation to make our various productions good in form as well as in manufacture, which was again brought forward in the address, and which it has become the fashion to insist on lately, we make little account of. It is, in the first place, only another form of appeal to the merely commercial view of life which is so prevalent nowadays; a kind of attempt to persuade people that if you will only learn to be artistic you will find it pays to be so; a statement not untrue in itself, but very little to the point. Neither individuals nor nations will ever develop an artistic spirit under the influence of the desire to make money by it. As was said by one speaker in the course of the debate in the Architecture Section, one of the most baleful influences on modern street architecture is the desire to make a paying property on the shortest possible notice; to throw together any design which will just pass the authorities, to rush the building up by night and day, working by relays of men, in order to commence at the earliest possible moment the gathering in of the harvest of rentals, in which the so-called "architect" is often himself one of the speculators. There can never be good or noble architecture where the main object is to run up buildings as quickly as possible, to catch the money. What is wanted is that people should regard architectural beauty as a thing worth having in itself, and worth foregoing a little immediate gain for. And so in regard to all other branches of art. What we want is that

people should take interest in the fashioning of whatever they make, take a pleasure in making it as beautifully as possible, because they enjoy doing so; not because it is better for the trade interests of the country; and we rather hope that this commercial argument will not be further paraded at any Art-Congress. It is essentially a false and deceptive view of the subject; a doctrine which, so to speak, cuts its own throat. The very fact of looking to artistic production as a matter of national commercial value in itself kills the very spirit which goes to produce artistic work—the love of the work for its own sake.

In regard to the important question of legislation in reference to architecture in cities, it will be seen that the two papers by the official architectural authorities of Edinburgh and London respectively come very fitly side by side, as each supplying one portion of the subject, Sir James Gowan's paper being to a great extent historical, and Mr. Blashill's critical; though Sir James Gowan closes with some definite and rather extensive, not to say alarming suggestions, in regard to a proposed board of architectural control: alarming because, after all, taste cannot be controlled or induced by legislation, and it seems absolutely certain that the influence of any such Board, however enlightened and cultured its members might be, must inevitably be (if it can get its own way) to stereotype a certain type of architecture as long as the same Board is in power, and, as Dr. Rowand Anderson observed in the course of the discussion, to "destroy architectural liberty." Those who read Mr. Blashill's paper, in which his reasoning on the subject, drawn from his own experience, is given with a pleasant sub-acid flavour of dry humour, will see that he, on the whole, sums up in favour of as much as possible of the let-alone principle. He has been accused, he says, of having allowed most horrible buildings to be erected; but he has refused various designs one after another, and what can be said if the unfortunate architect cannot produce anything better? It would be very difficult to get any authority to agree to stopping a building altogether on that ground; and after all, as Mr. Blashill says, are we sure that we are not strangling a new style in its infancy? This feeling in favour of a policy of non-intervention (at least as far as active interference is concerned) seemed to be the prevalent one among those who discussed the subject; and what the possible consequences





Countess of Douglas, who died about 1430, together with the adjacent door to the sacristy, form a very interesting and effective group. There is a good deal of heraldic carving on the tomb, the door, the roof corbels, and other places, amongst which the three chalices and the heart of the Douglases frequently occur. It would be a labour of love on a summer's day to decipher these devices and the few inscriptions that are still legible. Adjoining the church are the remains of what is called the Provost's house, but most of the wrought features have disappeared, and little besides crumbling, but picturesque, walls remain. The situation is beautiful, washed as the site is on three sides by the irregular streams of the Cluden and Nith; while an ancient earthwork, round which the nuns (for the place was originally a Priory for Benedictine nuns) had made paths for their delectation, adds much to the interest of the surroundings. A century ago these ruins were a favourite haunt of Burns, who has apostrophised them in the lines beginning—

"Ye holy wells, that still sublime  
Resist the crumbling touch of Time."

Much must have crumbled since Burns's day; but the place is well cared for now, and is surrounded by an iron railing, which not only serves to keep human intruders out (unless furnished with a proper "open, sesame"), but also the cattle, who regard ancient abbeys as scratching-posts of an extensive and convenient kind.

On the opposite side of Dumfries from Lincluden, and some seven miles out, is the castle we saw from Criffel.—Caerlaverock. It is an old foundation, since it is on record that it was besieged in 1300 by Edward I., and was described by one who was present as being in figure like a shield of three sides. It is, in fact, a triangle on plan, having a tower at two angles and a double tower at the apex. This was the original disposition, which has been retained all through, but the structure has undergone many alterations since it was besieged by Edward. These have consisted chiefly of the re-modelling of the interior. Of the buildings which line the three original walls of encinte, two wings remain; one dates from early in the sixteenth century; the other from about a century later, being the work of Robert, Lord Maxwell, who was created Earl of Nithsdale in 1620. As the initials R.N. occur on his work, it must have been built somewhat later than that date. The third wing, which contained the Banqueting Hall, is in ruins. This is the building from which Scott drew his Ellangowan Castle in "Guy Mannering," but whereas that was situated on a rocky shore, this just lies above the flat stretches of mud covered by the Solway.

There is a good deal of interest about the plan. Its triangular shape is curious, the arrangements for strengthening and defending the entrance, which leads under an irregular archway, more than 40 ft. long, are very elaborate, while the sixteenth century library, and Lord Maxwell's Banqueting Hall were, the one a spacious, the other a magnificent, apartment. But there is not about Caerlaverock that essentially Scotch flavour which distinguishes the smaller castles or strongholds of the neighbourhood, and separates them completely from anything south of the Border country. One of these may be seen in Comlongon, some three miles off, across the marshy plain. That is native to the soil. Caerlaverock belongs to a more general type, and has, moreover, been subjected to foreign influences.

The mouldings here reproduced show the sequence of dates in the work. Some of them are rather quaint in their effect, but those of the latest period (Lord Maxwell's wing) are, like most Scotch Renaissance work, coarse and clumsy. The carving with which Lord Maxwell adorned his pediments is not much more refined. It is somewhat damaged, especially in its inscriptions, and evidently no authoritative interpretation has been promulgated lately; for the caretaker points out

one panel as Prometheus bound, and the next, which probably represents Neptune, he calls Pharaoh crossing the Red Sea. Another is described as Peter and "John our Apostle" walking on the sea. This event, he says, may be found related in the Scriptures, but as there are three figures, two of whom are winged, and one, moreover, armed with a quiver, it is more likely that the subject is a classical one in which Amor plays a part, especially as the remains of the inscription run thus: NON AMAT ISTE SED . . . AMAT AMOR. Another panel is, with equal probability, said to be Solomon returning the celebrated child unharmed to its mother, but it is difficult to decipher the actual meaning. Other pediments contain heraldic devices, and on one or two are the letters, R. N. and E. R. N., for Robert Nithsdale and Elizabeth his wife. We also give a sketch of an early example of a joggle-arch, which was rendered necessary by the library fireplace coming immediately over it.

On another occasion we may perhaps look into one or two of the Border Castles or Peels, and obtain a glimpse into the curious life of which they speak with such grim eloquence. In the meantime we must return to Dumfries. Along the road which runs a few feet up the side of the hill, giving a wide view over the marshy plain, where the sea-gulls hover in flocks and dart down on to the newly-turned earth close behind the ploughman's heels; past the hamlet of Bankend and its ruined Peel dated 1622; up the long hill, across which the rain sweeps unchecked; and then at last down to Dumfries where Burns died, and where his bones lie.

#### NOTES.

**L**ORD BALFOUR OF BURLEIGH and Mr. Courtenay Boyle are now in the midst of the inquiry into the railway companies' rate proposals and the objections made thereto. Lord Balfour remarked at the outset that it was very desirable that objectors should not confine themselves to destructive criticism upon the proposals, but should formulate constructive propositions on their own part. In all probability nine out of ten objectors will be unable fully to carry out this suggestion. While they protest,—and in plenty of cases with justice,—that the proposals submitted are unreasonable, there are but few alternative propositions which will, upon examination, be found practicable. In a great many instances, however, the objections are only "destructive" to the extent of complaining that certain articles are placed in too high a class, and if they were lowered these would be withdrawn. Indeed, Mr. Pope made a statement on behalf of the railway companies which will, perhaps, cause the withdrawal of much opposition. It appears that a revised classification has been agreed upon as the result of the recent negotiations, and in this we hope it will be found that some of the counter proposals of the traders have been adopted. The counsel for the railway companies reiterated the statement that they have not the slightest desire to take any advantage of the traders, and that the Board of Trade is called upon to decide as to reserve powers, and not as to the actual operating rates. There is no doubt that some objectors have been confused as to the real issue, and that arguments which they have prepared in support of their protests may be beside the mark. At the same time, there are objections for which there is much to be said, such as those relating to "terminals," upon which the railway advocates have now stated their case. No fresh arguments were advanced, but Mr. Balfour Brown elicited an explanation of the principle upon which the proposed terminal charges are based. According to Mr. Pope, the average cost to the railway companies of the services mentioned has been ascertained, and this, plus a reasonable trade profit, is the suggested maximum.

**I**N commenting the other day on the conditions and instructions to architects in regard to the competition for the Sheffield

Municipal Buildings, which we characterised as eminently satisfactory, we omitted to mention one feature in the conditions which is, we believe, entirely new, and which is a rather important innovation in the management of large architectural competitions. This is, that there are not even to be anonymous mottoes employed; no mark or sign of any kind is to be put upon the drawings: each set is to be accompanied by a sealed envelope also without mark or sign, and drawings and envelopes will have a distinguishing mark put on them by the official hand when opened. This is a very important innovation. There will thus be no possibility for that marvellous leaking out of the authorship of drawings which is known sometimes to occur when the author has friends at court, and when a hint can be conveyed what motto to look after. The official authorities at Sheffield have been liberal in answering questions, more than one hundred and twenty of which have been numbered and printed, and circulated among competitors, with their corresponding replies in another column. Many of the questions, we are bound to say, are needless and trivial, and look as if some competitors expected the Sheffield Corporation not only to receive plans from them, but to give instruction in planning and architectural treatment, which is certainly beyond their *metier*. Numerous also are the demands as to whether an alternative plan may not after all be sent in; whether two members of a firm may not send in two separate designs, &c.; all which queries, we are glad to see, are met with a curt "No." One simple-minded competitor inquires, "What is the price of bricks delivered on the ground?" to which the official response is, "It depends on the bricks": an answer in which the official intellect certainly "scores," whether the humour of it is intentional or not.

**I**N the course of the proceedings of the London County Council at their meeting on Tuesday last, there arose a discussion of the greatest moment to Londoners, although it is reported very meagrely in most of the daily papers, and is not even alluded to in the *Times* report. The discussion was one arising out of two motions standing in the name of Mr. Holmes, relating to the grievous injury arising from what may almost be called periodic sewer-floodings in the metropolis, especially in low-lying parts of Hackney and some other neighbourhoods. The possibility of a recurrence of these floodings, which seem to be the almost inevitable result of heavy rainfalls, fills the inhabitants with alarm, not only on account of the nuisance they entail and the damage they do before the waters subside, but on sanitary grounds, for basements periodically flooded with sewage are, to put it negatively, not likely to be conducive to immunity from epidemic disease. Mr. Holmes, and many who spoke in support of his motions (one of which was carried and the other withdrawn), aimed at what may be called local remedies or applications in the treatment of a disease which some of the doctors (if we may so designate Mr. Rhodes, the Chairman of the Main Drainage Committee, Mr. Aneas Smith, and Mr. Hunter,—both of the last-named being engineers, and members of the Main Drainage Committee) seem to think there is only too much reason to fear is constitutional, and not local. In other words, the opinion seems to prevail, in quarters which should be well-informed, that our costly metropolitan main-drainage system is already proving to be inadequate, owing to the growth of the metropolis. It is even suggested that the only possible remedy is to adopt, wholly or partially, the "separate" system,—i.e., one system of sewers for surface drainage and another set of sewers for sewage proper,—at a cost of millions of money. The whole question, we are assured, will be brought before the Council as speedily as possible, but in a matter of this magnitude and importance it is well to proceed warily. It is announced that the recently-appointed Engineer to the Council, Mr. Joseph Gordon, is devoting pretty well the whole of his time



and energies to a careful investigation of the subject, with a view of reporting to the Main Drainage Committee, who will then bring the whole matter before the Council.

THE last number of the "Quarterly Journal" of the Palestine Exploration Fund contains some interesting details, with a plan, of the discovery of the remains of an ancient church near the street Tarib Sitti Maryam in Jerusalem. The walls remain up to about 5 ft. above the ground, indicating a short square Byzantine type of church about 40 ft. long, with a central and two side apses at the east end, and indications of four central piers. A plan is given of the Mount of Olives, and of a series of Christian burial-places in catacombs recently discovered on the hill. "Recent discoveries in Galilee" is illustrated by an engraving of a curious early Christian rock-cut tomb entrance at Shefa 'Amr, with a decorative horseshoe wall-arch encircling the opening of the tomb (which is itself square), with a broad band of carving showing vine foliage and a great circular patera at the crown of the arch. In the spandrel between the wall-arch and the square door a cross is carved in relief in the centre, with two birds (doves?), one at either side. The side of the passage approaching the tomb is also carved with a kind of semi-classic frieze of masks and animals, with a *guilloche* ornament running underneath. The whole is about as curious a relic of early Christian decorative art as could well be seen.

THE charming little book of sketches by the late Mr. C. R. Pink, issued to the subscribers who have contributed to erect a brass to his memory, is in itself one of the fittest of memorials to a man who was every inch an architect. The book, we are told in the preface, is like in form to the books in which the original sketches were made, and, we take it, represents pretty closely one of those books when it had been filled up. If this is so, Mr. Pink was an ideal architectural sketcher, whose wide sympathies and ready pencil led him to jot down whatever he saw that was notable or beautiful, or that might be useful to him, in a workmanlike way, for his own pleasure or benefit, though at the same time with a skill and knowledge that would have justified a more ambitious purpose. There are a few perspective sketches in the book, but the space is chiefly occupied by notes of details, separate features, bits of carving, mouldings, and scraps of heraldry,—which was always Mr. Pink's hobby. Almost all the sketches are accompanied by just such useful notes of dimensions, material, colour, and so on as supply the complement of information which the sketch could not convey, and in both sketches and notes the prominent and essential features are emphasised and insisted upon with the skill and knowledge only possible to the expert and earnest student who has no time to waste on non-essentials.

A FACTORY chimney, said to be the highest in the world, is now being erected at the Royal Smelting Works, near Freiberg, in Saxony. The horizontal flue from the works to the chimney is 1,093 yards long; it crosses the river Mulde, and then takes an upward course of 197 ft. to the top of the hill, upon which the chimney is being built. The base of the structure is 39 ft. square by 30 ft. in height, on which is placed a short octagonal transition, from which the round shaft starts. This is 430 ft. high, or, together with the base, 460 ft. high, with an inside diameter of 23 ft. at the bottom, and 16 ft. 6 in. at the top. It will take a million and a half bricks, and the cost is 6,000. Mr. H. R. Heinicke, of Chemnitz, in Saxony, is the architect.

THE Sanitary Chronicles of the Parish of St. Marylebone, during August and September, 1889, by Dr. Alexander Wynter Blyth, Medical Officer of Health (printed by order of the Vestry), record a great deal of useful work done, and include

detailed statistics of mortality and disease. Among the sanitary Acts affecting the parish (in common with other metropolitan parishes) passed during last session was the Poor Law Act, 1889, which enables the Asylum Board to admit any person who is not a pauper, who is reasonably believed to be suffering from fever, small-pox, or diphtheria, into one of the Asylum hospitals. The expenses are to be paid by the Guardians of the Union from which he is received, the amount being recoverable by the Guardians from the person so admitted, or "from any person liable by law to maintain him." But a more important Act, which affects the whole of the Metropolis, is the Infectious Disease (Notification) Act, 1889, for on the occurrence in his household of any case of "small-pox, cholera, diphtheria, membranous croup, erysipelas, the disease known as scarlatina or scarlet-fever, and the fevers known by the following names,—typhus, typhoid, enteric, relapsing, continued, or puerperal fever," the householder is bound to give notice to the Medical Officer of Health, under a penalty for neglect of a fine not exceeding 40s. There are also clauses compelling medical practitioners to notify the same diseases. The Act became enforceable on and from Thursday last, October 31st, and it will no doubt soon be possible, as Dr. Wynter Blyth remarks, to form a fairly accurate estimate of the number of cases of infectious disease occurring in the metropolis.

THE report by Dr. Parsons to the Local Government Board on the condition of the Blackburn Rural Sanitary District draws attention chiefly to defects arising from bad building, imperfectly-constructed drains, and wells placed in situations where impure matter must percolate into them. The report says:—

"In the older houses of the district insufficient ventilation is a common defect; many of the windows are not made to open, and of many others only a single small pane can be opened. Almost all houses in the district have doors and windows at the back, as well as at the front. One or two cellar dwellings were seen, which were damp and ill-ventilated. The Rural Sanitary Authority have no urban powers or bylaws to regulate the erection of new buildings. A good many new houses have been built of late years in the township of Livesey, on the border of the borough of Blackburn, and also in Billington township. In some of the newly-built houses the need for regulations to secure a healthy construction was exemplified. Thus, at Livesey, a row of houses is built on the edge of a clay bank which is in course of being filled up with ashes and house refuse, and some of the houses are stated to be actually built on such refuse. The ground under new houses is not cemented, nor is any waterproof course inserted in the walls to prevent damp rising in them. The drains of some new houses were seen to be laid with open joints, not properly luted with cement or otherwise.

"The ground around houses was frequently found in an uncleanly condition. There are some filthy unrepared private streets. The back yards, and the back streets by which they are approached, are commonly unpaved, and in many cases were found strewn with ashes, shells, and other refuse and filth.

"No sewers have been constructed by the Rural Sanitary Authority, except that some irrigation works for the disposal of the sewage from certain houses at Tockholes have been constructed by the Authority jointly with the Over Darwen Corporation in order to avoid the contamination of a reservoir belonging to the latter. Each row of houses in the district is, however, usually furnished with a common drain or sewer, which discharges into the nearest ditch or stream, into a cesspool, or upon the surface of the ground. Nuisances arising from the want of proper sewers, and the consequent accumulation of stagnant sewage in pools or ditches near houses, were observed at many places in the district, e.g., at Livesey, Wilphiro, Billington, and Mellor. The house-drains are in some cases of imperfect construction, as stone "soughs," or rows of common field-pipes, with rough untrapped inlets. Each house has usually a slopstone indoors; the pipe is made to discharge in the open air, but is usually untrapped, and in some cases in such close relation with the drain that foul air from the latter can only slightly diluted with external air, can come up through the pipe into the house."

THE East Barnet Valley Local Board have sent out an interesting circular of particulars to architects proposing to compete for their new Public Offices. The cost of the buildings, including roads, fences and gates,

&c., is not to exceed 3,000. An architect who had obtained the particulars with a view to competing writes:—"Taking the areas of rooms given at 10 ft. high only, it gives 7381 at a penny per cubic foot; say 6d. (the lowest possible), 4,3981." The Board, we are told, "will act as assessors in the selection." "All designs must be accompanied by specifications of work to be executed." "One design only will be selected, and "will be paid for according to the scale of charges authorised by the Institute of British Architects." This design, however, it is elsewhere rather inconsistently stated, "will become the property of the Board." The Board, however, "do not bind themselves to accept any design, nor do they undertake to employ the architect of the selected design to carry out the works." No premium is offered. Apparently all the Board "undertake to do" is to get plans from architects for nothing, for a building which could not possibly be erected for the sum named. What kind of "harchitects" do they expect will respond to such a proposition?

#### THE ART CONGRESS AT EDINBURGH.

THE National Association for the Advancement of Art and its Application to Industry held the opening meeting of its second Congress on Monday evening, in Edinburgh.

#### The President's Address.

The President, the Marquis of Lorne, in his opening address, said:—The last congress was held at Liverpool, and constituted the first meeting of the kind. Some wonder was expressed that we should think it necessary to have such an assemblage. Was it needed, it was asked, in this most civilised country, at a time when pictures realise high prices, and when the whole aspect of our streets is being improved by the erection of buildings which, in comparison with those they replace, are seemly and often handsome,—was it needed that we should have congresses of artists as incentives to the proper appreciation of art, when the great nations of antiquity had no such organisation? Greece, whose voyagers discovered Britain? Rome, whose legions conquered and colonised it, had no such expedients to push their arts, which sprung spontaneously from their people's taste, as the flowers now rise from the crevices of their walls, to be taken as relics by the descendants of those Britons the builders found and vanquished. The answer must be that the stress of modern life is so much greater than of old, the number of mouths requiring food in given limited areas is so great, that, in the haste to supply wants, necessities for the body are apt to be only considered, and there is little need to attract by grace or form where the desire is paramount for the appeasement of appetite. We multiply faster than did the ancient nations. We push each other into the sea and across it, and build up other peoples, who by their invention and skill make yet narrower in the world's markets the room that our people may hope to find. Besides these rivals of young blood and of our own veins, we have our old competitors on the Continent, those ancient antagonists whom century after century we have met in war, and now have to strive against in the more peaceful but hardly less vital occupations of peace. We desire among a practical people to show that it is that people's interest to make their work good in form as in stability, to clothe with the best combination of colours or patterns, brought, if necessary, from abroad if we cannot produce them here, the sturdy handwork in which they excel all others, so that grace and force shall go hand in hand, helping each other to attract customers in the world's mart. We must not forget that, although we justly pride ourselves on the durability of our manufactures, the French and Germans are treading in this also close upon our heels. The canon of Krupp have excelled ours in the durability of heavy ordnance, and France is building vessels near Marseilles which are as fast as those of our mercantile service, and have characteristics which make them quite as desirable for passengers as those of our great navigation companies. It is no time for us to be too self-satisfied. Look how our neighbours believe in the efficacy of art as a handmaid to labour. The art schools of Paris are of two classes, those intended to educate painters,



sculptors, and architects, and those intended for artisans employed in the decorative arts, masons, potters, iron and bronze workers, cabinet-makers, house-painters, paper-stainers, weavers, and others. The first school, the Ecole des Beaux-Arts, is the national art school under Government. It is not intended for artisans, but only for those who intend to practise the highest branches of art—namely, architecture, painting, and sculpture. Of the second class—the schools intended to train artisans for more or less decorative employments—some are maintained by Government, some by the Municipality of Paris, and all are free. Paris allocated in 1885 upwards of 40,000*l.* to instruction in drawing and modelling alone, and has five evening schools for artisans, with 450 pupils on the roll. Besides this, the Municipality has drawing taught in all the primary schools. There is also a preparatory school of practical drawing, and a school for the application of art to industrial purposes. For these purposes the City Council gave even more than they were asked to supply, and granted 42,000*l.* This is so important that I must quote further. "The method of instruction appears admirably adapted to train up an intelligent class of artisans." A thorough appreciation of the general principle underlying all the arts is inculcated, a thorough control of the tools, and a knowledge of materials and their special adaptability to the various purposes; but not least in weight there is encouragement to original design and composition, which avoids the exasperating sameness so often seen in our schools of art. For this purpose the variety of model, drawn from all available sources, is an essential condition. The monthly competitions are also invaluable. They insure that so soon as a pupil has mastered one branch of instruction, no time shall be lost in moving him to another. They keep up also a constant and living interest in the progress of education. A certain stated time is given, which concentrates the student's attention and prevents him from dreaming and dawdling. The Municipality spend very large sums yearly in decorating their public buildings by historical and national pictures. It is remarkable that through all the vicissitudes of the later history of France, when the people have indeed taken up far too many different models to encourage the art of government,—that through all the changes, the love for art, and the practice of its encouragement by the State, has been the only abiding institution among them. Witness, for instance, the manufacture of the Gobelin tapestry, which each Government has continued, not for purposes of sale, but as a monopoly secured to the nation for enrichment of the nation's public buildings. This beautiful art has not succeeded in maintaining itself among us, and the Windsor factory, which began well and had at first some deserved support, will have to be closed unless public bodies in Great Britain will follow the example of France and decorate their public halls and galleries with some of its beautiful productions. Many of my audience may remember the pleasant group and figures in statuary, modelled by M. Dalou, who exhibited in England for some years statues of peasant girls and women. He was one of the energetic band of artists who were to be found among the defenders of Paris against the Germans, and after the city had fallen, and was in danger of disgrace as well as of defeat by the insurgent hordes of the Communists, M. Dalou was not afraid to have himself inscribed as one of the insurgent officials. For what purpose? No, but that he might from within the city save its artistic glories from the torch of the incendiaries, which laid in ashes so many of the grand buildings of Paris. He and his friends were successful in rescuing the wondrous treasures of the Louvre; and now Paris in its gratitude gives him commissions for great works that have occupied him since he was allowed to return to his country, and will occupy him for a good many more years. Very noble designs are they which are now being executed by him, and worthy types of what a proud people may expect from its sons as illustrative of trials and endurance. His studio stands not far from that Champ de Mars which so many thousands of us have visited for the sake of the Exhibition this year. Were our councillors to give like commissions to our painters and sculptors we should be following a worthy example. Of old, Scotland did appreciate French architecture, and we have men who could apply the best foreign examples to native needs. When shall we hear of a Scottish baillie rising in his

place in council and moving as a matter of course that sums be given to our own people to decorate our public places? Were the experiment tried it might succeed better than some of us may imagine. Manchester has employed Mr. Madox Brown. Who will at Edinburgh honour himself and Auld Reekie by first making a similar proposal? You may have seen some articles by Lord Armstrong speaking of the too great expectations raised by the talk of this spread of technical training, but he also indicates drawing as one of the most useful things a boy can be taught. The eminent President of last year, and others, spoke each of his own profession, whether painting or of sculpture. It is evident that were Sir Frederic to have honoured us this year at Edinburgh by his presence, he would have paid homage to the natural beauty of the site of this capital, and would have extolled the individual patriotism of him who restored St. Giles's. It seems to me evident also that he would have recommended that a match be laid to a gunpowder magazine in the Castle, so that the explosion might vary a little the grim formality of line which characterises the lofty range of barracks on that historic rock. But perhaps he would have waited to perform this operation, so necessary from an æsthetic point of view, until he had had a little time and preparation to direct the guns of the Argyll battery at that awful monument of industrial hideosity which rises in the shape of a tall factory chimney in the middle of the fine valley beyond the North Bridge. And then he would not have been content until he had brought his guns to bear upon some of the stony horrors of the Calton-hill. In speaking of improving the taste displayed in the jewellery and silver and gold work in the shops of the tradesmen of the city, he said: There is probably still much to desire in the improvement of the skill displayed in undertaking the creation of statuettes, in silver and bronze works intended as gifts or as prizes for racing and athletic games. It is not sufficient that we should improve; we should be able to have designs for such purposes,—such as the little statuettes you see by the dozen in the museums of Italy, which prove that the ancient artificers could as easily put the clay into the form of man or woman as the later medieval artists of our northern climes twisted into graceful knots and foliage the tails of the grotesque animals which Saga or elf legend made him believe to exist in forest and lake. You will probably know the cave-studio formed out of a cliff by the side of the road that leads from Naples to Capo di Monte. In that cavern may be seen the curious art of the bronze caster most profitably and perfectly followed. The antique is accurately copied, so accurately, even to the oxidation of the metal, that it is next to impossible to know the original from the perfect counterfeit. And it is almost from beneath their feet that the rare and fine old models came. They were often gathered from the ashes of Pompeii, or from the black lava which entombs Herculaneum. A rare fidelity to nature, a wondrous power of copying attitude and expression, a mastery of proportion, and a taste for grace shone in the work of those Roman workmen, and why should we despair of being again like unto them? At present, if we do copy an old model, we see too often that the eye for proportion is no longer so keen, and that hands and feet are made too large, and a general clumsiness is traceable in the copy. We have abundant and abounding subjects in our own national history which should fire imagination, and produce results. Why should not the figures of our great heroes be as common as were the wondrously-fashioned figures of the old gods? Why should we not have Diarmid and Graine, King Arthur and Sir Balva, Fionn and the Feinn, and Bruce, and Crichton, and Wallace, and Dundee as forms of men familiar to our eyes as to our ears, just as Hercules and Apollo and Mercury were familiar to those old people whose touch was grace, and whose homes were haunts of genius, for they shaped their household things to images of joy, and coloured their walls with the great memories of deeds which the indwellers were to see, to recall, and to emulate? They did not stick upon their hearths vile caricatures of the Cæsars or of the Consuls, or of the *Ædiles* of their people. What we discover in their homes was noble in draughtsmanship, even though the subject be often ignoble; but our folk, whatever may be their politics, have no hesitation in buying an

atrocious print of their modern political hero, and placing him, apparently as a scarecrow against their own feeling of adoration, above the fire at which they warm their feet. Can anything be more dispiriting than the terracotta images we see on mantelpieces of our best authors, our most eloquent statesmen, our most popular men? They are more like the wax images the witches used to be supposed to make of the people they hated that they might stick pins into the likenesses that pains should follow in the like afflicted parts of the subjects of their detestation. Germany and Berlin have good ironwork statuettes of her heroes of the wars of Frederick. She has, through Wagner, put into harmony the legends of her shadowy warriors of the Nibelungen Lay. Stevenson has well worked to deprive Scotland of the reproach of having no good statue of Wallace. Why not have good small copies of his statue at Aberdeen made in bronze for a people who cherish the soldier-martyr's memory, and desire to help a countryman? Hamish MacCunn is doing work in music that will live, and we may yet have the blind Harry and the Fingalian legends touched by him. But what a wide field there is to occupy in art to-day! We need not be ashamed of what we have done in painting here. A most generous gift from a large-hearted Scotsman has given us scope for a display of the canvases of many of our best men, and the land that produced Jamieson and Raeburn, Faed and Noel Paton, has no cause to blush for deficiencies in painting. I have sometimes met with a feeling that to care much about these things is a proof of womanish tendencies, of impracticable ideals, of unworkmanlike or unmanly aspirations after comfort and luxury, rather than use and progress. I have heard it said, "Oh, we are a hard-working lot, we have no time or use for these things; we are too poor to pursue decoration, too practical to delay a moment to get grace or manner or attractiveness; we are too pushing to dawdle over design." Yet the busiest have ever a moment to help to make them more busy. The race for wealth is full of possibilities, and he who pushes ugly wares into the market will now find that his defter antagonist can beat him by aid of designs and the form that takes captive the eye of the purchaser. Mere beauty made the trade in amber in ancient days profitable to the rude dwellers on the Baltic, and every object that exhibits some new form of taste will have its money value. After pointing to various examples of art applied to ecclesiastical building in early times, Lord Lorne said there was one feature of Roman and Italian example we had as yet failed to follow, and that was the exterior adornment of our buildings by the aid of colour. The London white-surface bricks, he said, are now successfully used, and frost does not injure them. Why not have other colours? Why should not the smoky streets of Manchester, and other towns still more under the smoke pall of the Black Country, not be made to look as bright as colour and glazed tile can make them, with an occasional wash down from a street hydrant? All the hues so harmoniously shown on the tropical birds could be imitated to make these towns look like gardens instead of looking like dirty brickyards, as they now do. If less vivid tints be wanted, why not copy the diaper work on the Doge's Palace at Venice? In towns where the air is clear the glaze might be dispensed with, but how much even a partial employment of such coloured surface would light up the gloomy vacancy of our walls. In his concluding remarks, the President said: It is in the power of Art to awake the nobler senses. It is her function to raise the mind from what is low and mean and sordid; it is her province to show forth the beauty that lives in most of what exists around us, hidden though it may be by what is common or unclean. Art may point out the divine in human and natural forms, and show where the finger of God is visible among the defacements of His works; she can excite the deepest feelings of religion or of patriotism—it is for this we desire that she may dwell among us.

On the motion of Lord Kingsburgh, a cordial vote of thanks was awarded to the Marquis of Lorne for his address.

On Tuesday the sectional meetings were held. In the Section of Painting, Mr. Briton Riviere presided, and delivered an opening address, which we have in type, but it is held over this week for want of space.

A paper by Mr. Watts, R.A., on "The National Position of Art," was read, in the absence of the author, by Mr. McLachlan.



In the Section of Sculpture Mr. E. Onslow Ford presided, and gave an address.

On Wednesday, in the combined Sections of Sculpture, Architecture, and the National and Municipal Encouragement of Art, Mr. Philip Rathbone read a paper on "The Political Influence of Art."

#### *Architectural Effect in Cities.*

Mr. H. H. Statham, Editor of the *Builder*, read the following paper:—

As the subject of municipal legislation in reference to architecture is to be considered at this meeting, it will perhaps not be out of place to suggest briefly, from a purely architectural point of view, what can be aimed at or realised in the architectural effect of cities, before we come to consider how far legislation can assist (or hinder) the desired result.

In the broadest view of the subject, a whole city might be regarded as in itself a great architectural work, the combination of details to form a grand architectural composition. Then we have to consider the effect and the laying-out of the principal centres of the city, the most important public buildings, and the squares and open spaces adjoining them; and lastly the architectural treatment of the ordinary streets and street buildings.

It will at once occur to most of us that the first object suggested, that of treating a whole city as a great architectural design, can be in these days little more than a delightful architectural day-dream. That light-hearted founding of new cities, which was one of the favourite amusements of Alexander the Great and others of the now extinct race of beings called "conquerors," is an operation hardly to be expected in these democratic days. Cities are now no longer "founded": they develop, like everything else, on the principle of evolution. Yet it is as well to keep before our minds what might be done in this way if opportunity offered,—such opportunity as a State-aided colonising enterprise might possibly afford in the future. Take, as an example, Liverpool, where this Association last met: a city which has been built by degrees up the slopes of a hill rising gently from the estuary of the Mersey, and forming a slight concave bend, the estuary being the chord of the arc. If we could imagine Liverpool built over again from one comprehensive design, rising in platforms and terraces one above the other in great sweeps along the curve of the hill, with the broad inlet of sea-water at its feet, it might form an architectural effect such as has hardly been seen yet in any city in the world. But though we cannot expect to have the chance nowadays of thus planning a great city as a whole, with the object of rendering it as beautiful and striking as possible architecturally, still we see examples in modern times where this kind of architectural laying-out, this city-designing, as it may be termed, has been carried out to a considerable extent and with very fine results. The Ring-strasse at Vienna, for instance, almost amounts to giving a new architectural design to the city, independently of the design of the separate buildings which go to make up the total effect. In our country, Bath is an example of a city which has been to a considerable extent planned and carried out at one time, and under the direction of one man, Wood, an architect of genius in the prime taste of his period; and Bath has inspired Mr. Swinburne with one of the brightest and most enthusiastic of his later lyrical poems. And here in Edinburgh there has certainly been something like architectural design and contrast on a large scale, in the manner in which the portion of the new town which is contiguous to old Edinburgh has been laid out by the Georgian architects with that centralised symmetry and parallelism of line which renders it such an effective base to the picturesque irregularity of the old town. I admit that I find much of the new town too cold and formal as street architecture; but I consider the laying out of the parallel lines of the gardens and Princes-street, flanking the old town, a most fortunate and effective piece of architectural contrast as a whole, whatever may be thought of particular buildings which enter into the composition. More lately, in the Gothic revival period, there were some attempts to erect new Edinburgh buildings in the Mediaeval style. These may have had their own merits individually, but I am quite sure that if this theory had been adopted in the building of the main portion

of the new town, we should have lost one of the most effective elements in the city scenery of Edinburgh, the contrast between the Classical and Mediaeval manner of city building; not only the contrast to the eye, as a matter of composition, but the contrast to the feeling and association, when we find that a walk across the bridge from Princes-street to High-street takes us, we might almost say, into another age at once. There could hardly be a more striking instance of what may be the æsthetic effect of one or another system in laying out a large portion of a city. Try to imagine the new town of Edinburgh laid out and built as a modern-Mediaeval town, and you will be able to form some idea of the difference this would have made in the whole architectural effect and sentiment of this beautiful city.

Besides the disappearance of conquerors and the consequent decay in city-founding, already referred to, there are two very important distinctions between the conditions of ancient and modern cities which have a great effect on the treatment and the possibilities of city architecture. In ancient and mediæval times every important town was walled in with fortifications which compassed it within definite limits, with results on the character of the town architecture which we shall refer to just now; and of course this practice had the effect of giving a more distinct architectural individuality to the town, making it a defined structure instead of, as in modern times, a mere tract of country irregularly overspread with houses. The other distinction is that the line of ancient streets was mostly defined by accidental circumstances, either arising out of the original contour of the site, or depending on the boundaries of ownership. Hence the picturesque irregularity of line of the majority of ancient streets. In modern times it is generally considered that a street is or should be the shortest route between two points, and, moreover, that it is more for the convenience of the buildings erected along the streets that they should run in straight lines. This latter point cannot be gainsaid; the practical advantage and facility in planning buildings on a basis of straight lines and right angles is unquestionable, though too much weight ought not to be attached to it to the exclusion of other important considerations.

Before quitting the first head of the subject, the general architectural aspect of cities, it should be noticed that the character and outline of any important building to be erected in a city should not be decided without reference to the general character of the city and the site. Generally speaking, it may be said that a large dome is always a fine addition to the ensemble of a city. Every one knows how St. Paul's, St. Peter's, and Santa Maria del Fiore stand out in every view of London, Rome, and Florence respectively, and how inferior by comparison is the effect of the thin-lined centre lantern of Milan Cathedral as the leading feature of a city. And a dome looks effective whether on flat ground or on hilly ground; but perhaps more effective on high ground. A high tower, on the other hand, only gets its full effect on a level site; on the top of a hill it has an effect of insecurity; below a hill its vertical effect is lost, being killed by the lines of the hill, which compete with or overtop it. A lofty tower, therefore, is a feature for a city with a low and level site; and moreover, in placing the tower, it should be an object to get buildings of a strongly marked horizontal line in juxtaposition with it, so as to give more effect to it by contrast of line. Two towers of similar height placed near each other are rather likely to injure than to enhance each other's effect, unless in the case of twin spires forming part of the same design. If kept far apart each has more effect in itself, and there is the chance of the fine effect of seeing one in sunshine and the other in shadow—an incident which every painter delights in.

The dome and the tower may be taken respectively as the two types of prominent city buildings; they represent the comparatively low and massive building, and the high and narrow building, and what is said of them applies respectively to all buildings which represent either of these characteristics in their proportions and outline. Coming to the question of the laying-out of the sites which form important centres of effect in a city, it is sometimes debated whether we should aim at symmetry and centralisation of arrangement of the spaces and buildings in such a case, or whether a picturesque irregularity is preferable. I say emphatically, aim at symmetry and stateliness of effect in the important centres of towns

—stateliness, because that means dignity, and dignity and a certain palatial effect are proper to the public buildings and squares of great cities; and symmetry, because this designing of architectural combinations in city architecture is essentially and necessarily an artificial thing, and should be treated accordingly, and make no attempt to play at being accidental and picturesque in the ordinary sense. It is sometimes remarked that St. Paul's gains much in picturesque effect through being placed obliquely to the thoroughfare that leads up to its west front; perhaps it does, but that is because Ludgate-hill is only an ordinary and rather narrow street of shops not worthy of the situation, and it is fitting enough that the great Cathedral should pose independently of it. It would be a very different thing if Ludgate-hill were a great avenue of columnar classic structures in harmony with the Cathedral. Take the case of St. Peter's, with its artificially designed place with the fountains and the sweep of the colonnade on each hand, and if any man maintained that the facade would be better for facing obliquely to the place, I should say he was a man of essentially lob-sided intellect, whose character would probably be found to have some perverse twists in it. In England we are most oddly indifferent about this matter of the planning of buildings and open spaces in architectural relation with each other. An irrepressible and mischievous Commissioner of Works has had the State arch at the head of Constitution-hill rebuilt so as to stand on the side of a slope and cut into the middle of an irregular curve and face nothing in particular, while the laying out of the space in front, the very centre of the social circulating system of London (a foreigner described Apsley House as "No. 1, London"), has risen to nothing better than a series of leg-of-mutton-shaped spaces between intersecting roadways. The Albert Hall and the Albert Memorial have been built just sufficiently out of central axis as to appear as if they had been intended to centralise, but the plans had been set out wrong by a blunder in surveying. A French architect or a "Ministère des Travaux Publics" capable of committing such blunders would never hear the last of it; they would be permanently discredited as incapable. I may be told it would be equally so in Edinburgh: I should not be surprised to hear it. I am sure that if Edinburgh can give London any lessons in this respect, they will be lessons very much needed.

The architectural treatment of ordinary streets is a different matter. Much may be reasonably urged in favour of either the regular or the irregular treatment of street architecture according to circumstances; there is no absolute æsthetic right or wrong in the matter; they are two different classes of effect. In ordinary streets of passage, so to call them, it is no doubt best to leave each separate tenement to adopt its own architectural treatment; nothing can be duller than a row of uniform houses of a small class repeating the same features. But when your street is an important one, leading up to a principal square, for instance, or when it is a square designed partially for architectural effect, I do not think it is a false or unreasonable treatment to group the houses so as to form parts of one main design, and to prevent individual owners from infringing on this; a point which I believe has been a *casus belli* in Edinburgh recently. Nothing like stateliness of effect can well be got without this; only it must be remembered that uniformity in general design does not necessarily imply uniformity and repetition in minor details. Habitations may be grouped symmetrically as to their main lines, but varied in their treatment of detail, so as to give an individuality to each beyond that furnished by the number on the door. The builders of the Georgian brick streets of London, dull as they are—"long unlovely streets," as the Poet Laureate has stamped them—kept this in mind: the details of the entrance doors are continually varied, monotonous as the main line of front seems.

The picturesqueness of huddled-up overhanging houses and narrow streets, which we all like so much in a pictorial sense, had its origin in that walled-up condition of mediæval towns before referred to; the city could extend no further than the walls, and every square foot of ground within must be utilised to the utmost: it could only grow by additional crowding. However much we may admire this effect in old towns, let us beware of attempting it in new ones, where the excuse for it no longer



exists. It is a melancholy reflection that the picturesque in towns is too often the insatiable. Look at the bits from old cities which form the staple subjects of architectural pictures in our water-colour exhibitions; you will scarcely find one of them which a right-minded sanitary inspector would not wish to make a clean sweep of. Sanitation first, picturesque afterwards; that is the stern lesson which the modern study of the conditions of healthy life in cities has taught us.

The question of the laying-out of ordinary streets in regular or irregular lines, referred to just now, is partly affected by sanitary considerations. At all events curves should be avoided unless of very large radius. The concave side of a row of houses built in a curve of comparatively small radius is likely to be deficient in circulation of air as compared with a straight row. Crescents are charming in effect, but not sanitary. For a similar reason houses arranged in a square or quadrangle should always have the angles open; which fortunately is generally compulsory, on account of street access. Slight curves of large radius do not affect the question in a sanitary sense; so here the question comes in, are we aesthetically justified in deliberately laying out an ordinary street in winding lines for the sake of effect? The great beauty of this results from the manner in which buildings such as church towers, which would otherwise be side objects in the vista, come out to the centre of the view. This is what makes much of the effect of High-street, Oxford, which has been immortalised in Wordsworth's fine line—

"The stream-like windings of that glorious street."

But the effect of High-street is a spontaneous, not a contrived effect; and I cannot help thinking that if one proceeded to do it over again deliberately, there would be a sense of unreality and pretence about it; the fact that it was not spontaneous would be sure to force itself on one's notice. My conclusion would be that any such varying of the line of a new street for effect should appear as part of a definite scheme; a curve introduced to bring an important building into the view for instance, and with that evident object; in short, that being an artificially-contrived effect, it should appear so, and not pretend to be a happy accident. And one more caution in regard to street architecture, much needed at present, is not to carry the buildings too high in relation to the width of the street. The same height as the total width of the street ought to be the extreme limit, and a lower proportion than that is far better. A street flanked by buildings higher than its width becomes only a magnified alley.

Cities of moderate size (not, like London, an immense tract of country covered with houses), it is well to endeavour to lay out streets, where possible, so as to introduce into the vista some point of interest or beauty in the surrounding landscape, thus connecting it with the city. Even in London something like this is possible, for the remark was suggested to me by an incident in connexion with one of the longest, straightest, and dullest of the London streets of the Georgian era, Gower-street, which the cockneys call "Gow-er-street," and in which it is at present my lot to live. Not too often, but on every day when the London atmosphere is clear enough, I have a vision down this street of a green or purple hill, according to conditions of light; Hampstead Hill, which just fills up the end of the vista between the two rows of brick. I am afraid I should quarrel with any one who proposed to place even the very best-designed building so as to shut out that little vision of Nature's light and colour.

The whole subject is of course susceptible of almost endless development and illustration in detail. I have here only attempted to touch briefly on the leading principles which I think should be kept in mind in regard to the treatment of city buildings and streets from a purely architectural point of view.

#### Municipal Legislation with Reference to Architecture.

Sir James Gowan, Lord Dean of Guild of the City of Edinburgh, contributed the following paper on this subject:—

In so far as this country is concerned, there is no legislation which practically bears on the subject of this paper. The origin of legislation elsewhere, so far as I can find, appears to have begun with the Roman *Ædile Court*, founded some 500 years before the Chris-

tian era. Of this court Prof. Hunter, in his book on Roman law, says, "The jurisdiction of the *Ædiles* seems to have been limited. They had the management of the local Police and Public Works." This general expression, however, it is well-known, covered a good deal of control, and however it may have been extended, and in its ultimate effect exercised, throughout the civilised world by Masonic Crafts, Guilds, Municipal Authorities, and otherwise, it cannot be doubted that every city in Christendom bears marks of its beneficial architectural operation. My reading does not cover a knowledge of all the powers exercised by Continental States during the centuries, of an *Ædile* description. It is well known, however, that the municipal administration of the cities of France, including Paris, has an unlimited sway over the treatment of the exterior of buildings, including the style of architecture, the character of the elevations, &c.

The Courts of the Dean of Guild in Scotland have not by common law, or by statute, any direct control in questions concerning the style of architectural treatment to be adopted, or the kind of material to be employed in the construction of buildings,—their functions being limited, though somewhat varied between "lining," as it is called in Glasgow, that is fixing the lines or boundaries of adjoining properties, and in Edinburgh to questions specially of stability and sanitation.

The Municipalities, as distinguished from the Dean of Guild Courts, have no other power (if power it can be called) than that of the negative one of restricting the height of buildings, and setting back the lines of properties causing obstruction when these happen from demolition to afford an opportunity of correcting the line of frontage, at the public expense. Even this power I am unable to trace further than the Police Act of 1848. It may be interesting to notice in this connexion that so long ago as 1424, in the reign of James I., statutes were enacted which enforced that buildings should be restricted to two stories in height, with dormers, or three stories at the utmost, from which it appeared that 22 ft. ladders were considered long enough for use in case of fire, in all burghs in Scotland. This, again, is no doubt the origin of the existing law of keeping back buildings on public highways a distance of 25 ft. from the centre of the roadway.

In England, Manchester and Liverpool, and probably other cities, have restricted special powers, relating to the architectural treatment of buildings which are to be erected on ground which may have become the property of the Corporations, and the same power seems to rest in the hands of the freeholder in London and the superior in this country, who, under their leases or feu-charters, as the case may be, preserve a right of approval of the buildings to be erected in their grounds. This, however, is not more than in any case can be stipulated by the superior or feuar of a property as a condition of granting the conveyance.

In this city, under the Improvement Act, the Commissioners, whose powers have just terminated had the control in all such matters, and this was exercised, as may be seen, with beneficial effect. Generally, however, neither our Town Council nor the Dean of Guild Court have any control over the architectural features of buildings, so far as the exteriors or elevations of the same are concerned.

In England there is no jurisdiction corresponding to that of our Dean of Guild Court, and such architectural authority as they have is necessarily exercised by the whole municipal corporation. This, according to our Scottish lights, is a clumsy and impracticable way of disposing of such business. In Edinburgh such a course would be a waste of time.

What I have said naturally leads directly up to the question of whether it is desirable in the interests of communities that legislative power should be got for controlling the architecture of buildings, or defacements of an injurious kind, and how it should be effected.

Nobody will suggest the subversion of our Courts of Guild, probably the most ancient municipal institution of which we are possessed. The members of these courts, as at present constituted, are elected in virtue of the practical and theoretical knowledge which they possess concerning the stability of structures and the science of sanitation. Such a court as we possess in this city could not, and would not, profess to deal with questions of taste, that not being their province, and, probably, the com-

munity would not readily acquiesce in their judgment. At present all they can do, where they perceive the intention to commit any glaring architectural outrage, or to deface or destroy what is good in existing buildings by the use of incongruous materials or otherwise, is to remonstrate with the petitioner or architect; but it can easily be seen that this course, in many instances, is at best but a negative effort. There are occasional outbursts, through the press, when anything offensive to the public occurs; but these complaints generally come too late, when protest is in vain.

It must occur to any one who gives a moment's serious thought to the question, that Edinburgh, with its superb situation, naturally affords to architects the fullest scope for the production of fine and beautiful architectural effects,—and how much they have it in their power to heighten or mar its beauty! It has often been said—well said—that her face was her fortune, and every citizen who values her good looks, as afforded by nature, deprecates the monstrosities that are now and again erected within our precincts.

Taking a stand at the top of the Mound, at a point where the spires of St. Cuthbert's and St. Mary's come into line, no one can withhold their admiration of the beautiful prospect which here meets the eye. On the left we have the grim and powerful outline of the Castle Rock, standing sentinel, as it were, over the valley below. Letting our gaze travel westwards over the distant portions of the city, we experience a feeling of proud satisfaction as we take in the harmonious grouping of the various towers and domes, but as we turn nearer home, to Princes-street lying on our right, a sensation of restlessness comes over us, and as the eye reaches the sky-line, of what should be the most beautiful street in the world, we are forced to admit that for want of some broad controlling power, the beauties of the situation have been sacrificed, and many deplorable features allowed to creep in. Most of the gable ends adjoining Princes-street are totally wanting in architectural treatment, and obtrude themselves unpleasantly on the eye, making one regret that those who showed themselves capable of designing pleasing fronts should not have thought it worth while to give the same, or at least some, attention to the gable-ends and backs, while the collection of chimney-stacks of all shapes, sizes, and heights, eked out with every monstrosity which goes under the name of a cowl, makes one turn away from the contemplation of the scene with a sigh for what might have been, and a groan for what is.

With a few exceptions, many of these erections are loaded with expensive carvings of a very rude description, and to show what a properly-educated architect can do without going to a needless expense with elaborate carving, and how much depends on due proportion and a refined taste, I cannot be wrong in pointing out the New Club as a building dignified and assertive in its repose, and worthy of being studied by every student of architecture.

The same may be said as to the buildings in the suburbs of the city, where some superiors appear to value the amenity of their ground, and the architects who lay it out, and who have the passing of the plans of feuars, are careful not to allow anything very objectionable to be built; others, again, seem to care for nothing but covering their ground, and so securing their feu-duty.

Having said so much as to the desirability of some control being exercised over buildings, I come now to consider how this may be effected.

I somewhat shrink from stating my views as to how this is best to be done, as, no doubt, the difficulty would be to get a body of men of acknowledged architectural taste and artistic education as a court of appeal in whom the citizens would have confidence; but I throw out the suggestion that architects and others would be safe if powers something like the following were got and wisely exercised:—

First, to confer upon the Dean of Guild Courts at least negative power with regard to the proper architectural construction of buildings. That is to say, that the Court shall, in the first instance, decide whether any building is in itself, or in relation to its architectural or natural surroundings, or other considerations, objectionable and affecting public propriety and interest, and that there be, if it is desired, an appeal to a court of taste to be constructed of, say, the following:—The Principal of the University, Professor of Architecture (if such a



chair could be established), Professor of Art, President of the Royal Scottish Academy, Chairman of the Board of Manufactures, Chairman of the Cockburn Association, and the President of the Architectural Association.

But second, and of not less importance, let it be enacted that only architects having the guarantee of professional knowledge and ability authenticated by their position as members of an Architectural Association, constituted by law, equivalent in its own department to that of Law or Medicine, should be privileged to prepare plans for the Dean of Guild Court.

As matters stand, while the most trivial petition to sanction a plan is in most cases presented by a qualified Procurator, the plan may be the production of any person who has had no training to qualify him as an architect. This is no exaggeration, and the fact remains that men entirely destitute of any enlightened ideas of architecture are constantly employed to carry out what they are radically incompetent of doing.

I would observe here what I have again and again pressed for in addressing the architects of this city, that their profession will never have the status that it is entitled to until a Professor of Architecture is established in our University or attached to the Royal Academy under their new charter. In this way young aspirants to architectural fame, in addition to serving a regular apprenticeship or pupillage to a properly-qualified practitioner, would have to undergo a course of study, applicable to their profession, and they should have a diploma showing that they had so qualified themselves. By this means you would secure men who had undergone a proper training, and who would understand the elements which produce good architecture. Thus you would be more likely to get true form and proportion, so that the unsightly and distorted buildings we now see erected would become things of the past.

In conclusion, and referring again to our city, it may be worth while to notice what has been done to enrich its natural beauty by designs of great architectural merit. Elliot's east end of the Prison Buildings, Waterloo-place, St. Paul's Church, and County Buildings, Hamilton's High School, Burn's New Club, and Bryce's Buildings all over the city, Playfair's Donaldson's Hospital, and works on the Mound, St. Stephen's Church, and last, not least, Kemp's Scott Monument, all show that men of high class in the past, with scholarly attainments, have regarded the natural advantages of the respective situations, and in most cases have taken inspiration from studying the splendid sites the city affords. A continuation of like effort and good result in the future we may look upon as assured to us if we view the works erected more recently, but the greater aim of the future should be so to raise, by proper instruction, the standard of architectural skill and artistic ability, that even the least of the many works the architect has to deal with may give evidence of having received intelligent thought and care in its treatment.

Artistic excellence is a quality that may not be found in all who seek to pursue an architectural career, but even where that is wanting its absence can at least be condoned if there is shown to be a knowledge of the history of architectural forms and proportions sufficient to save the design from being offensive. To secure this it is necessary to have—first, a more complete equipment of education special to the architect; and, second, to have legislative authority vested in such a body as has been named whose neutral composition and discriminating judgment would lead up to a higher estimate of and appreciation for the fitness of things in architecture.

The conclusion at which I arrive is,—that more extended and effective powers than now exist should be vested in some responsible authority, and that one means, and an essential one, is, that the profession of the architect should be authoritatively placed on a higher and more responsible position than at present.

#### *The Influence of the Public Authority on Street Architecture.*

Mr. Thomas Blashill, Architect to the London County Council, submitted the following paper, which was read for him in his unavoidable absence:—

The question of interference by the public authority with the architecture of our streets touches the whole of us more or less. That my house should not burn is of almost as much

importance to my neighbour as it is to me; that its front should not fall out into the street may be of vastly greater consequence to the man in the street than to myself. These are practical considerations; beyond them is one that may be called sentimental, but is hardly of less interest. So long as the fabric is secure, the owner, and even the occupier, may be absolutely indifferent to its external appearance, though that shocks the artistic sense of the town. In every decently-ordered community questions of security are dealt with by the law, but the question of sentiment is neglected, or dealt with only indirectly, and by chance.

The Metropolitan Buildings Acts, under which London grows and is renewed, contain important provisions as to structure and, indirectly, as to design. The use of combustible materials in external walls is all but prohibited; the area of the door and window openings in the outer wall is limited to one-half the whole area of the wall; in new streets less than 50 ft. wide, the height of the front must not exceed its distance from the opposite side of the street, unless the "public authority" otherwise permits; the same sanction is required for projections beyond the face of the wall, whether they stand upon your own forecourt or overhang the public way. So that we have, indirectly, some very considerable restrictions placed upon the architect in matters of design. They close to him whole chapters of the most charming and interesting architecture in Europe. That the old timber buildings, or parts of them, are often imitated in cement and in iron, shows how impatient he is of such limits. The desire for picturesque irregularity is shown by the constant and increasing pressure on the public authority for leave to throw out projecting hoods and balconies, turrets and bays. A public body with a soul and a sense of humour would look kindly on these strivings after the quaint and the beautiful, and would rejoice when it could safely break the monotony of refusal and compulsion by gracious, sympathetic consent.

The building regulations of many English towns are founded upon those of London, without going quite so far in the direction of restraint. Those of the chief Continental cities generally go somewhat farther, especially in respect of the heights of buildings. Thus, in Paris the front wall cannot, in the widest streets, be carried higher than about 65 ft.; in Vienna the height of dwelling-houses may not, as a rule, be more than about 77 ft., while the floor level of the topmost story must not be higher than 62 ft., nor may there be more than five stories in the height of the house. In London no limit of height is actually fixed, so that a wall may be carried as high as 100 ft., and as much higher as the public authority may permit. In Sweden the regulations seem to touch the question of taste in a rather important way. The front of a house must not be painted white, but some colour inoffensive to the eye. In other respects, the Continental regulations are generally more restrictive than ours—except as to balconies, the width of which, to the extent of about 4 ft., is legalised; while with us this (one of the most romantic features of the elevation) has, in every case, to pass through the chaste fire of the public authority, particularly if it overhangs the public way.

These are the fetters with which it has seemed necessary to check the free exercise of fancy in architectural design. That (in so many instances) elevations rich, varied, and beautiful, are produced, is evidence of the skill with which these designs are treated. But within those limits the building-owner is free to do as he likes. He may erect on the finest site in the town a façade fit only for a back street or a back yard; that he so often refrains from doing this is evidence of the moderation of his class. The question whether he should be allowed to exercise his free will in this particular is often asked on behalf of taste and the beauty and dignity and interest of our street architecture; and it is no doubt well occasionally to ask it.

Of the qualities that we may desire in a design, is it not above all necessary that it shall be interesting? It is not ornament that is needful,—of that there is often enough and to spare,—nor any strict proportion, nor even beauty. All these and other characteristics,—even the quaint, which is often but thinly partitioned from the ugly,—may be but items in a greater whole, and means to an end. The design should interest and arrest the attention. It may even do more. There are buildings that

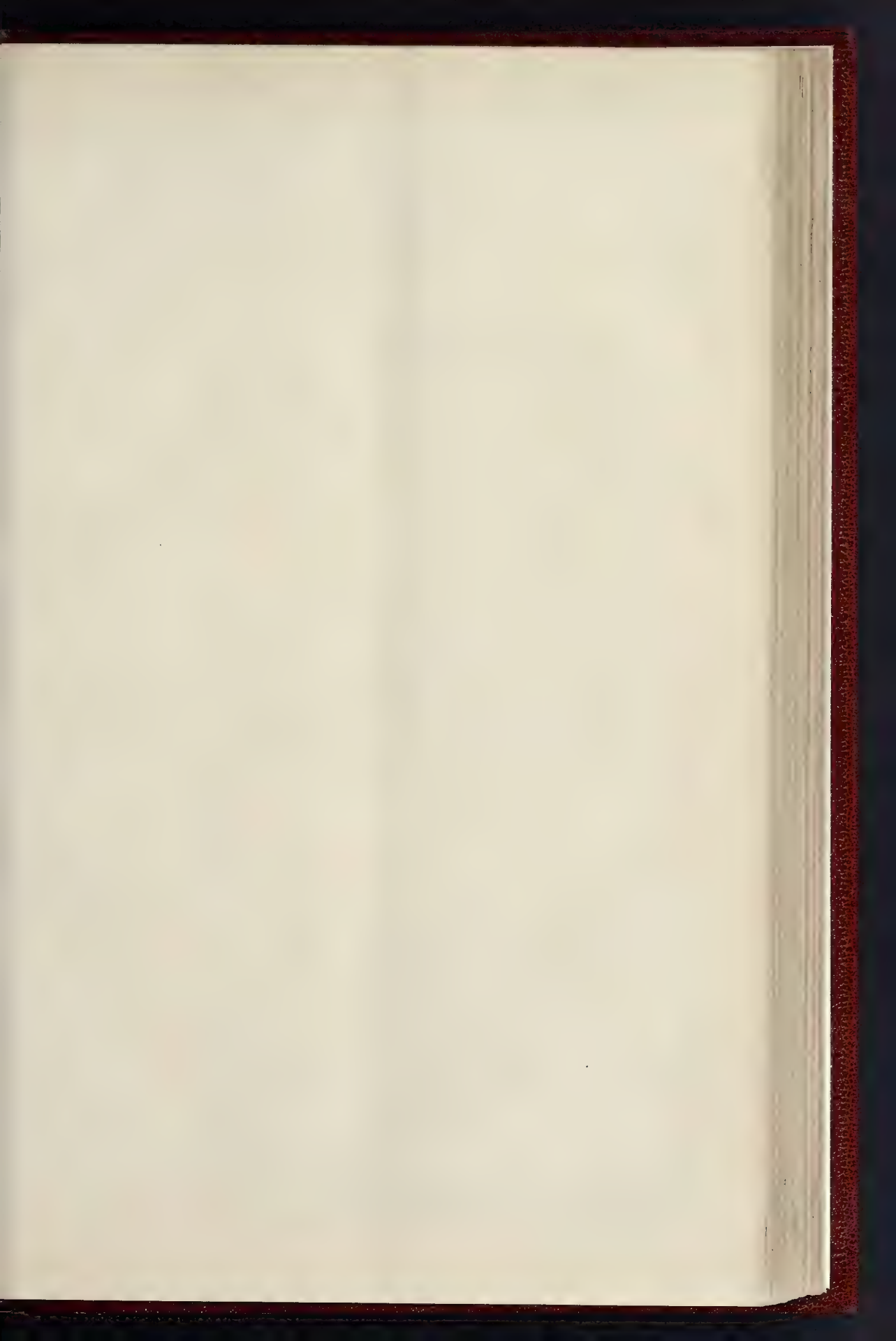
one gladly goes out of the way to see, and which we hope that other generations will reckon amongst the good things done in our time.

Would the interest of our street architecture be assured, or materially enhanced, by laws or by-laws? A good deal might be said for and against the idea. To compel a man to build securely will seem no unendurable hardship, even in his own eyes; but to make your neighbour build, not for his own pleasure, but for yours, is to touch him to the quick. The temptation to do this is, however, innate, and hard to resist. Next to the desire to do as I will with my own, is the desire that my neighbour should do as I will with his own—a sentiment by no means incapable of defence. He occupies a frontage upon the public street, which may be an exceedingly valuable privilege. Surely we may call upon him to construct his building with some regard to the public sense of fitness for such a position? His neighbours may fairly expect that he will be neighbourly enough to do something beyond mere necessary work for the public good; something that will not only give pleasure to the townsfolk, but help to spread the fame of the town. At the very least, he should refrain from doing anything to vulgarise and disgrace it.

But when we try to bring these ideas into working form, the difficulty begins. There must be some sort of censorship armed with power to reject and to compel; able to see, and not afraid to say, that one design is too poor for the position, that another is radically bad, and that a third is discordant with its surroundings. And it must not make too many mistakes. To form such a tribunal on a satisfactory basis seems to require a rather considerable command of a very rare and precious commodity. Taste—that divine endowment, the possession of which has the power of seeing clearly how another person ought to look and act; and of saying, after the event, what the responsible, but unilluminated, doer ought to have done—a good deal of that is wanted here. Scoffers will ask how we can expect to find this quality in bodies of persons selected on account of their views as to roads and drains and finance, or the proper way of ordering the universe. And the scoffer might be, for an odd time, in the right, if taste were only the result of some special process devised for that particular end. But is it not rather (I ask so that I may be informed) a sort of by-product evolved during the development of many different forms of capability? I am more clear that enough of it will be found if it should be wanted than that it could be usefully employed in the way I have suggested for consideration.

Let us try to take the measure of the necessity for such control. I am not sure that it is absolutely new, but there is very little experience of it. The picturesque architecture at home and abroad, which furnishes models for our instruction, was, as a rule, produced without it. There is, however, some considerable experience of the influence of the public authority, in various countries, over street frontages that have come under its control owing to the improvement schemes which it has promoted. It is, perhaps, as a whole, the baldest and least interesting architectural work of modern times. It is void of the individuality which comes of the special requirements of each building-owner and the particular views of different architects. It runs into endless façades of cold, academic correctness, in which nobody takes the least interest, until the effect becomes wearisome to the eye. It may be richer, but it is hardly more interesting than the miles of streets and squares that were built to the approval of the London ground landlords of three generations ago. At that time architecture, as an art, was at least asleep, it has been, on very fair authority, certified as dead; after two generations of vigorous shaking it has been aroused and now shows undoubted signs of life. In the earlier time no controlling body with a character at stake could have permitted the introduction of any of the forms of architectural design which will stand, if not to the glory, at least to the credit of our time. It would be an exaggeration to say that we should still have been building Greek or Roman façades, and putting the greatest diversity of everything behind them, as it would best fit in. The artistic worm would in time have turned even under that iron heel. But no one can answer for the consequences if only one generation ago public authorities under the best advice had been charged with the responsibility of seeing that the architecture of our streets was kept free from offence





# Sketches at the Arts and Crafts Exhibition

852

Wrought-iron Sign  
by Shirley & Co.

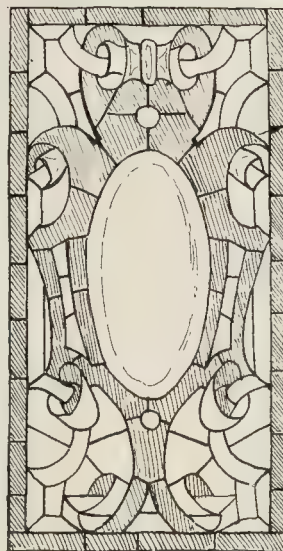
282

Music Cabinet — by W.A. Benson.

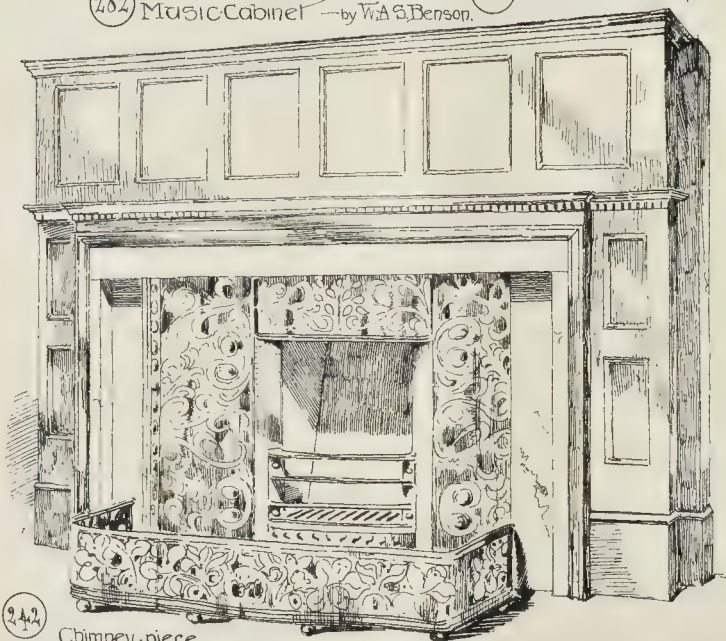
594

A Vase  
Doulton-ware  
Salt-glazed

64

Copper  
Repoussé  
Platé — by  
John Pe

610

Leaded Shield — in Venetian  
& bevelled Plate glass.

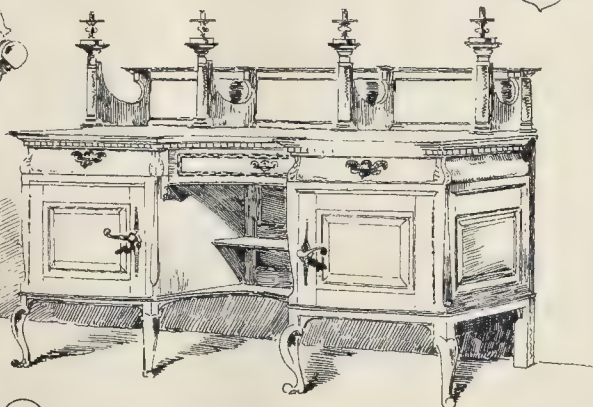
242

Chimney-piece  
by Longden & Co.

523

Lustre  
Figure panel





Crane - Border by Lewis F. Day.





to the eye of taste,—the taste of those in power. We were then in the thick of the "battle of the styles," when a man's views as to the manipulation of brick and stone stamped his public character and influenced his private friendship, and when a variation in architectural manner was a lapse from faith. We know our actual condition, and that it might be better. It is not too often that a building, or a group of buildings, really arrests and interests one by its beauty or by any of the other characteristics that give value to a design. But it is not so very often that such effects are produced by the architecture of any other country or time. Individuality is a rich mine that should not be over much cramped by authoritative inspection. Undoubtedly, the modern tendency towards those styles that come under the name of "free classic," has given a death-blow to the cold and formal mannerisms of those who worked in the purer styles, and has lit up our streets with designs which, if they often amuse and sometimes amaze, do, upon the whole, greatly contribute to the adornment and the interest of the town.

Nobody can suppose that the action of the public authority could, by special regulation, produce the beautiful or the interesting, though it might repress or prohibit the commonplace, the ugly, and the incongruous. But while we are asking this question, the need for such repression is growing less. The public interest in architecture and the power of satisfactory design are increasing side by side. The pottering attempts of old writers upon architecture to describe a building, old or new, have been entirely superseded by illustrations that speak all languages with a fluency and abundance of detail that could not have been imagined thirty years ago. This is immeasurably to the credit of our architectural press, and exercises the strongest influence on design. It cannot create genius, but it informs and instructs, fostering talent, stimulating fancy, and depriving ignorance of excuse. If an entirely incompetent designer should suffer rejection at the hands of an authority of any kind, I do not think he could greatly complain. The danger we run is from possible intolerance or caprice, or too great impatience of mediocrity. If we and our friends are of the elect, we stifle our pity for weaker vessels? A friend of mine gets sickness at the sight of a certain building, the design for which he thinks I might have caused to be rejected. It was the fourth design that was submitted for the site, and, being only human, I may have become rather weary of refusal. But he forgets the grave responsibility I have incurred. Who knows that there did not lie in one or other of the rejected sketches the germ of the architecture of the future, and that I may not have been instrumental in strangling, ere its birth, the new style?

The greatest length to which the law has hitherto gone in London in the direction of care or appearances is in the 17th section of the Act of 1862, which relates to structures that are simply neglected, but not dangerous. Where they have got into a "structural condition prejudicial to the property or the inhabitants of the neighbourhood," the owners may be compelled to put them into repair. To prevent the erection of an unsightly building is but a step, though a long one, beyond this provision; perhaps in a more sensitive age that step may become necessary to the comfort of the public, and the ingenuity of our legislature may be sufficient to bring it into the form of law. But, after all, are we not pursuing a shadow? What is the utility of art as applied to the architecture of our streets if, from the moment when it is displayed for a transient admiration, it begins to be covered, not with the hues of age and weather that would mellow and glorify it, but with the filth of the town atmosphere and the worse defilement arising from the streets? It will be difficult and, may be, impossible, to purify the air, but the houses call aloud for the cleansing hand. And I am disposed to think that a people that does not take care of the art which it has got is not very likely to reach, either by voluntary effort or by any sterner process, any very important position in relation to the art of the future.

[Of the further proceedings of the Congress we defer notice until next week.]

**Institute of Painters in Oil Colours.**—The "private view" of the exhibition of this institute is fixed for this day, Saturday, Nov. 2.

#### THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday afternoon last in the Council Chamber, Guildhall, Lord Rosebery in the chair.

**Loans.**—On the motion of Lord Lingen, on behalf of the Finance Committee, a resolution was passed authorising the Council to raise a loan by the issue of 1,000,000. Metropolitan Consolidated Stock (the stock to carry interest at 2½ per cent. per annum, and to be repaid at the end of sixty years, or, at the option of the Council, at any time after thirty years from the date of issue, provided that one year's notice of such repayment shall have been previously given), for purposes of expenditure authorised by the Metropolitan Board of Works (Money) Act, 1887, the Metropolitan Board of Works (Money) Act, 1888, and the London County Council (Money) Act, 1889.

**Appointment of a Valuer.**—Sir John Lubbock brought up the report of the Standing Committee, the first paragraph of which was as follows:—

"The Council on July 9 last resolved to appoint a Valuer, at 1,000*l.* a year, directing at the same time that an advertisement should be issued inviting applications for the appointment, and that your Committee should, after conference, if necessary, with other Committees concerned, report to the Council the candidates whom they considered most suitable. Your Committee have now to report that, with a view to complying with the direction of the Council, they referred the applications, twenty-four in number, to a joint Committee consisting of three members from each of the following Committees, viz. the Improvements Committee, Bridges Committee, Corporate Property, &c., Committee, and the Local Government and Taxation Committee, together with a sub-committee of the Standing Committee, with a request that they would indicate the three candidates whom they might consider the most suitable for the appointment. The Joint Committee, having carefully examined the applications, have, after a personal interview with seven of the candidates, selected three. Your Committee have seen these three gentlemen, and weighed their respective merits and qualifications, and they now submit their names to the Council in the following order.—Mr. A. Young, Mr. G. M. Moyes, Mr. W. Rex. They recommend—

"That Mr. A. Young be appointed Valuer to the Council, at a salary of 1,000*l.* a year; that his duties be those set forth in the minutes of the Council of July 9, with any others that may hereafter be prescribed by the Council; that he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office, and be not allowed to take any private practice; and that on retirement he be not entitled to any superannuation or pension."

After some discussion, the recommendation of the Committee was agreed to by a large majority. Later in the afternoon Mr. Young appeared on the dais and expressed his thanks to the Council for conferring this important appointment upon him, saying that it would be his endeavour, as time went on, to prove that the Council's selection was a wise one.\*

**Subways.**—The Highways Committee presented a report containing the following recommendations:—

"That, subject to the recommendation of the Finance Committee that the necessary costs be incurred, it be referred to the Parliamentary Committee to prepare and introduce into Parliament in the ensuing session, a Bill conferring the following powers, amongst others, upon the Council as to subways, viz.,—

1. To construct subways of such form and size in such thoroughfares or streets, and at such convenient times, as the Council may deem desirable.
2. To compel owners of gas and water or other pipes and wires to use subways where made, and to remove existing pipes and wires into subways.
3. To charge rent for use of subways, and grant use of subways free for a given period as compensation in cases of compulsory removal.
4. To acquire, by agreement, the whole or portions of vaults or cellars under public streets when required to enable subways to be constructed.
5. To alter, for the purpose of construction of subways, the position of sewers, pipes, wires, or other works in streets, on payment of actual cost only of structural alterations.
6. To call upon gas and water and other companies to supply plans and full particulars of any pipes, wires, or other works belonging to them in any streets along which it may be suggested that subways should be laid.
7. To call upon gas and water and other companies to deposit plans and obtain the approval of the Council for

\* Mr. A. Young has been for many years the Surveyor to the School Board for London, a post which will thus become vacant.

any proposed alteration, renewal, extension, or addition to existing pipes, wires, or works in any thoroughfare or street.

8. To remove all disused pipes or works in public streets.
9. To make regulations for the use of subways."

In the course of the discussion, Mr. Councillor Haggis, the Chairman of the Committee, gave statistics of the thousands of openings made in the streets every year by gas, water, and other companies, to the great detriment of the proper maintenance of the roads, and stated that the subways already existing in the metropolis were about four miles in length, and had cost about 90,000*l.* to construct. Although these subways were made, they had at present no power to compel the companies to use them, and, as a consequence, they remained practically unused. Mr. Haggis observed that in all probability the Council would, sooner or later, have to control and maintain all the main roads of the Metropolis, and they would then find that the construction of a good system of subways, though expensive in first cost, would be truly economical in the long run. Eventually, the recommendation of the Committee was adopted.

#### A Proposal to Build on an Open Space.

The Parks and Open Spaces Committee reported that they had had before them a letter from Mr. J. H. Allen, the chairman of the Committee for Technical and Recreative Institutes for North London, stating that the Duke of Bedford had promised to give, free of cost, as a site for an institute, the garden in the centre of Goldington-crescent, St. Pancras. It was suggested by Mr. Allen that the Council should purchase the garden for a public open space; and that the Institutes Committee should devote the money paid by the Council towards the purchase of a site of building land in the neighbourhood. After some discussion, in the course of which it was remarked by Mr. Acworth that the Duke of Bedford's offer was a somewhat left-handed one,—a doubt being also hinted by Mr. Phillips as to whether the Duke or his assigns had any power to build over the garden in question,—it was agreed that Mr. Allen be informed that the Council is not prepared to adopt his suggestion, but agrees that it is desirable to keep the garden an open space, and hopes some other site for a technical institute will be found.

#### Inspection of Drains, &c.—The Parliamentary Committee reported as follows on this subject:—

"On the 22nd instant the Council, on the recommendation of the Main Drainage Committee, resolved to make application in the next session for the following powers:—

1. To provide for periodical inspection of drains under houses, by Vestries or District Boards, and for the execution of such works by them as upon such inspection or otherwise may in their judgment seem necessary; a clause to be included requiring that means shall be provided for inspecting and testing house drains.
2. To prevent the construction of basements below the level of sewers, except with the consent of the Council.
3. To prevent buildings being erected in places where there are no sewers, except with the consent of the Council."

Your Committee have inquired very carefully into the existing law, with regard to these matters, and they have arrived at the conclusion that legislation in the direction indicated is altogether unnecessary, especially having regard to the pending question of the establishment of District Councils. A reference to sections 82 to 85 of the Metropolis Local Management Act, 1855, shows that Vestries and District Boards already have the power to authorise the inspection of drains, privies, and cesspools, and to cause them to be put into proper condition when necessary. By clauses 75 and 76 of the same Act, and clauses 63 and 88 of the Amending Act of 1862, the Vestries and District Boards have absolute power to require the construction in new houses of drains, upon any plan or system they prefer, and under section 138 of the Act of 1855, and sections 32, 45, 46, 50, and 51, the Metropolitan Board of Works, and the County Council as their successors, are empowered to regulate the construction of sewers by Vestries, and, by section 202 of the Act of 1855, to make by-laws regulating the construction, cleaning, &c., of drains and apparatus connected therewith. There thus appears to be a complete authority, the Vestries controlling the house drainage, and the County Council the local sewerage system. Instances were mentioned to your Committee of one or two Vestries having enforced these powers, and, looking to the circumstances of the present law, your Committee desire more detailed instructions, being advised that the provisions of a Bill, when the existing provisions are sufficient,



will probably lead to objection and expense, and they recommend:—

"That, in the event of the Council approving this report, the reference made to your Committee on the 22nd inst. be not further acted upon, and that it be referred to the Sanitary Committee to settle by-laws under sec. 209 of the Metropolitan Local Management Act, 1865."

Mr. Councillor Campbell contended that this report amply justified his contention, when the report was previously before the Council, that the Vestries had ample powers, but Mr. Brereton contended that these powers were nominal rather than real, and were therefore largely inoperative. The recommendation of the Committee was agreed to.

**The Proposed Strand Improvement.**—The Improvements Committee reported as follows:—

"The removal of the block of buildings on the south-side of Holywell-street will disclose the frontages of the houses on the other side, which will then become the north side of the Strand, and thereby acquire greatly enhanced value. Your Committee are of opinion that this property should also be scheduled, so that the Council may profit so far as possible by the increased value, or that, in the event of the property being required for further improvements in that locality, the Council should not have to pay the enhanced value when it requires it. Your Committee are of opinion that it would be inadvisable to furnish any separate estimate of the cost. The Council, if it sanction an application to Parliament for the above purpose, will not thereby pledge itself to take the property, the intention of your Committee being to bring the question again before the Council before any steps are taken for acquiring the property. Your Committee, therefore, recommend:—

"That powers be sought in the next session of Parliament to acquire the houses on the north side of Holywell-street, and that it be referred to the Improvements and the Parliamentary Committees to give effect to this proposal."

Mr. Marsland moved, and Mr. Brereton seconded, the following amendment:—

"That whereas the Council has determined by resolution of the 1st October to authorise the Improvements and Parliamentary Committees to take the necessary preliminary measures for the purpose of applying in the next session of Parliament for powers to remove the block of buildings on the south side of Holywell-street, &c., in order to put the Council in a position to deal with the whole of the new line of frontages to the Strand, to preserve the Church of St. Mary-le-Strand, and to recoup some portion of the expense proposed to be incurred, the Improvements and Parliamentary Committees be authorised to include in the said application to Parliament powers to acquire the land and buildings on the north frontage to Holywell-street, sufficient land and buildings on the north side of St. Mary-le-Strand Church, and a portion of the enclosure at the west end of the said church, so as to form a practicable roadway with frontage thereto."

This was carried. In connexion with the same subject the Committee also reported that their remonstrance relative to the long continuance of the unsightly hoarding around the Church of St. Mary-le-Strand had been met by an assurance that it will be removed on November 4.

**Sewer Floodings and the Main Drainage System.**—A good deal of discussion on this subject ensued on two motions standing in the name of Mr. Holmes, the general drift of which is indicated in one of our "Notes" this week.

After the transaction of some further business, the Council adjourned.

#### OBITUARY.

**Mr. Arthur Stocks.**—The death of Mr. Arthur Stocks, R.I., was recently recorded, after a short illness. According to the *Times*, he was born in 1846. He received his education at the Proprietary School, Islington, and on leaving school was instructed for some time by his father, Mr. Lumb Stocks, R.A., in his profession of line engraving; but, showing an aptitude for painting, the son entered the schools of the Royal Academy, then under the Keepership of Charles Landseer, profiting greatly by the instruction received there, and taking some of the medals.

**Mr. William Pitman.**—The death is announced of Mr. William Pitman, senior partner of the firm of Pitman & Son, Newgate-street, which took place at Highgate on the 23rd ult. The interment took place at Highgate on Monday last.

**Architectural Partnership.**—We are asked to mention that Mr. Thomas Verity, F.R.I.B.A., of 11, Jermyn-street, has taken his son (Mr. F. T. Verity, A.R.I.B.A.) into partnership. The "style" or title of the firm (to whom we wish all prosperity) will be "Thomas & Frank T. Verity."

#### Illustrations.

##### HONOLULU CATHEDRAL.

THIS church is being erected under somewhat peculiar circumstances. It was begun so long ago as 1865, but the funds then raised were only sufficient to enable some of the foundations at the east end to be put in, and to provide part of the stonework for the choir and its aisle. This masonry was executed in England, and sent out ready for fixing. Difficulties, however, arose, and owing to these and to other circumstances, the whole scheme was dropped for a time, and the stonework remained in the packing-cases in which it had come out. Matters remained at a standstill until Dr. Willis, the present Bishop, was appointed. The subject was then again taken up, and fresh designs were prepared, but it was not until 1882 that building operations were actually resumed. Since then steady and considerable progress has been made, the whole of the choir, with its ambulatory, having been completed, together with the three eastern bays of the nave.

Up to the present time the expenditure has been about 14,000*l.*, of which amount something like one-fourth has been contributed by members of the Mother Church in England. Funds are now being raised for the completion of the nave and the west front, but an architectural work on this scale progresses but slowly, and is of necessity very costly in an island to which almost all the materials have to be sent from other countries, and where skilled labour is paid at the rate of five dollars a day.

The illustration of the west front is taken from a drawing which was in this year's Royal Academy Exhibition. We will give a plan of the church next week.

The walling is of reefstone, found and worked on the island, but the timber for the spires will probably be sent from the United States; while the roofing tiles, glazing, and ironwork will go out from England.

Messrs. Carpenter & Ingelow are the architects.

##### BRONZE PANEL, S. ANTONIO, PADUA.

As one enters the gates leading into the choir of the gigantic and unique church of San Antonio, at Padua, one sees, let into the choir walls, and polished by frequent contact with the passers-by, four bronze panels, two on each side, the work of Donatello, representing the symbols of the four Evangelists. Our illustration reproduces a drawing, by Mr. Gerald Horsley, of the panel enclosing the angel of St. Matthew. The leaves of the book, some details of the scroll, and the circles on the background are gilt.

##### SKETCHES AT THE ARTS AND CRAFTS EXHIBITION.

THESE sketches give illustrations of several of the objects which we referred to as of special excellence in our article on the Arts and Crafts Exhibition three or four weeks ago (see *Builder* for Oct. 12, p. 253). All the objects represented were commented upon before under their catalogue numbers, which are appended in the illustration; and it is unnecessary to recapitulate here. We have endeavoured to give readers who are unable to come to London to look at the exhibition a more definite idea of the character of some of the work exhibited than mere description in words can convey.

##### DECORATION OF STAIRCASE, 89, QUEEN'S-GATE.

LIGHTNESS being an essential object in this design, the walls were coloured cream-white, the pattern on them being turquoise blue, touched up with gold. In the frieze the running ornament is cream-coloured, outlined in blue on a gold ground. The dado has a raised ornament in gold, on a straw-coloured ground, and a delicate terra cotta pattern decorates the soffit of the stairs.

Particular care was taken in this design in regard to properly filling the space, in order to avoid the ordinary objection of the rakes of stairs, and different heights of steps, cutting off portions of the pattern and forming ugly spandril spaces. The whole work has been specially designed to overcome this difficulty. The whole of the work was stencilled and details filled in. Mr. Edward Bell carried out the work from my design and full-sized details and superintendence.—J. H. EASTWOOD.

#### ARCHITECTURAL SOCIETIES.

##### Birmingham Architectural Association.

A meeting of this Association was held at Queen's College, on Tuesday evening last, when the President (Mr. T. Naden) gave his opening address, in which, after referring to the excellent nature of the papers read at the meetings of the previous session, and the general success which had been the noticeable feature of the Association during that time, he proceeded to describe the present system of education for the profession of architecture, pointing out that the failure of an arted pupil to acquire a sufficient knowledge of the wide range of subjects which it was necessary for him to study might be due to his own or his master's carelessness, but that his success invariably depended upon his own determination to avail himself of all the opportunities of gaining experience which might come within his reach. Mr. Naden then passed on to review the subjects which an architectural student should endeavour to master, and to lay down the general principles which should guide him in his studies. Several other gentlemen having spoken, a hearty vote of thanks was unanimously passed to Mr. Naden for his able address, to which was coupled an expression of the pleasure with which the members welcomed him as President for a second time.

**Manchester Architectural Association.**—The annual *conversazione* of this Association was held on the 22nd ult., in the Lecture Hall of the Athenæum. There was a large attendance of ladies and gentlemen. Drawings illustrative of the architectural work of the past year were hung on the walls, and there were also exhibited a large number of specimens of work by various manufacturers. The annual address was delivered by the President, Mr. J. H. Woodhouse, who said that the *conversazione* inaugurated the fifteenth session of the Association, which now numbered eighty-four members.

#### ENGINEERING SOCIETIES.

##### Association of Manchester Students of the Institution of Civil Engineers.

The opening meeting of the sixth session of this Association was held on the 23rd ult., at the Athenæum, Manchester. The President, Mr. J. Proctor, M.Inst.C.E., in the chair. The untimely death of the Past President, Mr. R. Vawser, M.Inst.C.E., who had been one of the best helpers of the Association, was referred to, and a vote of condolence with his family was unanimously adopted by the meeting. The President then gave his inaugural address, in which he drew attention to the objects of the Association, and to the education and training necessary to make good engineers, such as a knowledge of chemistry, geology, and the various branches of the drawing department, &c. He remarked that the usefulness and importance of the Association could not be over-estimated. He hoped that before long a paper would be read as to the cause of the high death-rate in Manchester and other towns, with suggestions as to the best means of reducing the same. Referring to the question of the purification of rivers, he expressed the opinion that action should be taken against owners of works on the rivers, as well as against local authorities. In conclusion, he drew attention to the excellent syllabus that had been arranged for the session. A vote of thanks was proposed by the hon. sec., Mr. A. D. Greston, M.Inst.C.E., seconded by Mr. A. W. Lawton, M.Inst.C.E., and carried unanimously, to Mr. Proctor, for his instructive and interesting address.

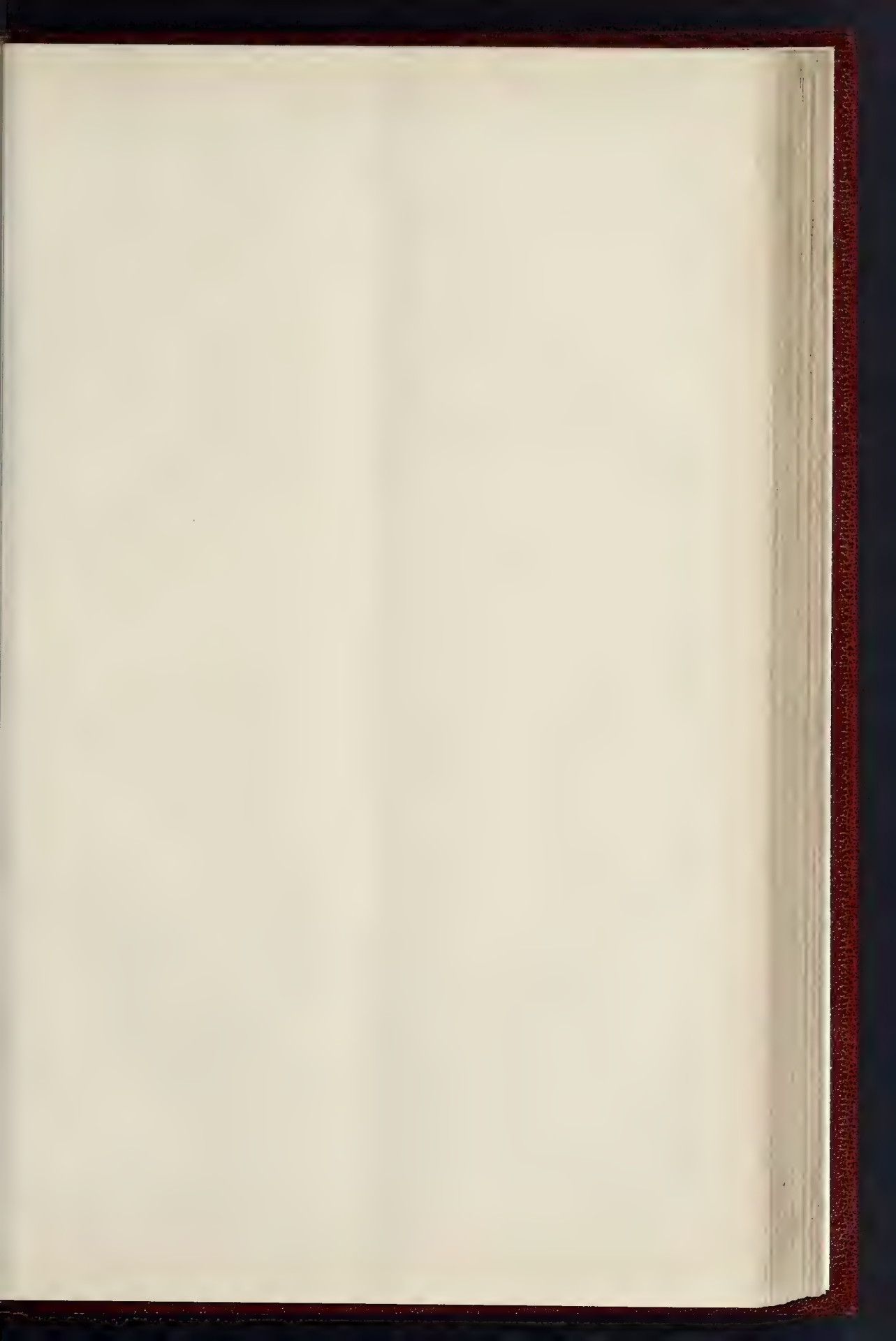
##### Liverpool Engineering Society.

The third ordinary meeting of the sixteenth session of this Society was held on Tuesday evening, in the Royal Institution, Colquitt-street. Mr. H. H. West presided. The principal business of the evening was the adjourned discussion on Mr. C. H. Beloe's paper entitled "Purification of water and sewage by the magnetic spongy carbon process," read to the Society on May 1 last.

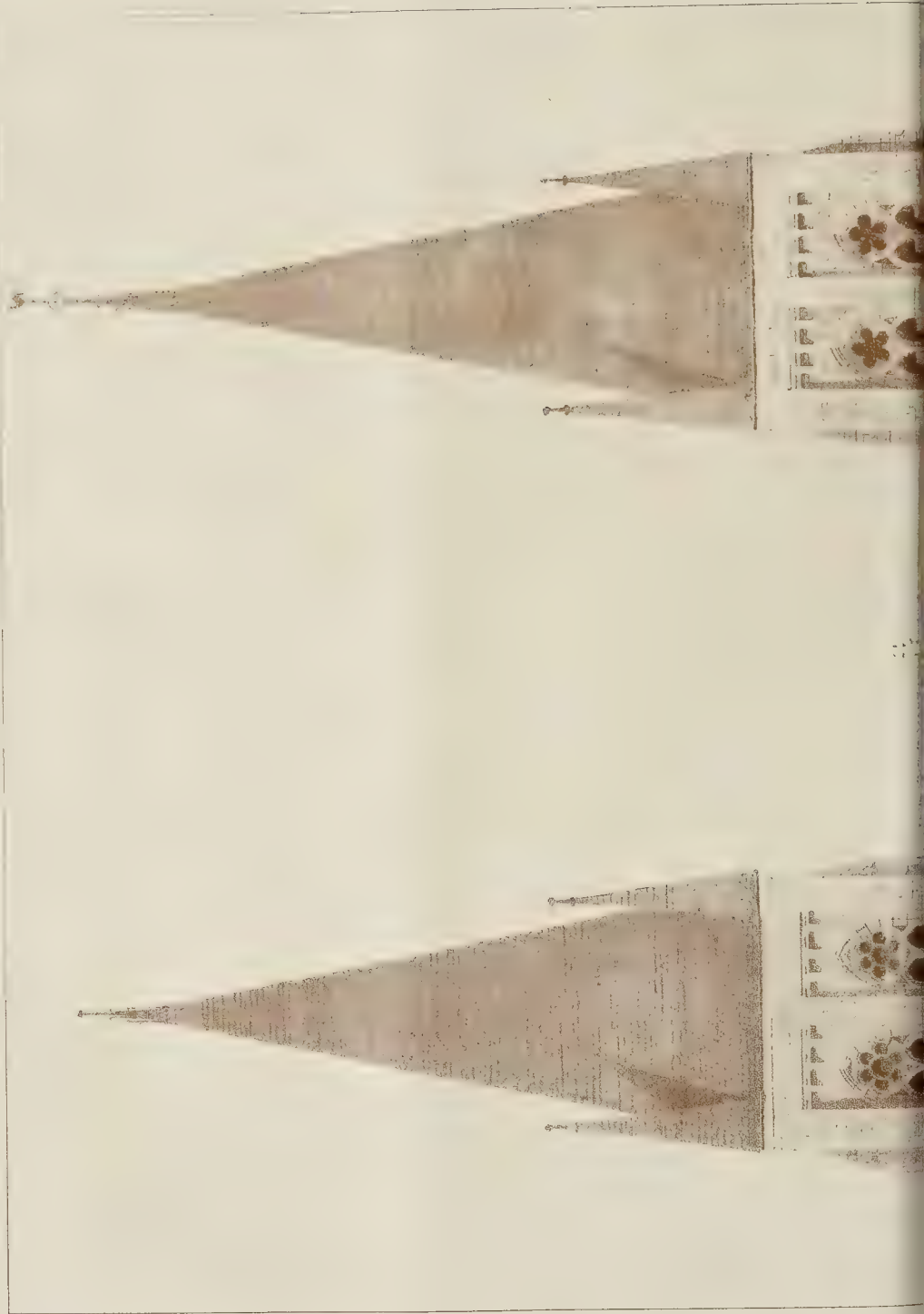
##### Jerry Building in Stockholm.

—The other day a three-storied dwelling-house in Stockholm collapsed, and examination showed that it had been erected upon a layer of clay, over-lying rock, without substructure of piles or solid fundamental work. Other houses on the same site are in a dangerous state.

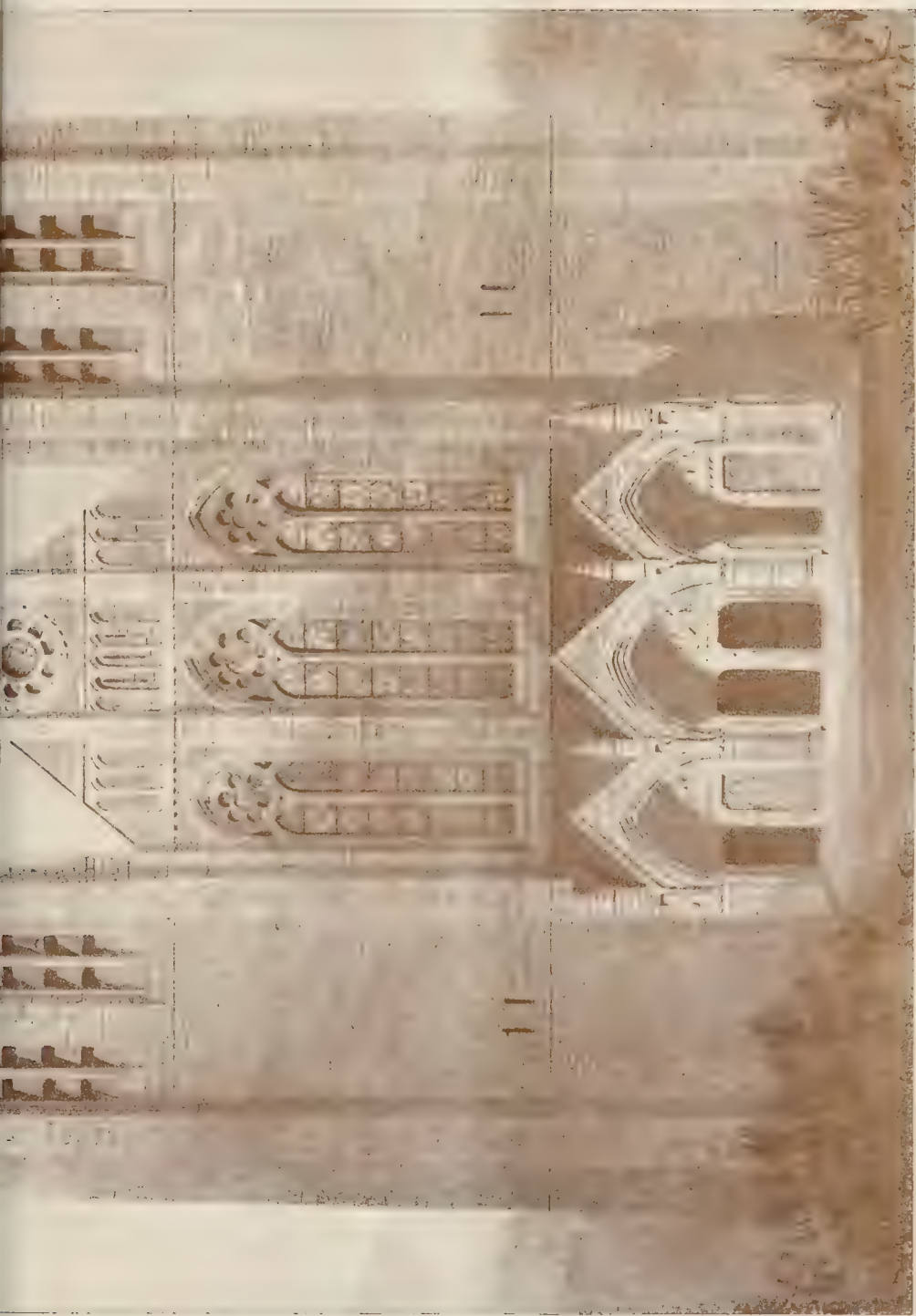




THE BUILDER, NOVEMBER 2 1889



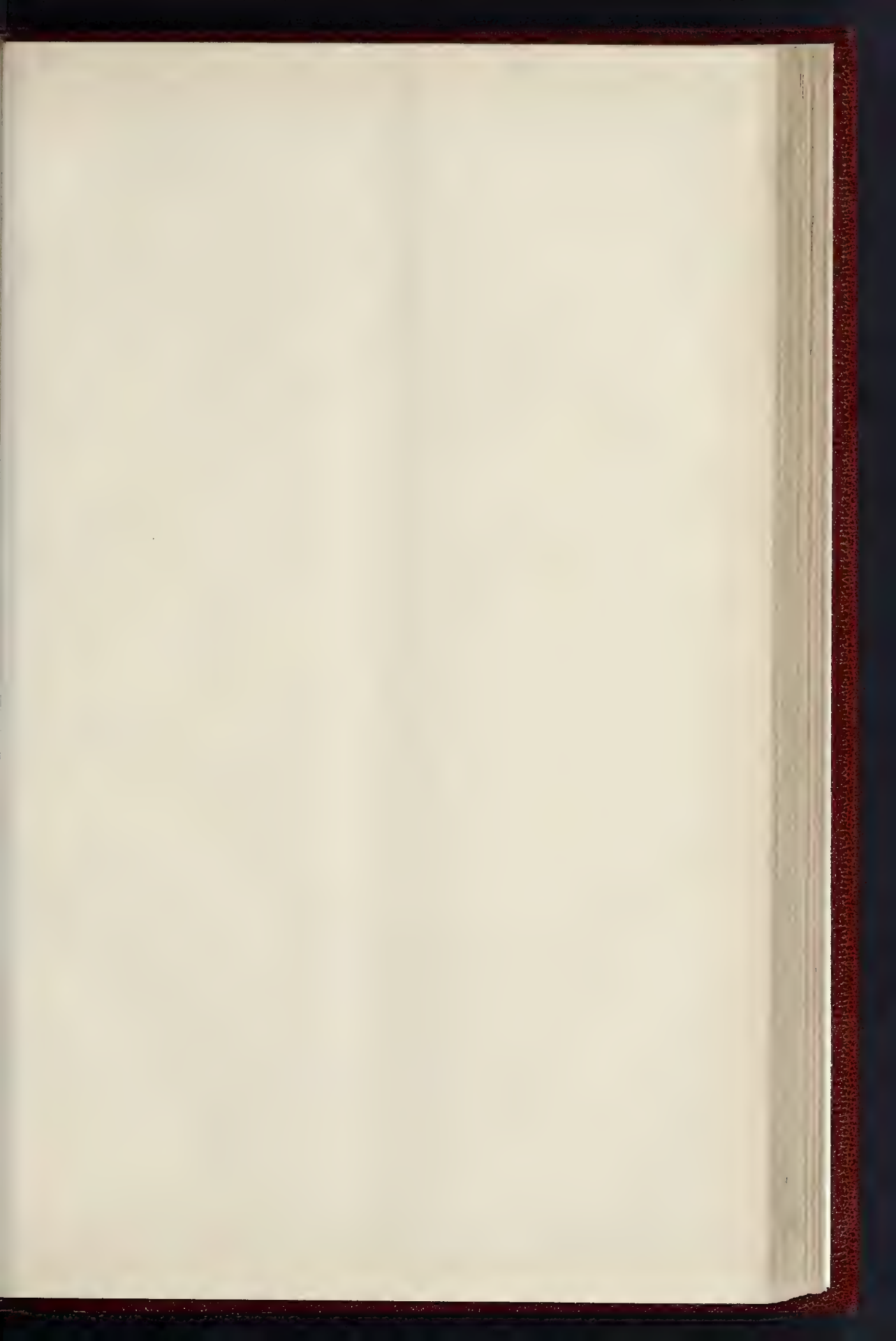




FRONT VIEW OF THE CATHEDRAL OF HONOLULU—MISSRS. CARRUTHER & INGLETON ARCHT.



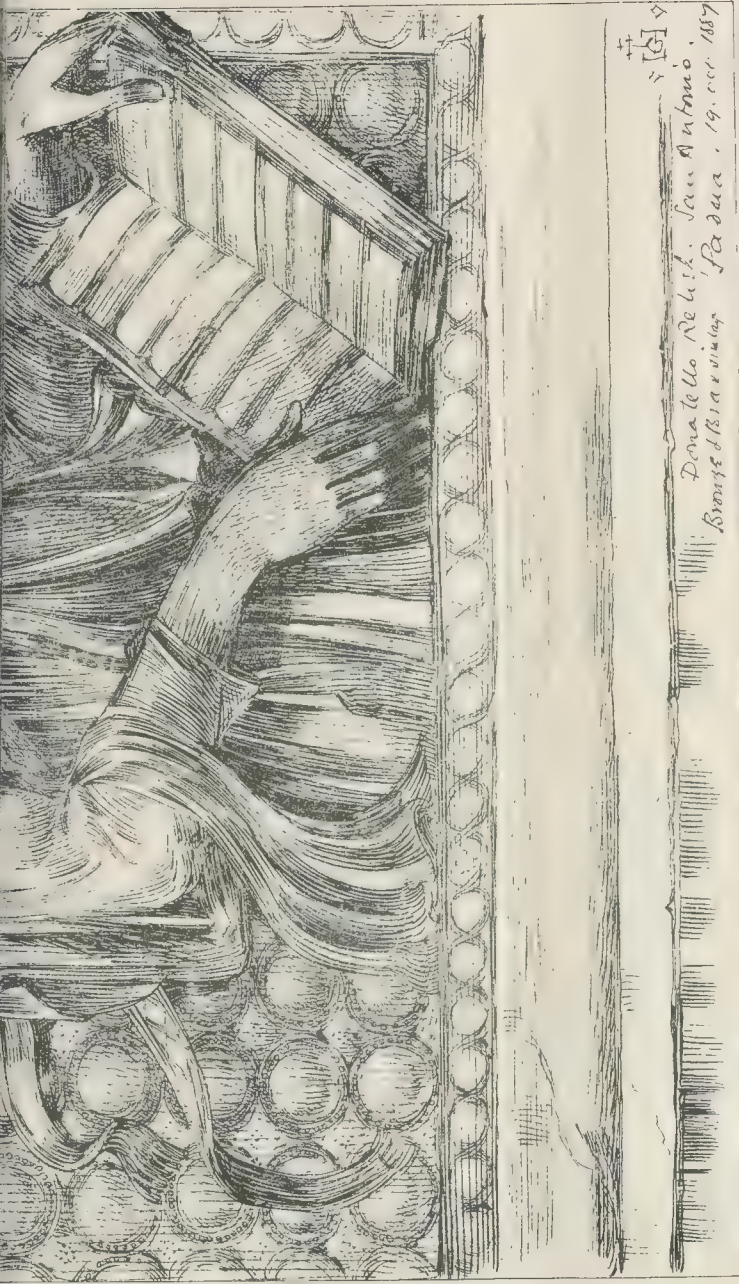




THE BUILDER, NOVEMBER 2, 1889







Drawn by M<sup>r</sup> Gerard C. Barker

Donatello Reliqu. San. Antonio.  
Brescia di Bravino, Padova. 19. oct. 1887





# THE SCHOOL BOARD FOR LONDON: THE BUILDING CONTRACTS QUESTION.\*

At the weekly meeting of the School Board for London, on the 24th ult., precedence was granted for the following resolutions of Mr. W. Weston Bourke:—

(1) "That the following resolution of the Board of August 1, 1889, be rescinded; and that the Board revert to the practice of publicly inviting tenders by advertisement as expressed in the resolution of the Board of December 17, 1886:—

"That, in future, tenders for all works, the value of which exceeds 100*l.*, be invited only from a limited and selected list of builders."

(2) That the following resolution of the Board of February 1, 1889, be rescinded; and that the practice adopted previously in their resolution of Dec. 18, 1888, be reverted to:—

"That tenders be obtained both for general repairs and painting, based upon schedules of prices renewable at the end of each two years, and that firms willing to carry out the work be appointed for divisions or groups of schools, but sub-letting be not allowed."

(3) That the words "divisions or groups of schools" in the above resolution of the Board of Feb. 21, 1889, shall be interpreted "divisions or groups of schools numbering not more than six schools" in each case, or, two groups of schools under the charge of local managers."

Mr. Bourke, in moving the first motion, said he dealt with a question of principle. The system of open tenders was not broken down, several members of the Board contended it was, referring him, in support of their contention, to the special report of the Committee on the Work of the Works Department. It had not been shown in that report that the bad work had been done under the open tender system, but he contended that all the bad work had been done by contractors appointed under the close contracts system. It was now said that the Board's work would be better done, because they had thorough supervision and selected tenders. He would ask whether the work would not be done better under the open system with "thorough supervision," or whether the work would be done better under the close system without "thorough supervision." If they had done their duty in the past with regard to supervision, they would not have had the complaints that there were in the special report of the Works Department. Mr. Bourke contended that the public were in favour of the open tendering system; the London County Council had adopted this system, and he had been told that they had seen no reason for adopting any other course. The Local Government Board always insisted that all tenders of upwards of 100*l.* should be advertised, and the Boards of Guardians and Local Boards had submitted to this order without ever protesting against it. What worked well all over the country ought to be for the London School Board. It was not the system that was wrong, but the want of supervision. Every respectable man ought to have the chance of tendering for the work of the Board.

Mr. Lobb seconded the motion. The Board had been misled. Some of the members had voted for the selected list of builders under a misapprehension, and some through inattention. The Board had been led to believe that the great scamping of the work was due to the open contracts. But that was not so. The Board had recently appointed a superior officer to look after the Board's interests in these matters, and the report of that officer showed that the bad work had been done under the close contracts system, as only two builders had been added to the list during the last four years. The close contracts system had been the cause of the Board, and it was time they had some alteration. They ought at least to give a fair trial to the open contracts system. Something like over four million pounds had been expended between twenty-one men under the close system.

Sir E. Hay Currie said he was perfectly sure that the open system of tendering was not the best for any body. Limited tenders, giving every respectable builder a chance of coming in

and making out his case, was what they wanted. The Board, he contended, would get good work if they adopted a system of limited tenders, and he hoped they would not go back to the free system.

Mr. Lobb: We never had it!

Mr. Collins said the point was: Had every respectable builder in London an opportunity of getting on the Board's list, and, having got on the list, had they an equal chance of getting the work? He thought the Works Committee meant that the builders should have this opportunity, and this was all that Mr. Bourke and any of them wanted.

Mr. Helby said when he first came upon the Board he had heartily supported the open contracts system; but he had gradually come to believe that it was one of the worst systems they could adopt. Every builder in London could apply to the Works Committee to have his name put upon the list, and if his references were satisfactory his name was at once put on. Mr. Helby held that the report of the Committee on the Work of the Works Department dealt entirely with builders engaged under the open contracts system, and Mr. Lobb was certainly wrong on this matter. Mr. Lobb could take it from him that the Works Committee had carried out the order of the Board contained in the resolution with regard to open tendering. It was true there had only been two builders added to the list, and they had carried out the work so badly that their names were taken off, and would never be admitted again. The Board's Architect had told him that in his private capacity he should not go in for the open system of tendering; it was the worst form of tendering they could have.

Mr. Lucraft said he did not at all agree that small tradesmen were not able to properly do the work. It was not true to say so. He thought clerks of works ought to be appointed to only one school at a time, and not to two or three at distances from each other, as was often the case. It was impossible for them to see that the work was carried out properly when they had to leave one school to visit another perhaps two or three miles off. With regard to close competition, there had never been such a thing at the Board. They had always had a hundred builders on their list, and he hoped there would not be less than this number on the lists in future.

Mr. Helby: There is no limit.

The Rev. H. Curtis said the members who had attended the meetings at Anderson's Hotel, convened by metropolitan builders, were getting a good deal sneered at. But he thought that it was only right for members to hear and consider any grievance that any section of the ratepayers might have to lay before them. He had now heard both sides, and felt that he must vote against the motion. He had been led to believe at one of the meetings that the work of the Board was to be done by seven builders only, but from what he had heard that day from Mr. Helby, who was the mouthpiece of the Works Committee, this was not the case. All respectable builders could apply to be put on the list, and he hoped they would do so.

The Rev. A. W. Jephson moved the "closure," which was seconded by Mr. Dellow, and carried.

Mr. Bourke, replying shortly on the discussion, said Mr. Helby had made out his (Mr. Bourke's) case. Mr. Helby had admitted that only two contractors had been added to the list, as Mr. Lobb had stated; and these two builders, said Mr. Bourke, had never built any schools. The work had been done under the close system.

The motion was lost by thirty-seven to five.

Mr. Bourke, in moving Resolution No. 2 (printed above), said he thought that the small builders who had been dismissed, some of whom had done the work for many years and received no complaint with regard to it, should have a chance of appealing. He regretted that disparaging references had been made to the small tradesmen. There was a narrow-mindedness in thus talking of small builders, and comparing them with large firms. The small men ought to have a chance of getting on and so becoming large men.

Mr. Lobb, in seconding, described the "dismissal" of the small builders as a piece of heartless cruelty, and said it would result in a serious loss to the Board. He regretted the want of trust shown by the Board in their managers and the individual members, and ridiculed the idea of sending a man from Marylebone to Woolwich for the purpose of seeing to a lock.

Mr. Gover said the present system had not worked well, owing to the areas given to the contractors being too large. If a window was broken at Sydenham Hill School they had to send to Woolwich for some one to come and repair it. The price allowed for replacing a broken pane was a shilling, and the distance from Woolwich to Sydenham being about ten miles, the man would have to come by train so as not to lose any time over the job. Sub-letting of contracts was not allowed, and, consequently, the contractor would let such a small matter wait till a larger job brought him to the neighbourhood, and so there was a considerable lapse of time before they could get the work done. The managers had looked sharply after these matters, and he advised the Board to continue to trust the managers with the work.

The Hon. E. Lyulph Stanley thought Mr. Gover's remarks should be addressed to the third resolution when Mr. Bourke moved it. He considered that under the present system the work was done as speedily as it was possible for it to be done.

Mr. Hart expressed himself in favour of the managers continuing to look after the small repairs to schools.

Mr. Barnes said he had heard nothing in the discussion to disabuse his mind of the belief that the work had been done well under the resolution of Dec. 16, 1886. There had been no complaint against the way in which the work had been done. Why, then, were these men turned over without any reason being given for so doing? Surely Mr. Stanley could not be really serious in saying that the work could be more speedily done by sending three or four miles instead of 100 yards. He hoped the Board would not allow the Works Committee to give the small repairs to the large firms.

The Rev. O. Mitchell supported the motion, complaining of the waste of time there had been in doing the work in Walworth under the present system.

Mr. Lynn pointed out that the second and third resolutions were alternative resolutions, and that the last would only be moved in the event of the second being lost, and that, therefore, members were right in discussing both the motions. He asked members to vote for motion No. 2 on its merits, without regard to motion No. 3.

Mrs. Maitland expressed herself in favour of the present system. She had been a manager, and when the resolution putting the work into their hands was passed, the managers of her division considered that it was impossible for them to properly carry it out. She wished to see whether the new system would work well or not.

Mr. Laing said he could only look upon this resolution as a sop to the deputation. He considered that the Board ought to give the new system a fair trial. They were practically going to have open tendering, and he thought they might rest satisfied with that.

Mr. Cook did not think the motion would have been brought forward if Mr. Helby had sought to extend rather than limit the list. He challenged Mr. Helby to show that his system was an economical one. He was not going to blame the whole of the men who had done the work for years because one or two of them had served the Board badly. The Board were the trustees of the ratepayers' money, the builders were ratepayers, and the Board ought to deal fairly with the matter.

Mrs. Besant thought the resolution might have been more clearly drawn up. She treated large and small builders on exactly the same ground, and had found there were faults with both sections. This motion, if passed, would throw the Board again into the position that had given them so much trouble. Talking about ratepayers had nothing to do with the question.

Mr. Helby said there had not been the slightest intention of dismissing any builder unless he had done his work badly. As to the managers, only a few of them had done the work thoroughly, and in these cases the bills had been sent to the committee with complaints of the enormous charges made for small repairs. The Board had not so much to do with saving as with getting the work done well. There had been serious delays in some cases in carrying out the work owing to the small builders not having the material at hand, and he had found that many of the workmen were most grossly under-paid. Under the new system the work was done quicker, as Mr. Stanley had told the Board, and there would be no delay in paying

\* See Builder for last week, p. 297.

The resolution of the Board of December 17, 1887, referred to, is as follows:—"That at least ten days' public notice shall be given, by advertisement, inviting tenders for all future contracts for 100*l.* and upwards; and the tender shall require sufficient security for the due performance of such contracts."

The resolution of the Board of December 18, 1888, referred to, is as follows:—"That the divisional member in charge of the school, or the local managers with the consent of the divisional member in charge of the school, empowered to order urgent and slight repairs in schools to a total amount not exceeding 5*l.* per department in each year, commencing on the 1st of March, 1887; and the bills for such repairs (provided they do not exceed the above amount) be paid by the Finance Committee of the Board, by the correspondent and the divisional member in charge of the school."



the bills when they became due as was formerly the case. He asked the Board to give the system twelve months' trial. With regard to a contractor doing repairs at a distance, he left the question to the contractor who had undertaken to do the work, and the Board ought to wait and see how the contractor would manage of such work. The attendance was small, and the business was chiefly confined to the consideration of a report setting forth the action of the School Board in relation to the subject of contracts, and the steps taken by the committee since the last meeting of the members of the trade. It was resolved that a letter should be sent to each member of the School Board, setting forth a statement with reference to the request made in the memorial presented to the Board. It was also agreed that an effort should be made to obtain another interview with the Board, in order that they might, by rebutting statements and answers to questions, present their claims in a still clearer light.

Mr. Foster thought the present system was certainly open to amendment, and that the motion of Mr. Bourke ought to have been rather to the effect of requesting the managers to carry out work in a more efficient manner than it had been done by them.

On the motion of the Rev. A. W. Jephson, it was resolved:—"That the motion be now put."

Mr. Bourke, in reply, said the Board had overlooked the fact that workmen sometimes scamped their work against the wishes of their employers, and this remark applied to large men as well as small. After what had been said with regard to the managers, he thought they had better do without them, and manage the schools at head-quarters.

The motion was lost by twenty-nine to fourteen.

Mr. Bourke moved, and Mr. Lobb seconded, resolution No. 3.

Mr. Collins said he strongly supported this, as a protest against the work at Deptford being done by a man at Woolwich. He objected to the work of four Parliamentary divisions being given to one man.

Mr. Barnes said if this motion was passed, this sort of thing would still go on. There was nothing in the resolution to prevent one man having several groups. He moved as an amendment:—

"That the resolution of the 21st February, 1889, shall be interpreted in the following sense:—

"Where a division contains more than six schools, the Works Committee shall give separate contractors the general repairs and painting of schools in groups not exceeding six in number."

Mr. Lynn seconded.

Mr. Bourke accepted this amendment.

Mr. Helby moved the previous question. He said that contractors could not carry the work on the schedule prices with such a small number of schools. The men now doing the work would throw it up if this motion was carried, and he did not know where the Board would then be.

Mr. Sharp seconded. They had discussed this matter for something like three hours, and, after all, it was not an Imperial question.

Mr. Gover thought that the fact of the Board having discussed this question for so long was the very reason why something should be done.

On a division, the "previous question" was lost by twenty-six to sixteen.

Mr. Gladstone (vice-chairman) moved: "That the proposed resolution be referred to the Works Committee for consideration and report." He said everyone agreed that there should be a larger number of builders on the list; but he objected to the number of schools allotted to a contractor being so small as that mentioned in the resolution.

The Hon. E. Lyulph Stanley moved, and the Rev. R. Rhodes Bristow seconded, a motion for the adjournment of the discussion. This was carried by twenty-four to twelve.

On the motion of Mr. Helby, it was resolved:—

"That a reply be forwarded to the letter from the honorary secretary of the Committee of Representative Managers of London Board Schools (with reference to the discontinuance of the authority given to managers to order urgent and slight repairs), in accordance with the terms of the report."

The Works Committee further reported as follows:—

"The Committee in their report, which was submitted to the Board on the 10th October, 1889, made various recommendations for the acceptance of tenders for carrying out the repairs to the schools and furniture of the Board on a contract schedule of prices, and added that the question whether it would be advisable to accept the tenders of Messrs. Grover & Son for both the Finsbury and the Hackney Divisions would be subsequently considered. The Committee now have to report that they are of opinion that the tender of Messrs. Dove Bros. should be accepted for the Finsbury Division, and the tender of Messrs. Grover & Son for the Hackney Division only."

This and the report of October 10 are held over pending the conclusion of the debate on the whole question.

A special meeting of the members of the London building trade who have been moving

\* Printed in the *Builder* for October 19, pp. 277-78.  
+ We have condensed this report from the *School Board Chronicle* of the 26th ult.

in this matter was summoned for Tuesday evening last, at Anderton's Hotel, for the purpose of considering the action to be taken by them in order to gain success for their contention that there should be "a perfectly equitable distribution of all the work necessary to the schools," and their "right to participate in the execution of such work." The attendance was small, and the business was chiefly confined to the consideration of a report setting forth the action of the School Board in relation to the subject of contracts, and the steps taken by the committee since the last meeting of the members of the trade. It was resolved that a letter should be sent to each member of the School Board, setting forth a statement with reference to the request made in the memorial presented to the Board. It was also agreed that an effort should be made to obtain another interview with the Board, in order that they might, by rebutting statements and answers to questions, present their claims in a still clearer light.

#### CASES UNDER THE METROPOLITAN BUILDING ACT.

##### NEGLECT TO GIVE NOTICE.

At the Dalston Police-court, on the 21st ult., before Mr. Bros. Mr. Alexander Payne, District Surveyor of East Hackney (South) and North Bow, summoned Mr. G. W. Beale, builder, under the following circumstances:—Defendant had given notice by letter dated August, 1888, of his intention to extend the schoolroom at St. Margaret's Baptist Chapel, South Hackney. This work was completed in the spring of 1889. The District Surveyor's account was sent in, and paid. In September, 1889, the District Surveyor discovered that new windows had been formed in some recesses in the chapel, and he wrote to the defendant requesting notice and full particulars of the work, which, however, he declined to send—hence these proceedings for neglect to give notice.

The defendant was represented by a solicitor, and maintained, first, that the works were covered by the original notice, and, secondly, that merely taking out the 9-in. filling of a recess and inserting a window did not affect the structure, nor was it work of a nature requiring a notice. He called the minister of the chapel to show that the work was constantly going on, but this witness admitted in cross examination that the order for these windows was not given till about July, 1889.

Mr. Hamilton, an architect, also gave evidence for the defence, and maintained that the work did not necessitate any alteration to the building. This witness, however, admitted that if the filling of the recesses were removed it was necessary to ascertain that there was an arch over the part removed, or to place one there, or the superincumbent wall would fall down. Also that the work could not be called a necessary repair under Section 9.

The Magistrate, in giving judgment, decided that this could not be called a repair or exempt under Clause 9, but was work for which notice ought to be given. Also that it was not covered by the original notice for extending the schoolroom.

The defendant was fined 20s. and costs.

#### IS NOTICE NECESSARY FOR REBUILDING PORTIONS OF AN EXTERNAL WALL AND CHIMNEY-STACKS?

At the Lambeth Police Court, on October 29, Mr. Banister Fletcher, the District Surveyor for West Newington and part of Lambeth, summoned Messrs. Briant & Son, builders, of 200, Kennington park-road, under the Metropolitan Buildings Act, 1855, 18 & 19 Vic., cap. 129, sec. 41, for refusing to give notice for rebuilding the upper portion of the external wall and chimney-stacks, which had been taken down (under a Dangerous Structure Notice from the London County Council) at No. 8, Crampton-street, Newington Butts.

In the evidence it was stated that the quantity of wall rebuilt was about 22 ft. long and about 3 ft. 6 in. in height, and, in addition, two chimney-stacks—one containing three flues and the other two flues—and the District Surveyor called attention to the important fact, that in the rebuilding a portion of the work was contrary to the Act in thirteen other respects, and that when he received the notice asked for the examination would be made by him.

The builders were represented by counsel and solicitor, the former contending that the work was exempt under Section 9 of the Metropolitan Buildings Act, 1855, and that the case of "Badger v. Denn," of 1858, governed the case, and that the late Mr. Ellison on that decision had dismissed a similar application.

The District Surveyor, in reply, pointed out that the case of "Badger v. Denn" could not apply to the present case, because that case was based upon an alteration having been made, and the decision of the Court was "that no public good could result from notice being given," and he agreed that in that case there would have been no public advantage, because none of the work, which consisted of making good decayed brickwork round a doorway,

could have been done at that time contrary to the Act. Whereas in the present case it was of the greatest importance that the work should be superintended by the District Surveyor, because if not the rebuilding might be improperly done as regards the wall in eight distinct breaches of the Acts, and as to the chimneys in six. He called attention to a similar case in which Mr. Hannay had decided that notice must be given for rebuilding, and also to a decision of Mr. Chance in this Court overruling Mr. Ellison's. The decision was:—"That rebuilding one foot in height of chimney-stacks was work which came within the provisions of the Building Act, and that notice was consequently necessary."

Mr. R. J. Biron, Q.C., the sitting magistrate, decided that if no alteration had been made the work was exempt. He refused, however, the application to give costs against the District Surveyor, and agreed to grant the District Surveyor a case, as he desired to go to the superior courts.

#### LOW SIDE WINDOWS.

SIR.—Mr. J. S. Corder, in his "Wayside Notes in East Anglia" (*Builder*, October 26th), says:—"It seems to me this theory of lepers worshipping at these low side windows requires confirmation." I have long thought so. In the north of Italy and adjacent parts of Switzerland these low side windows are not uncommon in small isolated chapels and churches. They are usually at the west end to the left of the door, and are not at all intended for the use of lepers, but are used by any passer-by. The church being shut up when no service is going on, a person on his knees at the low window still has a full view of the high altar, and, in these small churches, of most of the interior. This window is not generally glazed, but merely protected with iron bars. May not this have been their use in England? They may occasionally not have been directed to the high altar, but to some special popular altar. I have seen a similar window in an old Gothic church in Sicily, also on the left of the west door.

G. S. PARRY (Lieut.-Colonel).

18, Hyde-gardens, Eastbourne,  
October 28.

#### THE INSTITUTE AND THE ASSOCIATION.

SIR.—The short footnote which you appended to your report of Mr. Stokes's Presidential Address appears to me to contain a timely note of warning concerning a danger that we must be very careful to avoid in any steps taken in the direction indicated by the A.A. President. The danger I refer to is that of an absolute and complete amalgamation of the Institute and the Association. Such a course would, I am convinced, be productive of the greatest harm, and it is worth noticing how careful Mr. Stokes seems to have been in his address to avoid using any terms which might be interpreted into an argument for amalgamation. His whole address seems to have been based upon the admirable idea of the co-existence of two separate and distinct bodies, each independent of the other and under its own form of government, but at the same time working cordially together and helping each other wherever possible for the furtherance of the common cause.

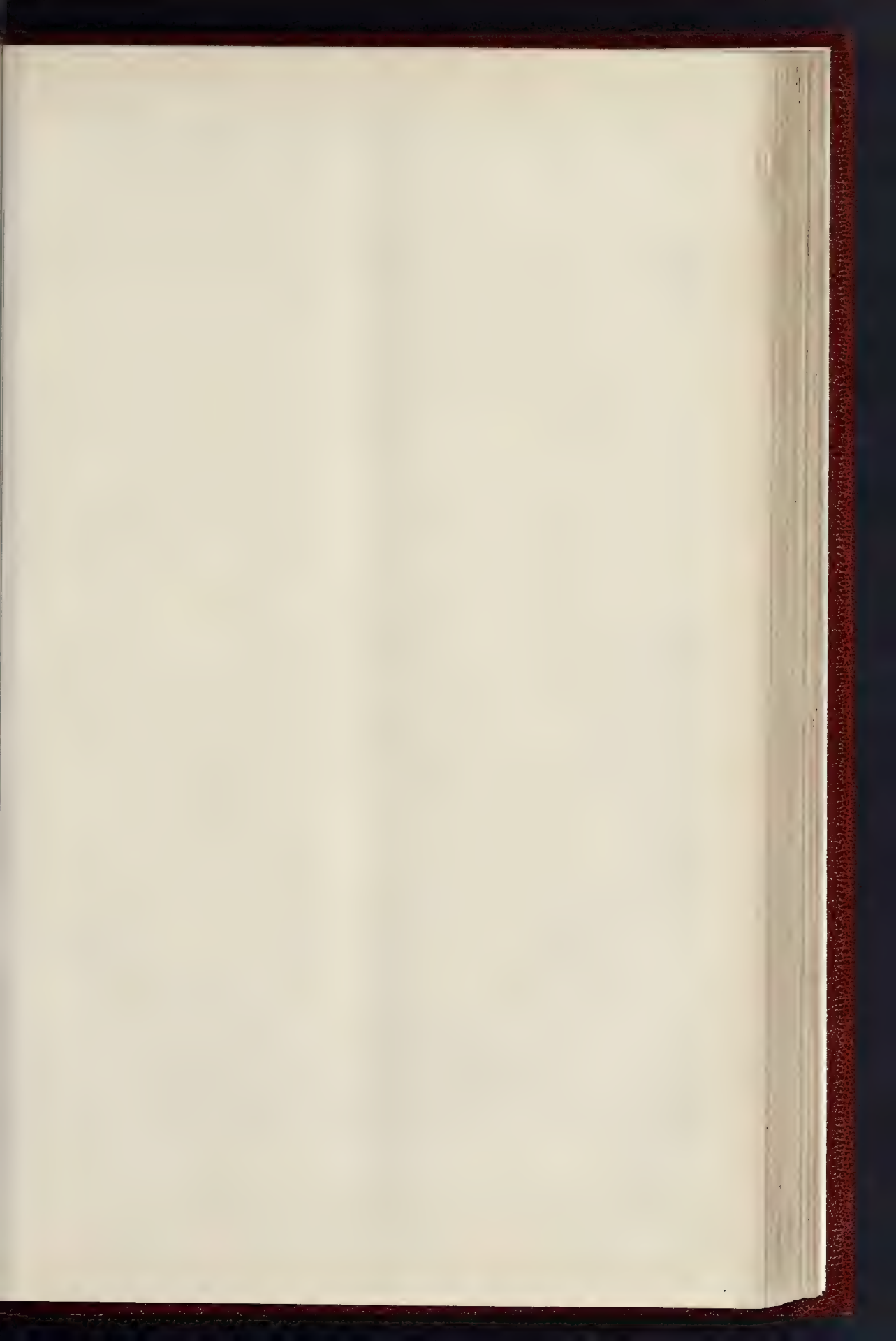
The functions of the Institute are essentially of an examining nature, those of the Association of a teaching nature, and I venture to think that the Institute should neither directly teach, nor the Association directly examine. It is not hard to find precedents for this dual conduct of education. The Royal Colleges of Physicians and Surgeons and the Hospitals, the Universities and the Colleges, occupy an almost precisely parallel position, and was not the feeling that schools ought to examine their own students the chief cause which led to the establishment of the Oxford and Cambridge Schools Examination Board?

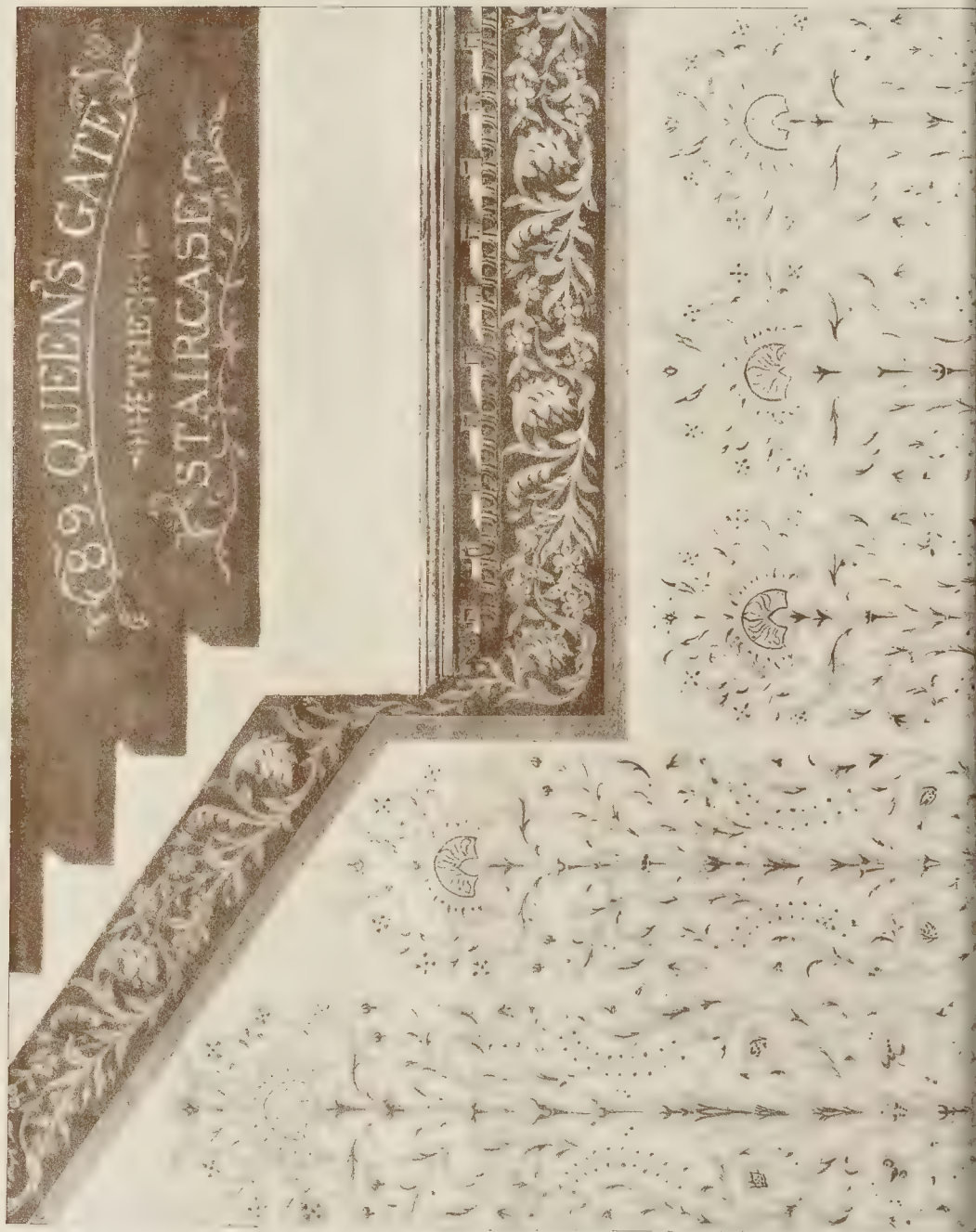
There seems to be now a reasonable hope of ideas with regard to the future of the A.A., which many of us have, I think, for a long time, fondly indulged in, being brought within the range of practical politics. The Triple Examination of the R.F.A., the favourable reaction which Mr. Stokes's courageous address has received, the appointment of the A.A. Education Committee, are all signs of the times which we cannot ignore, and which serve to indicate the direction in which public opinion is tending. At last there appears to be a probability of the great educational problem generally and quietly solved, and a satisfactory settlement, and it would seem a thousand pities if the good work that has recently been accomplished by the Institute, and that will, I believe, be accomplished by the Association, were to be marred by any imperfectly considered, though well-intended, schemes, either of the nature of an absolute amalgamation of the two bodies, or, I take it, an opportunity of adding, in the direction of restrictive legislation.

OWEN FLEMING.

London, Oct. 28, 1889.











J. H. EASTWOOD  
ARCHITECT  
MECKLENBURG S.C.  
W.C.





## IMPROVEMENTS IN THE STRAND.

Sir,—I must acknowledge the ready courtesy of Mr. Nevill in admitting the priority of Mr. Teulon's scheme for the above; but to fully justify my previous letter, I would beg space to correct an error into which he has fallen.

The plan for which I claim complete identity with Mr. Nevill's recent proposal I referred to as "last amended by Mr. Teulon in 1882." The plan Mr. Nevill has seen, and upon which he bases his remarks as to the Strand portion, was a much earlier one. In the plan as last amended, Mr. Teulon had abandoned the suggested strip of garden land parallel roads on north and south sides of same from economic considerations, and proposed instead to widen Wyck-street to 60 ft., and the Strand to 35 ft., leaving an eligible plot of building land between the two roadways, and dealing with the gradient of Newcastle-street by giving it a turn to the eastward, all exactly similar to that portion of Mr. Nevill's proposal. This statement you will be able to confirm by reference to the copy of the plan enclosed with my previous letter.

The scheme for dealing with the Strand and for the main thoroughfare to Holborn is, as Mr. Nevill says, so simple as to require no advocacy; but it appears to me that too much publicity cannot be given to so simple a solution of this question, having in view the much more costly proposal at present under consideration by the London County Council, a plan of which appeared in your issue of the 19th inst.

J. BROOKES HUNT.

Southsea, Oct. 23, 1889.

## "TECHNOLOGICAL EXAMINATION": STAIRCASE.

Sir,—In reply to "Student," if the desire had been for an ordinary "dog-leg" staircase there would have been no occasion to mention the width of the hall; the object of mentioning its width and making it greater than the width of the staircase was to test the knowledge of the candidate and to see in what way he would treat the side of the staircase which would have no support from a wall. The use of such a staircase is that it enables a lift to be put against the wall, and where stairs are centrally placed more light is obtained for the lower floors than where the well-hole treatment is adopted.

Of course you are quite correct in your note; had the intention been to lift the whole width of the hall there must then have been a well-hole. I may mention that other students understood the question and answered it, I am glad to say, correctly.

October 28.

THE EXAMINER.

## "PAVING STONES IN THE PARIS EXHIBITION."

Sir,—I have read with interest the results of the experiments made with a view to test the various wearing capabilities of the named road materials. It is not my intention to question the value of these experiments; but I wish to point out that our remarks on them are very misleading, for you state that the higher the co-efficient the better the material as tested by this apparatus. The very reverse is the case. Therefore, the materials which you state are acknowledged by most practical people to be the best have the best have the lowest co-efficient of 0.72, Mountsorrel coming fifth in the list with a co-efficient of 1.36, Guernsey tenth with 1.60, and Aberdeen thirteenth with 1.77. I have before me a copy of report on experiments made in Paris with the same apparatus in May 1881, the results showing in this instance the Quenast to have a co-efficient of 0.80, and the best of the Guernsey tested a co-efficient of 1.21.

CHAS. M. MANUELLE.

\* \* \* "Co-efficient d'usure" is a rather ambiguous phrase, and we were informed by a French geologist with whom we inspected the collection that the higher figures represented the highest efficiency of resistance to wear. Our remarks, however, mainly rested on the inefficiency of mere laboratory experiments to give the true comparative practical values of paving stones in actual use. The construction of the apparatus upon the matter by our correspondent furnishes an additional instance of this, for certain of the ones given in the table under "sandstones" have lower co-efficients than the granites, and if our correspondent's construction of "co-efficient d'usure" is correct, the table would give some sandstones as having higher qualities for road-metalling than granites, which it is not very easy to believe. So we fail to see that "the materials which . . . are acknowledged by most practical people to be the best have their value confirmed by these experiments." It happens to be so with "granite," which, by the way, is not a granite, but one would contend that the Mountsorrel stone is far more road-metalling than Guernsey or Aberdeen, which it should be according to Mr. Manuelle's view.—En.

## MESSRS. O'BRIEN, THOMAS, &amp; CO.'S CIRCULAR.

Sir,—Our attention has been drawn to a paragraph in your issue of Oct. 30 containing reference to a circular we addressed to architects. The circular was addressed to two thousand architects in England, and the meaning you ascribed to it was somewhat different to what we intended. Although this large number was sent out, we only have had letters from two architects saying that it contained an objectionable offer, and to these gentlemen we have replied with explanations which they have deemed satisfactory. Under the circumstances, however, we consider our proper course is to issue an explanatory circular, at the same time withdrawing the former one, to all those architects to whom it was first addressed, which we are accordingly doing. We enclose for your inspection the original circular which we sent out, and we have marked one paragraph in red ink which we consider bears upon the last paragraph which you have quoted in your paper, and which, standing alone, is objectionable. We also enclose a copy of our explanatory circular. This circular will be sent to the whole of the architects who received our first circular this week.

\* \* \* We print Messrs. O'Brien, Thomas, & Co.'s letter, which we do not, however, regard as an entirely satisfactory explanation of the matter. The terms of the original circular appear to us capable of only one interpretation; and three architects sent it to us, drawing our attention to it in no measured terms, one of them, a man of recognised high position in the profession, characterising it as "perfectly scandalous." The reason that few protests were made against it is probably that most architects do not read circulars of the kind at all. A copy of the circular was, in fact, sent to the private address of the Editor of this journal, who threw it away without reading it, and only knew of its contents from correspondents who did read it. However, it is evident those who issued it are convinced they have made a blunder, and have felt bound to retract it.—ED.

[Since the foregoing was in type Messrs. O'Brien, Thomas, & Co. write to say that before issuing the circular in question they consulted an architect in the City (whose name they send), who informed them that in sending their price lists to architects it would be necessary for them to quote their trade discounts. No suggestion was made on either side that the trade discount would be paid to the architect as a commission for the introduction of business, but it was thought that architects would require that information.]

## CHURCH-BUILDING NEWS.

**Hornsey.**—The new parish church at Hornsey is to be consecrated this morning (Saturday, Nov. 2), by the Bishop of London. The church affords accommodation for 1,250 persons, and has been erected according to the designs of Mr. James Brooks, architect. The first stone was laid in June of last year by Lady Magheramorne, whose husband, Lord Magheramorne, the former Member of Parliament for the division, has given towards the cost a sum of 1,000*l.* Exclusive of the tower, the spire, and west front, which it is not intended to proceed with at present, the church, with organ, has cost a sum of 15,000*l.*, towards which 10,000*l.* has already been subscribed. The pulpit, it is of interest to note, has been erected by parishioners and friends as a memorial to Canon and Mrs. Harvey, the former of whom for upwards of half-a-century was the rector. The building, which is of Ancaster stone, the style of architecture being Perpendicular, has been erected by Messrs. Rudd & Son, of Grantham. We gave a double-page perspective view of the exterior of the church, with plan, in the *Builder* for May 12, 1888.

**Llandaff Yard.**—We are informed that the committee appointed to collect funds for the building of a new church to seat 250 at Llandaff Yard have accepted the designs of Messrs. Kempson & Fowler, architects, Llandaff, and have instructed them to carry out the work.

**Llandow.**—The restoration of the interesting little church at Llandow, near Cowbridge, Glamorgan, has now been commenced. The church will be fitted with new seats, prayer-desk, lectern, chancel-seats, and altar-table, all of oak; also a stone pulpit. The work is being carried out under the direction of Messrs. Kempson & Fowler, architects, Llandaff, Mr. John Morgan, of Llantrissant, being the contractor.

**Salcombe (Devon).**—Salcombe Church, erected in 1843 at a cost of 2,600*l.*, consisted until recently (says the *Western Morning News*) of a nave and north and south aisles. Early last year it was resolved to add a chancel, sacristy, choir vestry, organ loft, and north and south

porches, leaving a north transept to be built. The tender of Messrs. Farr & Son, builders, West Alvington, was accepted. As the work progressed funds came to hand better than was anticipated, and it was decided to omit the erection of the porches, but to add the north transept, thus making the work at the east end of the church complete. The architect is Mr. J. D. Sedding. The chancel is 31 ft. long by 20 ft. in width. It is divided from the rest of the church by an arch of a double order of chamfering on the west side, and of a single chamfer on the east side, and a screen wall under the arch 4 ft. high, with moulded coping 9 in. deep, and played plinth projection. Two clergy-desks and the choir-stalls, of oak, are the work of Mr. Trask, of Ilminster. The altar-rail is also of oak, supported by ornamental iron standards, supplied by Messrs. Longdon & Co., of London, the standards being of black and gilt fleur-de-lis. The east chancel window is of five lights, and is filled with stained glass in memory of the late Earl of Devon. The subject of the centre light of the window is the Crucifixion, the two lights to the north side being the Agony in the Garden and Christ bearing the Cross, the two lights to the south the Resurrection and Ascension; the rose light over represents Christ in Glory, whilst around this are symbols of the four Evangelists. The chancel steps are of Hopton Wood stone, and the chancel and sanctuary pavement of various marbles. The altar-table stands also on a raised dais of Hopton Wood stone and Devonshire marble. The wagon roof to the chancel is of ribbed oak, with very handsome carved oak bosses, designed by Mr. Edmund Sedding, nephew of the architect, and carved by Messrs. Farrs. The north transept is 17 ft. by 15 ft., and is separated from the chancel and the church by arches of Polyphant stone. It has an oak ribbed roof, and is seated with chairs. In this transept there is a stained-glass window of three lights. The subject of the centre light is the Good Shepherd, and is in memory of the late Lady Kingsale, and is the gift of her daughters, the Hon. Mrs. Stretton and the Hon. Mrs. Florence de Courcy. The subjects of the lights on either side of this centre one are St. James and St. John, and both are the gifts of Major-General and Mrs. Birdwood, of Woodcot, and are in memory of their two sons, Frederick William Lane Birdwood and William Albert Birdwood. To the south of the chancel are the sacristy and choir vestry, with the organ gallery over. The whole of the dressed masonry, both internal and external, and also of the windows, is of Polyphant stone. The dedication service took place on the 17th ult.

**Proposed International Exhibition at Edinburgh next year.**—We have received the prospectus of the "International Exhibition of Electrical Engineering, General Inventions, and Industries," which it is proposed to hold in Edinburgh in 1890. We are informed that the Executive have secured a site of about ninety acres in extent, within easy walking distance of the centre of the city, and possessing the very exceptional advantages of railway-stations belonging to the two great Scotch railway lines (the Caledonian and North British), within the grounds, thus enabling passengers from all parts of the kingdom to be set down within the Exhibition enclosure. Tramway lines also run to the entrances, and a canal, which will be utilised for the conveyance of visitors, skirts the grounds. It is anticipated that the opening of the Forth Bridge early in 1890 will attract numerous visitors, and these, added to the great stream of tourists, &c., which annually visit Edinburgh, will no doubt ensure a success still greater than that achieved for the Exhibition of 1886. The Exhibition will include Electrical Engineering, General Inventions, Industries, and Fine Arts. It is proposed to close the list of applications on December 1, 1889, the space at the disposal of the Council being already very largely applied for. A great number of the most interesting exhibits now at Paris will be shown at Edinburgh, including a selection of the extensive and unique collection of Mr. Edison. The classification comprises twenty-two sections, six being devoted to Electrical Engineering and Inventions, and fourteen to General Inventions and Industries, with special sections for women's and artisans' industries. There is also a separate section for Fine Arts. The general manager is Mr. Lee Bapty.



## The Student's Column.

WATER-SUPPLY.—XVIII.

LONDON WATER-SUPPLY (continued).

**IN** 1867 another Royal Commission was appointed to inquire into the supply of large towns, with especial reference to London. In the evidence given before the Commission we find many plans and schemes devised, several of which, however, had been proposed on previous occasions. Foremost amongst these was the project of the late Mr. J. F. Bateman, C.E., F.R.S., to bring water from the mountainous districts of Wales about the sources of the river Severn, south of Snowdon, and to the east of Cader Idris and Plynlimmon. It was also proposed to add the water from the upper drainage grounds of the Banw and Vyrnwy rivers, immense reservoirs being constructed at suitable points. An artificial conduit was to convey the water to London. There could be no question as to the purity of the water, which was soft and excellent, and not liable to much pollution by reason of the non-populous districts, and little cultivation within the collecting grounds. The rainfall was large, and though the data for estimating it were rather scanty, the rocks within the area were shown to be practically impervious, so that the greater proportion of what fell might, with due engineering skill, be collected and utilised. The ground is at such an elevation that, notwithstanding the gradient of one foot fall per mile to bring the water, it was anticipated that nearly the whole metropolis could be supplied without pumping, from large reservoirs to be made at Stanmore, near Edgware, 270 ft. above sea-level. The works of existing companies were proposed to be utilised as much as was economically practicable.

Mr. Hamilton Fulton developed a plan to take the water from the upper portion of the Wye, in Mid-Wales.

Messrs. Hemans and Hassard propounded a gigantic scheme to supply the metropolis with water from the lakes of Cumberland and Westmoreland, taking advantage also of certain drainage areas should these latter be required. Ullswater, Thirlmere, and Haweswater were the chief sources to be laid under contribution, and the water was to be conveyed by a conduit running through the Midland counties to London, supplying some large towns *en route*. The other main features of the scheme are somewhat similar to those of the Welsh project just alluded to, but it was believed that the rainfall could be calculated more accurately in the Lake district proposal.

Mr. George Remington suggested the utilisation of the high ground of Derbyshire, collecting the water above Mill Dale, on the river Dove, and bringing it to a reservoir to be constructed at Barnet.

So it would appear that engineers had carefully considered methods of supplying the metropolis from all mountainous districts which could be regarded as being capable of yielding the necessary amount of water by gravitation. But the public, eager as they were for a wholesome and copious supply of the precious fluid, had to contend with those who had certain rights and interests in the respective districts, and who (as in all such cases) would form a formidable opposition. Other powerful arguments militating against any scheme which included the bringing of water from a very long distance were also urged. For instance, it was not thought particularly desirable that the whole of the metropolis should be dependent on long conduits for its water, as awkward contingencies might arise by reason of foreign military occupation, or wanton mischief on the part of even a single individual, when we should be completely at the mercy of any one who was able to obtain possession of a short length of the aqueduct. Moreover, accidental interruptions to the conduits, or to the flow of the water, would be serious things, the City having only the quantity of water in the service reservoirs to fall back upon. The enormous expense attending the construction of the various works, the Commissioners reported, would be a great tax on the ratepayers. The Commissioners were also of opinion, that no town or district should be allowed to appropriate a source of supply which naturally and geographically belonged to, and might prove useful for, a town or district nearer to such source, unless under special circumstances. In this connexion, it is interesting

to note that, since the expression of this opinion, the Welsh and Cumberland sources have actually been, to a certain extent, captured, the former by Liverpool and the latter by Manchester, showing how just the prediction was.

Attention was, therefore, not unnaturally directed to the consideration of other sources of supply. Believing that Thames water became more and more polluted as it flowed on from its source, it was generally assumed that by the time it reached Hampton it was more highly impregnated with obnoxious matter than at places higher up the river. Engineers therefore proposed to take the water from it and its tributaries at higher points. Many of the schemes were novel in their way, but generally involved bringing the water long distances. Besides, it became known that they were based on erroneous assumptions as to the actual pollution of the water, and many of the conditions which necessitated a different source of supply were not complied with, so long as Thames water in its ordinary filtered state was used at all. Some of these new suggestions were merely intended to increase the output of individual companies, and were, therefore, beside the mark. It was proposed to utilise the water from the springs issuing from the chalk, and other pervious beds. As we have seen, the New River and Kent Companies had already drawn upon the chalk formation. One thing was tolerably certain as to the chalk water, viz., that its quality in regard to freedom from the baneful effects of sewage, was excellent; and this was an item of considerable importance. This question is sure to crop up in respect of the future water-supply to London, and instead of being altogether retrospective in our remarks, we may now consider it in its present bearings.

It is calculated that of the rain which falls in the upper drainage area of the Thames, only about one-third reaches Hampton. The remainder is absorbed by the pervious layers on which it falls, by percolation into the oolite, sand, and chalk, which form about two-thirds of the area, by draining into other river basins underground, and by evaporation. The manner in which these various agencies are brought about has been already alluded to. It is most difficult to estimate the amount of water actually absorbed by each pervious formation; we may arrive at a rough approximation of the total quantity taken up by all of them, but we are not justified in drawing conclusions as to supply, from such general data; neither do we know the proportion of the water available to the amount absorbed. Springs issuing from the strata can be gauged, and with certain precautions included, but it yet remains to be shown how exhaustive pumping in wells within the area, would affect these springs, and this is a serious item. So long as the springs themselves, as they issue from the ground, are utilised, their volume would, of course, be unaffected, for it would only be robbing the rivers; but bearing in mind what we have said about springs, we recognise that in most instances they are only kept going by being fed by surplus rain which they throw off. If, therefore, we make wells, and draw off the surplus, or, in other words, lower the saturation level, the time must come when there will be comparatively little surplus water thrown off, and the springs be much reduced in volume. We cannot get the same water above and below too. Even already the pumping for private and public supplies has very much lowered the average level of saturation, in the metropolitan district. What, then, would be the effect on this level if all the water used in the metropolis were taken from the same source? The population of the City at present might not, perhaps, be large enough to exhaust it, although many of the wells now in use would certainly run dry. But in effecting any material change in the source of supply, it must be sure in its result, and as permanent as possible,—the tax-payers ought not to be burdened with the expense of such a doubtful undertaking as that of obtaining the whole supply from the chalk which provides neither the one nor the other. The chalk under London is extremely useful in supplying private establishments with water, and it should remain so.

In dealing with underground sources in the vicinity of the metropolis we have confined our attention to the chalk, for although water may certainly be occasionally met with in lower beds (the "Lower Greensand," for example), recent experience has shown that this cannot be depended upon,—at any rate for a large supply. This follows from the manner in which the beds

are disposed, for although they are thick and have a tolerably broad outcrop many miles from London, by the time they reach the metropolitan area they are known to become very thin and comparatively unimportant, some of them being altogether absent. A ridge of hard old rocks of an impervious nature stretching from Prussia through Belgium (where they are seen not only in the Ardennes but have been proved by borings for water to the northward of those mountains), passing under the North Sea, have been met with, at a great depth at Harwich and Ware, and have been proved to exist at Chatham and, generally, under London, eventually cropping out in the north of Somersetshire and running from thence into South Wales and the South of Ireland.

This broad elevated underground expanse of rock materially influences the method of distribution of the water which percolates into the oolites and other secondary beds under the chalk in the upper part of the basin of the Thames. These beds do not come on to London laden with the precious fluid they have imbibed, but thin out, merely sending a representative by way of apology, in the shape of one of the oolitic beds. Moreover, their lithological character is not the same throughout, and their value as water-bearing strata varies accordingly. Bearing in mind the great complexity of the subject, the irregularity of the distribution of the beds underground, our slight knowledge as to the actual amount of surface and rain water absorbed by individual beds, and our absolute ignorance as to what really becomes of much of the water so absorbed, we cannot refrain from cautioning those who look to a deeper seat for our water-supply than the chalk. We have seen that the chalk is not, in all probability, sufficient as a permanent supply, and we reluctantly come to the conclusion that the bulk of the drinking water of the metropolis must still be obtained from the surface.

The objections raised as to the inconvenience attending the bringing of water from long distances are not, perhaps, so strong as they were before the experiment had been successfully tried in recent times on the continent and elsewhere; but it, nevertheless, is far preferable, for many obvious reasons, to have the seat of supply as near at hand as possible.

In considering the progress of the water companies, allusion has been made to the amount of water per day flowing in the Thames past Kingston, and of the relative amount artificially abstracted. The consumption is naturally much greater now than at the time when this comparison was first instituted, as may be seen on reference to the returns of the Registrar-General. We do not desire to further enter into the discussion as to the minimum quantity of water in the river at the places of intake. It seems tolerably certain that the tremendous quantity abstracted, causes the river to be much lower than it would otherwise be, at certain periods of the year, but it seems rather absurd to argue from such premises that the Thames is incapable of yielding the required quantity. Assuming that the mud flats exhibited at these periods are really due to this abstraction, surely this state of things could be largely remedied by constructing immense storage reservoirs (such as many of the cities in the north of England are compelled to do), and filling them in times of flood. This means great expense, and much scientific skill would be required to keep the water good, still we believe it could be done by refilling the reservoirs at every available opportunity. The connexion established between the rainfall of the upper Thames basin, and the height of the river at the places of intake, might be taken advantage of, to indicate the times when it would be advisable to draw off the water.

**Cement on Wood.**—Wood, says the *Bausen-tung*, which is to be coated with cement, should be rough, not smooth. The best coating is produced by the mixture of one part of cement, two parts of fine sand, and one part of curdled milk. Not more should be made of the composition at the time than can be laid on in half-an-hour, and during its application it should be stirred continually, so that the sand does not settle. It is better, with the object in view, to apply two coatings, the second being the thicker. Such a coating adheres well to wood, and affords a good protection against rot, and even, to some extent, fire. Another method is to mix good fresh cement with curdled milk until attaining the thickness of oil paint, and then apply it to the wood.



## VARIORUM.

"THE GENERAL HISTORY OF PRINCIPLES OF SANITATION," by Sir Edwin Chadwick, K.C.B., a reprint in the form of a sixpenny pamphlet (London: Cassell & Co.), of the address recently given by the author at the opening meeting for the present session of the Sanitary Institute, and noticed in our columns on the 12th ult.

"The Chrysanthemum Number" of the *Gardeners' Magazine* (published at 4, Avenue-lane, London) is a double number. It contains an interesting history of the chrysanthemum in Europe, and "a chrysanthemum portrait gallery," including portraits of many of the most notable English, Continental, and American growers of, and writers upon, this flower. The "history" before mentioned is by Dr. C. Harman Payne, whose name and fame as a writer on horticulture entitle him to speak with authority. It seems that while the present year has been fruitful in centenary celebrations, not the least important, so far as horticulture concerned, are the special exhibitions organised in England, Scotland, and Belgium, to commemorate the hundredth anniversary of the introduction of the chrysanthemum to Europe, that to say, "the flowering species" of the first of the large, "a Chrysanthemum Conference" to open at Chiswick on Tuesday next, November 5. The publication under notice contains a double-page plate of the Roubaix specimen of the "Fair Maid of Guernsey" (a variety of the plant grown with much success by M. Phatzer, of Roubaix), besides several well-executed wood engravings of other varieties of the plant; and altogether it is a seasonable and welcome production.—The number of Cassell's *Magazine* for November concludes other volumes of that excellent illustrated serial. The paper on "The Winter Dress of Men and Women," by "A Family Doctor," contains a great deal of common-sense concerning clothing in its sanitary aspect. "Curiosities of the pot-gear" is an illustrated article dealing with the archaeology of sandals and shoes. The paper on "Bent Ironwork," by E. Crossley, is like the specimens illustrated) rather slight. What not to do in a Sick-Room, by A Nurse," may be read with profit by any people.—"The Leisure Hour" for November (London: 56, Paternoster-row) is the first part of a new volume. It contains an interesting paper by Mr. W. J. Gordon "The Lighting of London": this is mainly taken up by a sketch of some of the arrangements now in progress for lighting considerable districts of London by means of electricity. "Etymological Doublets," by Alfred Erlebach, and about Gernets," by Alfred Schofield, M.D., are very readable papers. "The Sunday at home" for November (same publishers as the foregoing) also commences a new volume. It contains an illustration of a large terra-cotta relief by Mr. George Tinworth, entitled "Christ for Herod," at present in Messrs. Doulton's show-rooms at Lambeth. The contents also include a paper on "Bell Mottoes," some of which are very curious. At Bruton, Somerset, according to the writer, there is a bell inscribed "Once I'd a note that no one could hear, But Billee made me sweet and clear."

Summing the inscription to be true (notwithstanding the statement that "this Billee" was "man of much conceit," and "a caster of my bells with mottoes glorifying him"), it may be wished that Billee could be recast as one of our London suburban church-bells.—"The Girls' Own Paper" and the "Boys' Own Paper" are both of them excellent magazines for their kind. They commence new volumes in the November parts, and are published at Paternoster-row.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

7,052, Cowl for Chimneys, &c. J. Laming. In order to prevent down-draught, chimneys or flues, according to this invention, constructed of a hollow cone, open at the base, suspended in a vertical position immediately above the chimney, or terminal of the flue. The cone is sustained by struts, and an open frame is also fitted round the cone to prevent its loss in high winds. The diameter of the cone is of larger diameter than the chimney or other terminal, and when unaffected by wind, the cone is concentric with the flue, and lies above it. When acted on by the wind, the cone is raised above the base of the cone is driven at the terminal of the flue, and the escape of

smoke and air takes place on the lee side, the cone having a pendulous motion. The terminal of the flue is fitted with an indiarubber ring to render the contact of the cone silent, and to prevent vibration.

11,668, Fire and Sound proof Plastering. W. Doehring.

The surface of the wall or ceiling is, according to this specification, first covered with an easy-hardening fireproof layer, a mortar mixed with soluble glass. Before this hardens, coarse gravel is spread over it; a porous material made fireproof by impregnation. By the composition of these three layers a fireproof, sound-absorbing, light, and porous covering is made, which, when heated by fire, for instance, does not peel off and crack, and is a bad conductor of heat, so that walls and ceilings which are plastered with this material are cool in summer and warm in winter.

12,415 and 12,417, Wood Screws. C. D. Rogers.

These specifications relate to a screw with one or more threads or spiral grooves impressed into the metal of a screw, and with threads raised or made between the grooves and surface of the blank by the compression and displacement of the metal in forming the grooves.

13,326, Heating and Ventilating Apparatus. W. R. Maguire.

This apparatus provides the use in combination of a suitable arrangement of furnace or furnaces, and a heating chamber of a series of tubes open at both ends and arranged vertically round the walls of a chamber to receive the radiant heat from the furnaces and communicate it to the air around and about them.

13,474, Scaffolding. W. Ebeling.

According to this invention, a scaffolding for repairing, straightening, or building chimney stacks, or for fixing lighting conductors to them, is constructed by the use of ladders, hooks, and trestles of iron or wood in such a manner that from the ground upwards, by means of ladders, hooks are driven in on both sides of the upper end of the ladders, on which trestles are hung, and on which again boards are laid, these boards being used for the resting point of another ladder.

## NEW APPLICATIONS FOR PATENTS.

Oct. 14.—16,120, H. Le Mesurier and W. Dart, Fastenings for Emergency Exit-doors for Theatres, &c.

Oct. 15.—16,177, H. Cole, Automatically Retaining in position Windows and Doors.—16,178, H. Hardy, Water-closets, &c.—16,183, H. Smith, Fastener for Window-sashes, &c.—16,192, C. Broad and C. McCann, Metallic Sills for Window and Door Frames and Casings.—16,201, W. Sayer, Air Propellers or Ventilating Fans.—16,215, A. Boulton, Metallic Crossbars and Rails for Window-sashes, &c.—16,218, M. Rogers, Securing Window-sashes in any required position.

Oct. 16.—16,301, S. Hill, Door-closing Springs and Checks.—16,312, D. Waddell, Closing Ladder.—16,327, G. Jerram, Paving.—16,335, W. Bird, Joint, Self-closing Door Apparatus.—16,340, W. Ayres, Sash-weight Moulding Machine.

Oct. 17.—16,363, J. A. Duckett, Clay Mills.—16,372, J. Mander, Sash-fasteners and Openers.—16,398, F. Stewart, Mitre Clamps.

Oct. 18.—16,516, J. Shenton, Machines for Making Bricks, Drain-pipes, &c.—16,519, W. Minns, Cutting Window Lead for Stained-glass Windows, &c.—16,527, W. Mackinnon, Attaching Sash-lines to Sashes.—16,536, H. Hall, Tiles for Lining Walls, &c.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

3,781, R. Franklin, Bolts, &c.—7,646, H. Kofersheim, Brickmaking Machines.—9,524, D. Knowles and E. Raybone, Sash-fasteners.—12,263, H. Barnett, Sash-fasteners.—14,471, G. Baldwin and F. Varley, Door-knockers.—14,489, R. Hannan, Protecting Windows, Doorways, &c.—14,567, C. Thomerson, Fixing or Supporting Head-pipes.—14,723, F. Fehse, Decorative Tiles, &c.—14,733, D. Nicoll, Waterproof Slabs and Blocks.—14,739, J. Sim, Casement Fittings, &c.—14,768, W. Snelgrove and W. Avery, Fastenings and Guards for Doors, &c.—14,772, A. Houghton, Gates, Doors, &c.—14,778, J. Macneil, Coping bricks.—14,797, R. Barton, Paints, &c.—14,877, H. James, Girders for Bridges, &c.—15,093, R. Wilford, Screw-fastenings for Windows.—15,131, C. Cross and A. Ashwell, Indicating-fastenings for Doors.—15,194, E. Harrison, Revolving Window-shutters.—15,250, J. Bower, Door-latches.—15,355, S. Hill and R. Hodges, Automatic Combined Catch and Bolt for Double Doors.—15,367, J. Kidman, Bakers' Ovens.—15,385, W. Whitam and F. Dawson, Combined Bolt and Door Prop.—15,411, D. Gill, Perforating and Fixing Slates.—15,593, A. Brookes, Veneers.—15,713, T. Helliwell, Ventilating the Roofs of Railway Stations, &c.

## COMPLETE SPECIFICATIONS ACCEPTED.

## Open to Opposition for Two Months.

13,632, R. Platt, Automatic Retaining-catches for Doors, &c.—15,022, R. White and F. Ayton, Door-latches.—16,155, J. Thornton, Fireplaces.—18,354, R. Taylor, Concrete Mixing Machine, &c.—18,371, H. Illingworth and S. Rushworth, Screw

Nails.—18,912, A. De Villepigue, Levelling Apparatus.—10,032, G. Bellingham, Fastenings for Doors and Windows.—14,352, H. Leach, Door-bell Mechanism.—14,515, A. Paris, Cloth-covered Plaster Blocks for Ceilings, Walls, &c.—14,664, A. Rockwell, Door-bell Mechanism.

## RECENT SALES OF PROPERTY:

## ESTATE EXCHANGE REPORT.

Oct. 16.—By HUBBERT, SON, & FLINT.  
Rickmansworth—Two f. houses in High-st., r. £56  
The f. residence "Walmersley," r. £50, p.a. 880  
F. cottage and blacksmith's shop, r. £31 p.a. 600  
Crossley-green—A plot of f. land, r. £100 p.a. 123  
Oct. 17.—By PARSONS, FRANK, & CO. (at Baker).  
Baker—F. house and shop in High-st., r. £46 600  
Two f. houses in High-st. 1,210  
A f. house and shop in High-st. 600  
Two f. houses in Church-st. 2,040  
1 to 7 Park-rd., f. r. £107, 6a, p.a. 1,355  
Holme-cottages—F. g.r. of £3, with reversion in 74 yrs. 720  
Park-rd.—F. g.r. of £25, with reversion in 70 yrs. 210

Oct. 18.—By W. HALL.  
Battersea—33 and 37, Ingrave-st., n. 60 yrs., g.r. 415  
Upper Holloway—13 and 15, Hampden-rd., n. 65 yrs., g.r. £13 489

By P. D. TUCKER (at Derby).  
Ashbourne—F. pasture and meadow land, 25a. 2r. 9p. 1,250  
"New Close Farm," 65a. 3r. 22p., f., r. £190 p.a. 5,000  
Enclosures of f. land, 63a. 1r. 2p. 790

Oct. 19.—By D. Watney & Sons (at Newport).  
Pontypool—Near Two plots of land, 2a. 3r. 28p. c. 280  
Enclosures of a land, 20a. 0r. 30p. 610  
A plot of garden land, 1a. 1r. 19p. r. £10 189  
Two cottages and 2a. 0r. 19p., r. £14 p.a. 400  
"Cwmffwrdd Farm" and 24a. 3r. 17p., r. £23 p.a. 508

"Taloch Farm" and 11a. 0r. 21p., r. £18 p.a. 330  
One-fourth share of a land, 15a. 0r. 5p. 230  
"Pentreford Farm" and 42a. 2r. 30p., r. £16 p.a. 1,020  
Three plots of a building land, 7a. 0r. 30p. 880  
"Llangar Farm," 55a. 1r. 30p., f., r. £13, 15a. p.a. 1,180  
Thirty-one f. cottages, r. £161, 4a. p.a. 1,830  
A copyhold plot of land 11  
"Carwood Cottage," r. £12, lesshold 115

Oct. 21.—By BLAKE, HADDON, & CO.  
Croydon—Nos. 12 to 20 (even), Park-lane, f., area 2a., r. £100 p.a. 3,100

By G. BROCKINGS.  
Soho—62, Frith-st., f., r. £90 p.a. 1,900  
Fulham—8 to 14 (even), Pollard-rd., n. 89 yrs., g.r. £31, 10a. 825  
Sydenham—The residence called "St. Roman's," f., r. 73 p.a. 300

By H. W. LEE.  
Clapton—79, Median-rd., n. 76 yrs., g.r. 26 815

By E. WOOD.  
Forest-gate—11, Fowling-rd., f., r. £30 p.a. 250  
Marylebone—83, Lisson-grove, n. 31 yrs., g.r. £9 600

Oct. 22.—By HALL & GOSWELL.  
Sevenoaks, near—1 to 7, Hope-cottages, n. 90 yrs., g.r. £14, r. £30 p.a. 135

By G. E. SMALLPRICE.  
Barnes—1 and 2, Lawrence-cottages, f., r. £44 p.a. 335  
Lower Clapton—27 and 29, Obelisk-rd., f., r. £180 1,180

By DRENNAN, TAYLOR, & CO.  
Forest-hill—F. house and laundry, area 5,700 ft. 880  
Spitalfields—11 and 12, Steward-st., f., r. £115 p.a. 1,560  
84, 93, and 94, Gun-st., f., r. £107 p.a. 1,210  
18, Steward-st., f., r. £40 p.a. 680

By MANSFIELD & ROWE.  
Norwood, Farquhar-rd.—The residence called "Hillside," n. 49 yrs., g.r. £30, 10a. 1,510

By F. J. BERRY.  
Peckham—190, 192, and 194, Queen's-rd., n. 60 yrs., g.r. £12 1,050  
190, 192, and 200, Queen's-rd., n. 60 yrs., g.r. 1,010  
212, Queen's-rd., n. 60 yrs., g.r. £9 225

Bermundsey—33, Longley-st., n. 50 yrs., g.r. £9 325  
Rotherhithe—274, Rotherhithe New-rd., n. 63 yrs., g.r. 25  
2 and 4, Chilton-st., n. 34 yrs., g.r. £5 350  
12 and 14, Plough-rd., n. 30 yrs., g.r. £6 380  
291 to 303 (odd), Lower-rd., n. 33 yrs., g.r. £31, 10a. 1,635

Oct. 23.—By J. H. HERRICK.  
Hyde-pk.—84, Orsett-rd., n. 63 yrs., g.r. £10, r. £115 1,310  
A Tavistock-rd., n. 67 yrs., g.r. £8, r. £105 1,350  
6 and 30, Tavistock-rd., n. 67 yrs., g.r. £15, 10a. r. £180 1,335

Baywater—1 g.r. of £95, subject to a g.r. of £3 for 67 yrs. 1,705

By FARRINGTON, ELLIS, & CO.  
Mitcham—1 and 2, Cressfield-rd., f., r. £78 p.a. 1,100  
Beher, West end—Four cottages and 15a. 2r. 2p., f. 1,300  
Hersham—F. g.r. of £30, with reversion in 92 yrs. 720  
An enclosure of f. land, 6a. 0r. 30p., r. £11, 10a. 380

Oct. 24.—By BRADLEY & CO.  
Southend, High-st.—Eight plots of f. land 4,350  
Tyler's-avenue—Nine plots of f. land 2,240  
Paddington—14, Sovereign-mews, n. 31 yrs., g.r. £25, r. £78 p.a. 646

By JENKINS, SONS, & ELLIS.  
Hammersmith—58 to 63, Brook-rd., n. 24 yrs., g.r. £18 1,150

By J. H. BURNELL.  
Hammersmith, Margrave-rd.—A plot of land, 2a. 2r. 38p., f. 5,410

By GRANT & SONS.  
Canada—The Huntington Copper Company's mines, with all rights, works, plant, and machinery 1,600  
Camberwell—61 and 62, Church-st., f., r. £62 p.a. 1,695  
Barking—82, Heath-st., "Blue Anchor" Public-house, f., r. £16 p.a. 250

By C. C. & T. MOORE.  
Mile-end—30 to 80 (even), St. Dunstan's-rd., n. 74 yrs., g.r. £18, 10a. 950

Commercial-rd.—F. standing in Steele's-lane, n. 250 p.a. 500  
Hendon, Marston-rd.—Two plots of f. land 44



By H. J. Bliss & Sons.	
Bethnal-green—20 to 28 (even), Hagen-st., f., r.	£100, 12s.
28, Hagen-st. and 30, Salter-st., f., r. £27. 4s.	
South Kensington—12, Gilt-st., u.t. 42 yrs., g.r.	£7. 7s., o.r. £80
Victoria-pk.—15 and 16, Roke-st., f., r. £31. 4s.	
By NAVION & HARDING.	
Hornsey—45 to 51 (odd), Lightfoot-rd., f., r. £125	1,050
A plot of f. land in Lightfoot-rd.	300
Stoke Newington—57, Mayville-st., u.t. 70 yrs.,	180
g.r. 25, r. £23	600
2 Evering rd., u.t. 88 yrs., g.r. £8. r. £50	100
New Southgate—13, 14 and 15, The Avenue, u.t.	310
59 yrs., g.r. £15, £27	469
Commercial-rd.—34, 36, and 38, Anthony-st., u.t.	585
11 yrs., g.r. £7. 2s. 6d.	336
Canonbury—44 and 46, Hulton-rd., u.t. 29 yrs., g.r.	230
£14, r. £24	450
Hornsey—1 and 2, Virginia-villa, f., o.r. £24 p.a.	350
A plot of f. land in Muswell-rd.	210
Clerkenwell—22, Woodbridge-st., u.t. 23 yrs., g.r.	440
£4, r. £25	
Dalston—8, Downs Pk.-rd., u.t. 77 yrs., g.r. £3 10s.	
o.r. £20	
Stamford—11—1, Market-place, u.t. 30 yrs., g.r.	
£15. 12s., o.r. £25	
Oct. 25.—By BAKER & SONS.	
Romford—1, 2, and 3, Stanley-villa, u.t. 52 yrs.,	615
g.r. £17. 17s., r. £70 p.a.	
By ROBINSON & PARRIN.	
Clatford—2, Brownhill-villa, u.t. 88 yrs., g.r. £6	210
By J. J. DAYRELL & CO.	
Kenilworth—13, Leighton-crescent, u.t. 68 yrs.,	
g.r. £8	

[Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; o.r. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

SATURDAY, NOVEMBER 2.

Association of Public Sanitary Inspectors.—The chairman (Mr. Hugh Alexander) will deliver his annual address. 6 p.m.

MONDAY, NOVEMBER 4.

Royal Institute of British Architects.—Opening meeting of the Session. Address by the President, Mr. Alfred Waterhouse, R.A. 8 p.m.

Society of Engineers.—Mr. Samuel Griffin on "Modern Gas-Engine Practice." 7.30 p.m.

Clerks of Works' Association.—Monthly meeting. Paper by Mr. W. Brown, on "The Construction of Theatres" (Carpenters' Hall. 8 p.m.)

Royal Institution.—General Monthly Meeting. 5 p.m.

Liverpool Architectural Society.—Mr. James Dod on "Diagrams illustrating the 'Liverpool Building Act.'" 7 p.m.

TUESDAY, NOVEMBER 5.

University College, London.—Mr. Hugh Stannus on "The Distribution and Application of Ornament with Reference to Surface, Material, Construction, and Purpose." IV. 8 p.m.

Society of Biblical Archaeology.—The Rev. W. Houghton, M.A., F.L.S., &c., on "The Tree and Fruit Represented by the Tappakh of the Hebrew Scriptures"; and two other papers. 8 p.m.

Glasgow Architectural Association.—Mr. C. McIntosh on "The Elizabethan Style of Architecture." 8 p.m.

WEDNESDAY, NOVEMBER 6.

University College, London (Archæology).—Professor R. S. Poole on "The East in the Middle Ages." (Continued) 5 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting. 8.30 p.m.

THURSDAY, NOVEMBER 7.

Builders' Benevolent Institution.—Annual Dinner, at Carpenters' Hall, London Wall. 6 p.m.

Royal Archaeological Institute.—(1) Mrs. Tirard on "The Great Sphinx of Egypt, with some account of the Spread of the Sphinx Idea in the Ancient World." (2) The Rev. Greville I. Chester on "Sculptures of Oriental Designs at Bradwardine and Moccas, Herefordshire." 4 p.m.

SATURDAY, NOVEMBER 9.

Liverpool Architectural Society.—Visit to the new Infirmary (by permission of Mr. Waterhouse, R.A.). 2 p.m.

## Miscellaneous.

**Norwich Cathedral.**—We are informed that Mr. John P. Seddon has been appointed by the Committee architect to carry out the "Goulbourn Testimonial Pulpit," which is to be placed in the choir of Norwich Cathedral. It is to be executed by Mr. Harry Hems, of Exeter, in oak, carved to correspond in richness and general treatment with the well-known old oak stall-work of the choir. Mr. Seddon has also recently designed and superintended the erection of the altar-rails in the same cathedral, which were executed by Messrs. Starkie Gardner & Co., of London. These consist of a triangular-sectioned brass rail enriched with enamels, supported on a series of coupled marble columns rising from a marble plinth, and with open-worked brass capitals with blue enamel grounds and brass bases. These columns are grouped in pairs, with quadruped and triple groups at the ends. These altar railings were the last work undertaken and paid for by Dean Goulbourn before his resignation of the Deanery of Norwich.

## Chimney-shaft Building Foundation.

A rather high chimney-shaft has just been erected at Messrs. F. S. Hempleman & Co.'s Chemical Works, Rainham, Essex, and forms a prominent landmark on the river side, lying about half-way between the outfall pumping-station at Crossness on the Kent shore, and Purfleet on the Essex shore. We understand that, as might have been expected from the locality of the site, considerable difficulties presented themselves in the foundation, as borings and sinkings proved the strata to be anything but good for such an erection for they showed 3 ft. of made ground, 4 ft. of loamy clay, 16 ft. of soft peat, 5 ft. of soft clay, and 3 ft. of running sand before ballast was reached. To meet this emergency, the foundation was formed with sixty-nine piles of 12 in. by 12 in. pitch pine, which were driven by a 10 cwt. monkey with 10 ft. fall, into the gravel, until the drive was reduced to an average of about 3-16 in. to the stroke. The piles having been cut off evenly, were braced by 12 in. by 12 in. and 12 in. by 9 in. stringers, and the space between them for a depth of 2 ft., and up to the top of the stringers filled in with Portland cement concrete. Upon this surface, 11 in. by 4 in. and 11 in. by 3 in. Burnetts' planks were laid, and then a bed of concrete 40 ft. square and 8 ft. thick. This having been floated up to a perfectly level surface, was left to stand for some weeks, and on being tested was found to be quite even. The height of the chimney is 185 ft., the external measurement at the base 15 ft., and at the cap 7 ft. 6 in., the internal diameter being 9 ft. at the bottom and 6 ft. at the top. The head is built entirely of blue Broseley bricks in cement, and is surmounted by an iron ring cap put together in sections with copper bolts. A 1½ in. by 1 in. lightning-conductor is fixed. The shaft was built from external scaffolding to a height of 25 ft., and above that from the inside. The weight upon the piles is about 1,300 tons. The whole of the foundations and shaft were designed by and have been executed under the immediate personal supervision of Mr. W. Seckham Witherington, F.R.I.B.A., and the shaft itself was erected by Mr. Joseph Blackburn, of Arkwright-street, Nottingham, with Mr. David Ellis as his foreman of the works.

**Berlin a Seaport.**—Although the plan of making Berlin a seaport, as is also proposed for Paris, as is yet in embryo, it is worthy of some mention. The technical press of Germany has taken up the idea with great enthusiasm, the scheme having been propounded by Vice-Admiral Batsch in an article in the *Deutsche Revue*, proposing a canal from Berlin to the North Sea, available for the largest vessels. The author shows that it would be attended with great difficulties to attempt to connect Berlin with the sea by regulating the course of the river Elbe; but that it would be easy to connect the river Spree and the lower course of the Oder with a canal, which, in fact, partly exists. A glance at the map of Germany will show the feasibility of such a plan. As regards the utility of such a canal, the author values it the higher in view of a completion of the Baltic-North Sea Canal, which will greatly facilitate the import of English goods, particularly iron and coal, to the Baltic ports. It is now necessary, says the Admiral, to give the heart of Germany an outlet to the sea, which would be much cheaper for traffic than railways.

**Ashton & Green, Limited.**—We are asked to mention that the business hitherto carried on by this Company has been divided into two distinct and separate concerns, the Iron and Marble Department being conducted by Messrs. Wilmer & Hives, under the style of "Ashton & Green Iron Company"; and the Slate Department by Mr. Ernest Mathews, under the style of "Ashton, Green, Mathews, & Co." The last-named branch will be carried on at 13 and 14, Bury-street, St. Mary-axe, London; Temple-gate, Bristol; Farrington and Bow-bridge Wharves; Stratford; Old Ford; Festiniog, North Wales; and at the various depôts formerly occupied by the Company. This branch of the late Company's business has been under the management of Mr. Mathews since the death of Mr. Ashton in July, 1879. The Ashton & Green Iron Company's business will continue to be carried on at the show-rooms at 11 and 12, Bury-street, St. Mary-axe; 40, Holborn-viaduct, and Temple-gate, Bristol. Mr. Wilmer has for more than ten years managed this part of the late Company's business.

**The Carpenters' Company.**—The Master and Wardens of the Carpenters' Company entertained a number of gentlemen at dinner at their hall on the 24th ult., to meet those who have assisted the Company in the technical education they have been promoting. The Master (Lieut.-Colonel Banister Fletcher), in proposing the health of "The Examiners," said that it argued well for Englishmen engaged in any professional work that they would devote the large amount of time necessary to examine the work of that institution. It might fairly be asked why the Government did not undertake this work, as was done in France and other foreign countries, where a man could go to a national school, and, without fees, learn everything that might be required to give him technical or other education. One was forced back to the fact that things were more expensive in England than on the Continent, and he doubted whether this country would stand the expense sufficient for the purpose he had indicated. Technical education would also have to rely on voluntary effort, until some future Government could see that in it lay the strength and salvation of the country. The City Companies had come forward nobly to help this work, and all those present would welcome the toast with all heartiness, remembering that the gentlemen referred to in it were laboriously engaged in heavy work, who voluntarily assisted the Company in developing technical education; and he could not conceive how it would have been possible for the Company to have done their work without their voluntary services. Sir Philip Magnus, in reply, congratulated the company on the good work that it had done in advancing technical education. Mr. A. Cates also returned thanks. Mr. A. Preston, in proposing "The Lecturers," said that he was informed that the gentlemen who lectured in that hall to audiences of young artisans and working-men students, numbering from 300 to 700, found them thoroughly appreciative of the subjects that were laid before them.

**Building Inspection in Stockholm.**—In a recent article in the *Swedish Journal of Building*, a reform of the building law now in force in Stockholm is urged. At present the supervision of building operations is vested in a "Building Board," and the law ordains that the following five notices of building operations are to be given:—1. Before the fundamental excavations are begun. 2. Upon laying the foundations. 3. Upon the completion of the same. 4. When the building is roofed in. 5. When completed. Our contemporary maintains that these regulations are very defective, inasmuch as there is no supervision whatever from the time of laying the foundations and till the house is practically completed, when the Board may, in fact, condemn the whole structure, to the serious detriment of the *entrepreneur*. The journal, therefore, advocates the appointment of a chief inspector, with a staff of sub-inspectors to watch over the work whilst in progress, and proposes the adoption of the following three additional regulations:—1. Technical examination of the drawings of all new buildings, and the rectifying at that stage of all faults of construction. 2. Examination of the site and the proposed foundation. 3. Control during the whole work, so as to see that the proper drawings are followed, and the material used is sound and good. It is proposed to throw the cost of the latter labour upon the builder, it being maintained that this expense, calculated to amount only to about £50 per house, would be gladly borne by the latter in view of the assistance and the guarantee of good workmanship received in return. Moreover, without such a guarantee no one would purchase or advance money upon new house property. The journal concludes by maintaining that an effective control over the building of houses is as necessary and important as, for instance, the control over the sale of drugs. It may be added that an alteration is to be made in the law of building in Sweden, whereby only architects who have passed certain stipulated examinations will be permitted to erect houses.

**New Canal in Holland.**—The work upon the new canal, which is to connect Amsterdam with the Rhine, is rapidly progressing, and it is anticipated that the canal will be ready in 1891. It is stated that the Government has proposed to the local communes to abolish canal tolls, and that this will no doubt be carried out. By this step Amsterdam and Zaardam would for the first time obtain free access to the sea.



**The English Iron Trade.**—As was to be apprehended, speculation has at length set on hold upon the English iron market, and may be said to be rampant this week. Scotch warrants advanced on Monday from 56s. 9d. to 58s. 3d., but on Tuesday the excitement in the ring was the greatest experienced for years. In ten minutes Scotch warrants jumped from the previous night's finish to 60s., buyers standing at 1d. under that price. Makers' iron is quoted from 1s. to 5s. higher, according to brand. The advance of Middlesbrough pig has been 7s. 6d. a ton on the week; and of Bessemer iron in Cumberland and North-west Lancashire, 9s. a ton. In other districts the rise has not been so rapid, but it is very substantial. The excitement in the Glasgow warrant market on Wednesday was very great, and an immense business was done. The effect of the advances in pig-iron upon finished iron and steel has been to send up the former 15s. and the latter 10s. per ton. The business doing in the manufactured products is not large, however, and is restricted to immediate requirements, as makers are so full of work as to be unable to accept further orders at present. Shipbuilding is proceeding most briskly, and while the number of launches is large, new orders are fairly plentiful. There is continued activity in all branches of the engineering trades.—*Iron.*

**The Sanitary Ware Trade in the Midland Counties.**—We understand that on account of the continued rise in the cost of raw materials and the increase in wages, which have materially increased the cost of manufacture, the Midland manufacturers of sanitary ware have unanimously agreed to lower the discount on their list 5 per cent. on and after the 1st of November. We also understand that a new and revised list of prices for various patterns of chimney-pots made by them will be issued on the same date. Business generally in this branch of trade in the Midlands is very brisk, and many manufacturers have booked orders which will keep them fully employed for several months to come.

**The Morley Memorial College for Working Men and Women**, adjoining the Victoria Hall, Waterloo-road, has, we hear, begun a very vigorous life. Over 450 students have joined within three weeks of the opening day. In fact, they come in with somewhat embarrassing rapidity, and volunteers (both ladies and gentlemen) are urgently wanted, both to teach classes and act as librarians. Six librarians are wanted to take one evening a week each from 8 to 10.

## PRICES CURRENT OF MATERIALS.

TIMBER.		£. s. d.	£. s. d.
Greenheart, B.G.	ton	12 0 0	15 0 0
Teak, E.I.	do.	12 0 0	14 0 0
Log, Siam, U.S.	foot cube	0 3 0	0 3 0
Black, Canada, U.S.	do.	3 10 0	5 0 0
Birch, " "	do.	3 10 0	5 0 0
Rim	do.	4 0 0	5 0 0
Fir, Danisco, &c.	do.	2 0 0	3 10 0
Oak	do.	2 10 0	3 10 0
Canada	do.	5 10 0	7 10 0
Pine, Canada red	do.	3 0 0	4 0 0
" yellow	do.	3 10 0	5 0 0
Lath, Danish	do.	4 10 0	5 10 0
St. Petersburg	do.	5 0 0	6 10 0
Wainscot, Riga, &c.	log	2 15 0	4 5 0
Deals, Finland, 2nd and 1st.	std. 100	9 0 0	11 0 0
" 2nd	do.	7 0 0	8 15 0
" 4th and 3rd.	do.	7 0 0	8 15 0
Riga	do.	7 0 0	8 15 0
St. Petersburg, 1st yellow	do.	11 0 0	15 0 0
" 2nd	do.	12 0 0	16 0 0
" white	do.	7 0 0	8 15 0
Swedish	do.	8 0 0	10 0 0
White Oak	do.	8 0 0	10 0 0
Canada, Pine, 1st	do.	16 0 0	20 0 0
" 2nd	do.	11 0 0	17 10 0
" 3rd, &c.	do.	8 0 0	10 10 0
" Spruce, 1st	do.	8 0 0	11 0 0
" 2nd and 3rd	do.	7 0 0	9 0 0
New Brunswick, &c.	do.	6 10 0	8 10 0
Battens, all kinds	do.	6 0 0	10 0 0
Flooring Boards, sq., 1 in. pre-	do.	0 11 0	0 14 0
pared, First	do.	0 8 0	0 10 0
Second	do.	0 5 0	0 7 0
Other qualities	do.	0 4 0	0 6 0
Other qualities	do.	0 4 0	0 6 0
Honduras, &c.	do.	0 4 0	0 6 0
Mahogany, Cuba	do.	0 4 0	0 6 0
St. Domingo, cargo average	do.	0 4 0	0 6 0
St. Domingo, 1st	do.	0 4 0	0 6 0
Tobacco	do.	0 5 0	0 6 0
Honduras	do.	0 5 0	0 6 0
Sax, Turkey	do.	4 0 0	13 0 0
Porto Rico	do.	15 0 0	22 0 0
Bahia	do.	14 0 0	18 0 0
Satin, St. Domingo	do.	0 6 0	0 10 0
Walnut, Italian	do.	0 4 0	0 6 0

METALS.		£. s. d.	£. s. d.
Iron—Fig, in Scotland	ton	0 0 0	0 0 0
Bar, Welsh, in London	do.	6 10 0	7 0 0
" at works in Wales	do.	6 0 0	6 10 0
Staffordshire, in London	do.	7 10 0	8 0 0

METALS (continued).		£. s. d.	£. s. d.
COPPER—			
British, cake and ingot	ton	47 0 0	48 0 0
Best selected	do.	48 0 0	49 0 0
Sheet, strong	do.	48 0 0	49 0 0
Chili, bars	do.	48 0 0	49 0 0
YELLOW METAL	lb.	0 8 0	0 8 0
LEAD—Fig, in Scotland	ton	12 0 0	0 0 0
English, com.	do.	13 10 0	13 12 6
Sheet, Spanish	do.	14 8 0	0 0 0
Tin—Strait	ton	94 0 0	0 0 0
English ingots	do.	98 0 0	0 0 0
Zinc—English sheet	ton	0 0 0	0 0 0

OILS.		£. s. d.	£. s. d.
Linsed	ton	20 17 6	21 3 0
Cocanut, Coochin	do.	20 15 0	21 0 0
Caylon	do.	23 10 0	24 0 0
Palm, Lagos	do.	23 10 0	24 0 0
Rapeseed, English pale	do.	31 0 0	32 0 0
" brown	do.	29 10 0	30 0 0
Cottonseed, refined	do.	23 10 0	24 0 0
Tallow and Oleine	do.	21 0 0	40 0 0
Lubricating, U.S.	do.	7 0 0	12 0 0
Tar—Stockholm	barrel	1 6 0	0 0 0
Archangel	do.	0 15 6	0 15 9

## CONTRACTS.

Epitome of Advertisements in this Number.

### CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Roadmaking Works	Tottenham Local Bd.	J. E. Worth	Nov. 5th	ii.
Lime and Cement	Mile End Vestry	J. M. Knight	Nov. 6th	xii.
Lighting, Recent's Canal	do.	do.	do.	xii.
400 Scholar Ladders	London County Council	Official	Nov. 7th	ii.
Iron Hurdling, Gates, &c.	Met. Asylums Board	do.	do.	ii.
Roadway	Trustees of Dr. Edward's & Bishop King's Charity	E. F. Roberts	Nov. 11th	ii.
Construction of Road	Southport Corporation	Official	do.	ii.
Tar-paving and Roadmaking	Central London School District	Jarvis & Son	do.	xii.
Lamp Columns	Hendon Local Board	do.	do.	xii.
Broken Granite	Edmonton Local Board	G. E. Escher	Nov. 12th	ii.
Roadmaking Works	Lewisham Bd. of Wks.	Official	do.	xii.
Underground Urinals and Closets	Com. of Sewers	do.	Nov. 15th	ii.
Main Drainage Works	Manchester Corp.	J. Allison	Nov. 23rd	xii.
Stores and Materials	Cheshire Lines Com.	Official	Nov. 30th	ii.

## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

<b>BECKENHAM (Kent).</b> —For the erection and completion of new parish room, for the building committee of St. Michael's and All Angels, Beckenham. Mr. P. Brown, architect, Anerley, S.E.—	
Syme & Duncan, Beckenham	£235 0 0
J. Smith & Son, South Norwood	797 0 0
Caplan & Hedgrave, Waddon Works, Croydon	649 0 0
Reid, Beckenham	648 15 0
<b>BROMLEY (Kent).</b> —For the erection of a boundary wall in Beckenham-lands, for the Bromley School Board. Mr. Hugh S. Crogeon, Surveyor.—	
G. H. Lay	£205 0 0
J. L. Woodmans	280 0 0
J. Taylor & Son	275 0 0
J. Pidgeon	275 0 0
E. Peill & Sons	269 0 0
T. Crossley	253 0 0
C. Sutcliffe (accepted)	250 0 0

<b>CHICHESTER.</b> —For the erection of six cottages at Chichester, for Messrs. T. Norfolk & Sons. Mr. Thomas Dinwiddie, architect.—	
Oliver, Chichester	£1,410 0 0
Hall, New Cross	1,124 0 0
Jerrard, Lewisham	1,092 0 0
Kennard Bros, Lewisham	1,080 0 0
Holloway, New Cross	1,079 0 0
Knight, Sidcup	1,047 0 0

<b>CORK.</b> —For additions to Cork Lunatic Asylum. Mr. W. H. Hill, B.E., F.R.I.B.A., architect. Quantities by Messrs. Patterson & Kemper, Dublin.—	
B. McMillin, Cork	£13,525 0 0
F. Nunn, Killarney	22,280 0 0
E. W. Johnson, Cork	22,147 0 0
E. & P. O'Flynn, Cork	22,055 0 0
Martin, Belfast	21,903 0 0
Samuel Hill, Military-road, Cork	21,139 0 0

<b>CROYDON.</b> —For the erection of stables and conservatory, Addiscombe-road, for Mr. D. L. Howell. Mr. D. R. Dale, architect.—	
---	--

<b>Stables.</b>	
Hayworth & Son	£787 0 0
J. Smith & Son	717 0 0
Marriage	609 0 0
Hoare & Son (accepted)	598 0 0
<b>Conservatory.</b>	
Dashwood & Co.	289 0 0
Weeks & Co.	227 0 0
Hoare & Son (accepted)	220 0 0
Dean & Co. (no lantern)	212 0 0
Marriage	200 0 0

<b>GREAT WAKERING (Essex).</b> —For the erection of a Congregational Chapel, for the building committee. Mr. Charles Pettew, architect, Chelmsford.—	
Wiggins & Burgess, Great Wakering	£774 14 0
W. E. Letch, Braintree	£740 0 0
C. E. Orfeur, Colchester (accepted)	690 0 0

<b>KEYHAVEN, MILFORD-ON-SEA (Hants).</b> —For the construction of wharves and docking to port. Mr. W. Charles Evans, F.R.I.B.A., surveyor.—	
W. Jansaway, Southampton	£1,700 0 0

<b>LEEDS.</b> —Accepted per schedule of prices, for erecting house, warehouse, &c., Stoney Rock-lane, Leeds. Messrs. Swale & Mitchell, architects, Chelmsford.—	
Mass and Blackburn—Wm. Shephard, Joiner—J. Lindley & Son, Plumber—Geo. Rowley, Painter—J. D. Dakin, Slater—T. E. Heavysides, Painter—J. T. Thompson.	[All of Leeds.]

<b>LEIGH (Essex).</b> —For building a new residence. Mr. W. Winn, architect, 22, Surrey-street, Strand, W.C.—	
C. E. Orfeur, Colchester (accepted)	£285 0 0

<b>LONDON.</b> —For pulling down and rebuilding "The George and Dragon" and coffee tavern adjoining St. John-street, Clerkenwell, E.C., for Mr. W. Pierpoint. Mr. H. L. Newton, architect, 49, Victoria-street, Westminster. S.W. Quantities supplied.—	
H. Smith & Son, Kensington	£3,987 0 0
Perry & Co., Bow	8,563 0 0
Patman & Fotheringham, Holborn	8,083 0 0
Kirk & Randall, Woodrich	7,800 0 0
J. Beale, Westminster Bridge-road	7,400 0 0
S. Godden, Bryanston-square	7,392 0 0
S. R. Lambie, Kentish Town	7,945 0 0
H. Hurman & Sons, Kensington	7,295 0 0
G. E. Todd, Hackney	7,295 0 0
Gould & Brand, Camden Town	7,189 0 0
C. Dearing & Son, Essex-road	7,139 0 0
J. Milroy, Baker-street	6,943 0 0
W. L. Kellaway, Clerkenwell	6,918 0 0
* Accepted.	

<b>LONDON.</b> —For alterations and construction of mortuary, post-mortem room, carpenters' shop, &c., at the Whitechapel Workhouse, for the Whitechapel Board of Guardians. Mr. Bruce J. Capell, architect, 70, Whitechapel-road.—	
Lattin	£430 0 0
Wilson	422 0 0
Neeve	394 10 0
Gladding	369 0 0
Cox	369 0 0
Londale	348 0 0
Lusk	340 0 0
Edwards	340 0 0
Hunt	338 0 0
G. Barker	335 0 0
Horey	333 0 0
Lobb & Oliver	327 0 0
Bardell	320 0 0
Catmar	318 0 0
Gilbey	316 4 10
Pennack	310 0 0
Robertson	306 10 0
Rolland	297 0 0
Aldridge	290 0 0
Torode	290 0 0
Edmonds	288 0 0
Norberry	273 10 0
Humphreys (withdrawn owing to error)	243 10 0

<b>LONDON.</b> —For alterations to Wellington Club, Islington, for the Salvation Army. Mr. J. Williams Dunford, architect.—	
S. Blow	£1,670 0 0
T. Andrew	1,380 0 0
G. Barker	1,278 0 0
Whitehead & Co.	1,050 0 0
Coxhead	1,037 0 0
Bardell	880 0 0
Robson	860 0 0
Martin & Barclay	831 0 0
Channing	877 0 0
Waite	840 0 0
Jarvis	830 0 0
Wood	798 0 0

<b>LONDON.</b> —For alterations to the United Radical Club, Ray-street, Hackney-road, E. Mr. W. Batten, architect.—	
Taylor	£1,297 0 0
Ergent	1,277 0 0
Higgs	1,248 0 0
Counsell Bros.	1,016 0 0
Jarvis	960 0 0
Watkins	921 0 0

<b>LONDON.</b> —For alterations, &c., at the "Meyrick Arms," Clapham Junction, S.W. Messrs. W. E. Williams & Son, architects.—	
Gregory	£1,447 0 0
Barker	1,335 0 0
Thomerson & Son	1,280 0 0
Todd	1,190 0 0



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**& CO. LIMITED,**  
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# The Builder.

Vol. LVII. No. 240.

SATURDAY, NOVEMBER 9, 1895.

## ILLUSTRATIONS.

The Duomo, Milan: Proposed new West Façade.—Mr. Daniel Brads, Architect .....	Double-Page Ink-Photo.
Ladies' Residential Chambers, Chelsea-street, W.—Mr. J. M. Brydon, Architect .....	Double-Page Photo-Litho.
Project for the West Window of Chesterfield Church.—By Mr. F. Hamilton Jackson .....	Double-Page Ink-Photo.
Cottages, Little Suffolk-street, Southwark.—Mr. E. Hoole, Architect .....	Single-Page Photo-Litho.
The Red-cross Hall, Southwark.—Mr. E. Hoole, Architect .....	Single-Page Photo-Litho.

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### Some Further Notes at the Recent Art Congress.



THE collected papers of the second Art Congress will present, when published together, a great amount of thoughtful criticism on artistic subjects, coupled, no doubt, with a certain degree

of mere sentimentalism, but at all events free from the extravagance which characterised some of the utterances of last year at Liverpool. Conspicuous among those which go to answer the question, what is the practical use of these gatherings, is the paper read by, or at least written by, Mr. G. F. Watts, on "The National Position of Art." This critical reflection, by an artist of singularly high aims and living entirely for his art, on the condition and aspect of the everyday life of his generation, serves at least to remind people how far we are, as a nation, from any real delight in life such as art can afford, and how much people need to be reminded and appealed to not to lose all consideration of the possibilities of beauty and interest in everyday life. Mr. Watts's voice comes indeed to the generation among which he lives as the voice of some seriously-minded artist of the early Renaissance days, who has lost his way by unhappy chance amid a utilitarian and money-making generation. He speaks to a public who mostly know nothing of the kind of interest in life which he sets before them; he is the voice of one crying in the wilderness; but such voices, though never popular, are not always without their effect. The two most striking points in Mr. Watts's paper are his remarks on the machinery question—an old subject, but which he puts in a more striking light than usual; and on the position taken by the artist in England at the present day. Will not some of the great employers of labour take to heart a great artist's appeal to them, to endeavour to preserve the human element in work as far as possible, not merely for the sake of the work but for the sake of the workman? "If by these meetings," says Mr. Watts, "the minds of those who are in power in the commercial world, the heads of firms, often themselves men of culture, lovers and collectors of art, can be awakened to the inestimable worth of en-

couraging their workmen to be artistic by all possible means in their power, they will be rendering their country as splendid and far-reaching a service as the poets or philosophers of the day." Here is certainly a noble ambition suggested for great employers of labour. "Very noble, no doubt, but not business," some will reply: "not the way to make money." Perhaps not, in the usual business sense; but on the other hand is there not something almost grotesque in the contrast between the means and the end pictured in Mr. Watts's next sentence?

"The proportion of things is seldom kept in view. In the haste to be rich the very man, perhaps, who finds his most refreshing leisure within the walls of his private picture gallery, is in his daily work assisting to extinguish the life of this very Art, of which he believes himself to be so devout a lover; turning his workmen into machines, and pouring hideous and badly-made articles out upon the world, every one of which weighs in the scale against the chances of a national life for Art, as it does against national reputation."

The other remark we referred to, in regard to the position of the artist, will be a very novel one to some. We have been familiar in times past with the cry that artists were neglected and not treated with sufficient respect by Society; a cry that the artist can hardly raise now, when in truth the danger seems to be that he should be petted and pampered by Society much more than is good either for him or his art. Mr. Watts is not asking that he should be made more of, but that more should be asked and expected of him:—

"In enterprise, in arms, in poetry, in worthy and high aims, the British nation can claim a dignified place among the most dignified. Can as much be said of the distinctive character of her school? Individual names will start into memory, and to these time will do justice, but I cannot think the school displays efforts worthy of the mental activity of our time. The ever-increasing sense of justice, the almost entirely modern development of sympathy, the desire to cast off hypocritical disguises at all costs, and the effort after truth in all things, is not evident in our art as a School.

For the professor of art is not called upon by the State to record the widely reaching influence of the British nation; of its greatness no splendid reflex is required from his hand. True, he is asked to portray the nation's heroes, its prophets and its poets, but he is not himself asked to speak in stirring language or stand among the leaders of thought as one of them, and point towards the light of progress, to which all the earnest-minded of to-day are pressing.

We want more intellectual demand made upon our artists."

We look upon this as a very remarkable and weighty thought—perhaps the most so which the congress has produced. In the Renaissance period the great artists and poets were the great men of the day; a generation or two since this was to some extent the case in France, where even now there is more trace of it than there is with us. In England it certainly cannot be said that our great artists are leaders of thought and action, nor for the most part, perhaps, that they are fitted to be so. Modern English art seems not less remarkable for the wide diffusion of a certain standard of technical excellence, than for the equally wide diffusion of a kind of dead level of intellectual commonplace. The complaint against contemporary painting and sculpture, especially as illustrated at the Academy, is not so much feebleness of execution as feebleness and commonplace of intellectual meaning. The higher demand on them which Mr. Watts wishes for is the most certain means of producing the higher effort: to adopt Sir F. Leighton's words, "What the public wish for they will have." In France a more serious view is taken of the position and calling of an artist, and certainly the French paintings of the day, as collected recently in the Paris Exhibition, indicate the existence of a far keener and more serious interest in life than is reflected from the walls of our Royal Academy.

How little we do for our artists, to give them either the opportunity or the stimulus to produce the highest they can, was a point forcibly touched in Mr. Rathbone's able paper which we have before referred to, in some remarks partly with regard to the eminent painter whose words we have just been quoting. He maintains (going perhaps a little too far in this) that it is false to assert that Florence had powers and genius at her command which we are without. But that we have not made the most of the great artists we have had and have is, we fear, painfully true.

"We have had and have such opportunities, and have thrown and are throwing them away with more than culpable negligence. We gave to Flaxman no opportunity for the display of his singularly graceful genius, and it has been lost for ever to England. We might have had in Alfred Stevens's monument of the Duke of Wellington a work of art of which the fame would have rung throughout the world, and we have thrust it away unfinished in a corner of St. Paul's Cathedral, where it is impossible to see it, having worried the unfortunate artist to death before he could complete it. Future ages, when they gather up the remains of the noble and lofty



genius of G. F. Watts, will not be able to repress their contemptuous scorn of the generation that gave him no opportunity of worthily displaying it."

This latter remark is more true than even some of those who are most interested in Art have probably realised. It is a really extraordinary thing, when we consider what is done by other nations in the past and in the present, that so great a painter as Mr. Watts should not have had any great opportunity given him by the English Government to execute monumental work on a great scale. Look at the great opportunity just now given by France to Meissonier—an artist who, in spite of his wonderful technical powers, is intellectually on a far lower level than Mr. Watts—to decorate the Panthéon: and consider that we as a nation have never encouraged or enabled our great painter to do anything more than paint isolated pictures and exhibit them in annual picture-gallery shows. The contrast is certainly a striking one, if English people could be got to look at and consider it.

We are disposed to think, apart from any natural and special interest in architecture, that the Presidential address in the Architectural Section, by Dr. Rowand Anderson, was the best of all the Presidential addresses delivered at Edinburgh. It was an admirably reasoned and logical statement of the position and function of architecture as an art. Dr. Anderson's object was to emphasise the constructional basis of architecture, and to combat the superficial view of Ruskin, blindly accepted by many persons who are carried away by his eloquence without considering what truth there is at the bottom of it, that a building is only architectural when it is ornamented. Architecture is the expression of constructive function; and in urging this view of the subject, Dr. Anderson went so far as to say that "the designing of machinery, whether for peace or war, has now reached such a high standard of excellence in function, form and expression, that these things are entitled to rank as works of art as much as a painting, a piece of sculpture, or a building," and also that machinery is the only true constructive art that has been produced since the decline of mediæval architecture.

"That may seem to many of you a strong statement, but if you turn it over in your minds it will lose that character, and you will recognise the truth of it. Do no misunderstand me by thinking that I want to raise steam-hammers and pumps, or the work they do, to the level of a painting or fine piece of sculpture. The work done by many of these machines is, I am sorry to say, of the most pernicious kind as far as art is concerned. All that I maintain is that the machine itself is a true work of constructive art, and ought to be recognised as such. Moreover, in conjunction with the best art of former days, they teach this important lesson, that man cannot, unless warped by bad education and false criticism, construct anything except in a natural, functional, and therefore artistic manner."

In illustration of this Dr. Anderson gave in another part of his paper an amusing account of the manner in which a late eminent archaeological architect attempted to solve the problem of designing fitly a kind of building for which he had no precedent in Mediæval architecture:—

"Overhanging the steep cliffs of the Calton Hill is what looks like a castle, recalling some of the English and Welsh ones. As a matter of fact, it is mistaken by many who enter Edinburgh for the first time by the North British Railway, to be the world-wide-known Edinburgh Castle. I remember meeting the late Mr. Billings, the architect and author of the well-known work on the Baronial and Ecclesiastical Antiquities of Scotland. I had just before then seen a building of his erected for the North London Waterworks. It is in the form of a castle. I asked him why he made a water-work like a castle. His reply was: 'What would you have me make it like?' I replied, 'A water-work'; but said he, 'Can you tell me what a water-work is like, as I must have a type to work from?' As I could not do so, or convince him that he might originate one, I had to retire from the dispute, leaving Mr. Billings quite satisfied that a castle was a very good representation for a tower for pumping up water. The architect of the Calton Jail, under the influence of the prevailing taste of his day, must have looked at the problem he had to solve from the same standpoint as Mr. Billings. He wanted a type to work from, and he chose the Castle; but, as a castle is a place

to keep people out, and a jail to keep people in, see what a deplorable result."

In regard to the latter sentence, it might perhaps be urged that as the object in each case is to prevent anyone getting over the wall, one way or the other, the architectural expression of the two might reasonably be rather similar; but the general truth of the position taken up is unquestionable. Carrying on the same argument in the concluding paragraph of a paper which will add a great deal to the value of the next volume of the *Transactions of the Association*, he said:—

"It is still too much the fashion to rely on the clever imitation of old work, without its reality and functional truth. I am told that much of the picturesque modern timber-framed houses in England have very little framing in them; it is all on the surface—a mere external show. The same may be said of the grand old fire-places of our forefathers, which require too often a real one within the show one, as the public, however much they may like to delude themselves about the real place, will not stand a smoky chimney. How can any good come out of such work? It may live for a while like many other fashions, and until some one writes up some other of the numerous phases of art, when we are surfeited by what we have been indulging in. The greatest and only hope of architecture lies in a healthy, intelligent public opinion; they must ask for and insist on getting structures soundly and sanitarily constructed, adapted to the purposes for which they are erected more than ever they had done; and although I say that every other consideration is to yield to this, in conjunction with this healthy public spirit, the proper education of architects must keep pace with it, because the public cannot do as a body the work of specialists; then men able to carry out such buildings in an artistic and truthful manner will, by reason of this determination, be called into existence. Architecture must cease to follow the transient literary and æsthetic fashions of the day, and must be based on the art from which is useful or mechanical, of architecture from building, and all the talk about applied art must give way to that which is produced as in nature. All these must pass away if we are ever to get into a clearer atmosphere of reality than now surrounds us, and we must put ourselves in line with the science of the day, then we may look forward to erecting buildings, fitly representing the ideas and wants of the age with a constant succession of ever-varying expression and beauty, natural dignity, and not artificial picturesqueness."

The same general idea about architecture, as being in reality the expression of structure and function, formed the keynote of the interesting and piquant paper read by Mr. J. D. Sedding at the Friday morning continued meeting of the sections of sculpture and architecture; a paper which, with that which followed it by Mr. Stirling Lee, led to some rather lively though good-humoured sparring among architects and sculptors present. The point of Mr. Sedding and the architects, which we must be allowed to say we do not think the sculptors quite understood, was of course that architecture is itself a form of artistic expression, quite apart from any further expression which it may derive from the addition of sculpture: that there may be the artistic or inartistic element in *plan* even, apart from any consideration of the detail of the exterior elevations. The expression used above by Dr. Anderson, as to the art which is produced "as in nature," means that Architecture must be the expression of function just as the structure and design of animals and plants is the expression of function. It is odd that sculptors who are constantly employed in modelling figures the design of which is the expression of function, cannot see the same thing in architecture; but of course as long as they are so indifferent to architecture, and only think of the architect as "the man who makes the box," they are not likely to see it. In regard to the relation between sculpture and architecture, however, Mr. Stirling Lee made a really good point in criticism in his idea of regarding sculpture as in reality a higher form of masonry, and in his remark that "if our art" (the sculptor's) "is built up of the union of geometry and anatomy, and in accordance with the limitations of our material, it follows that the anatomical art which ignores geometrical form, however true it may be in itself to the human body, is not suitable for architecture, which is nothing if not a geometrical science."

That is a view of the relation between architecture and sculpture which gives matter for a great deal of thought. In regard to the question of æsthetic relation of architecture to sculpture in the more usual sense, Mr. Mullins's paper at the Wednesday morning meeting offered a suggestion as to the manner in which an architectural framework may assist the sculptor in getting over some of the difficulties imposed on him by modern costume:—

"I think it is almost impossible to render interesting or attractive a portrait statue in modern dress, when placed in an open space—out of doors and with no near surroundings. But place the same statue by a building; either on a pedestal, in character with the architecture, or in a niche; and the monument will be then in place, and the straight up and down clothes will be a matter of less importance; they will challenge the eye less, and the statue will not at any rate be condemned because of them. I could mention several instances where this has been done; but I will only allude to two:—the more modern figures carved on the Podium of the Albert Memorial in Kensington Gardens, such as Goethe and Turner, are as interesting as their more sumptuously or artistically clad neighbours; and as they are by the same artist's hand, it is fair to infer that modern dress will lend itself to treatment; but the figure must have a home. The other is the statue of Lord Herbert of Lea at the War Office; an excellent statue, but the excellence of which is greatly enhanced by the position in which it is placed."

We may observe, however, that the last-named statue is not really placed as part of an architectural design; it is only the central object in a courtyard. As to the gain in interest to a building, and to an average portrait statue, when the latter is niched in the architecture, there can be no two opinions; and as another example of what the French are doing to encourage their own artists, we may allude to the account in our Letter from Paris, in another column, of the intended commission for no less than forty-six portrait statues for the Tuileries buildings. But when it is a question of an ideal work of sculpture of the highest class, we very much question whether the sculptors are taking the best ground for themselves if they wish their best work to form a portion of architectural decoration. For one thing, a figure or group of the highest class ought to be capable of being looked at all round—a point on which sculptors will often insist very strongly; and a work of this class ought to have so much intellectual interest concentrated in it as to be a central object in itself. We came with delight the other day on Mercie's noble group, "Gloria Victis," in the centre of one of the courtyards in the Hôtel de Ville at Paris; it seemed admirably placed there; we should not have liked to see it in a niche on the front of a building.

One of the most admirable of the shorter papers at the Congress was Mr. C. W. Whall's on "Suggestions for Artistic Co-operation," from the point of view of a decorative artist working with or under an architect. Mr. Whall, a true artist himself, is more loyal towards the architect than some less able artists, and urges that the decorative artist should be willing to follow fully the wishes of the architect in regard to the *ensemble* of the building, but on this understanding, that the architect should not fetter his ideas by any sketch. Let the architect's direction to the decorative artist, he says, have these three qualifications; let it be verbal, let it be ample, let it be final; but do not impose a sketch on him, unless you are prepared to do without him and carry out the sketch yourself. The sketch, once made, fetters his ideas; he cannot get it out of his mind, though he might have produced something much better if left unfettered. We must refer also to Mr. Whall's suggestion for a self-education of the taste: "How are we to know good ornament from bad?"—

"Do you wish to have a home, cultivated, refined, artistic? Then begin with one pot room. Your boudoir, ladies (and I am told that the best translation we have of 'Parthenon' is 'boudoir'), the private, inner, living-chamber of Pallas, presiding genius of all that is domestic, dignified, refined—your snugness, gentlemen (is less dignified word, and I cannot, unfortunately, supply you with Greek



for it; strip it of everything, to the bare walls, without cornice, or wainscot, or paper, and then start to decorate and furnish it, observing only one rule—to admit into it no ornament, and as little as possible even of fabric, which has been touched in any way by machinery. If you really care about beauty enough to think it worth time and trouble, I believe that this rule would result in a search for the beautiful, which would lead you into pleasant places where the neglected hand-industries languish unnoticed."

We have seldom seen a better practical suggestion for the cultivation of artistic taste.

There are many more papers in the series, well worth thought and notice, which we may return to at another time; they will all, we hope, have a permanent form in the published volume of Transactions. For the present we close with one suggestion: it is really desirable to split these Art-Congresses up into sectional meetings? We heard frequently from various speakers about the unity of art. "There is but one art," &c. Then why have separate sections for different "arts"? Both artists and the public would learn more by considering the subject as one great whole.

#### THE LESSON OF THE GLASGOW DISASTER.

**I**F the main facts as to the fall of the Glasgow mill are correctly given in the Glasgow papers, as we see no reason to doubt, there can be little or no question as to the cause of this terrible catastrophe. Like the Tay Bridge disaster, it has been due to an unusually violent wind-pressure against a structure not in a condition to resist the strain. At the first moment something was said as to insecurity of foundations, and it was mentioned that the force of the gale had been greater in the earlier part of the afternoon than at the time the accident happened. But both these assertions appear to have been disposed of since. Mr. Grant, of the Glasgow Observatory, writing to the *Glasgow Herald* of the 4th, gives the velocity of the wind for each quarter of an hour during the afternoon of the 1st, from which it appears that at 5.15 the velocity registered, forty-eight miles an hour, was higher than at any other part of the afternoon; and the anemometer at the Observatory only registers general rate of travel of the wind in a given time, not the pressure of sudden gusts, of which there were probably some which for the moment were at a much higher velocity than the general one indicated. It is stated, on what seems good evidence, that the foundations and the brickwork were thoroughly sound. What then was wrong? Simply that a couple of walls 185 ft. long and about 70 ft. high, without any intermediate cross wall, without the shelter of a roof or the breaking up of the vertical height by floors, were suddenly subjected to a heavy pressure of wind while the work was yet new. Had the roof been on and the floors in, the building would never have succumbed to the wind. It is stated that the main beams for the floors were in, which would form a certain degree of tie between the walls,—how much we cannot tell till an official inquiry elicits the details of construction,—but if there was a swoop of wind into the interior of this great shell of wall, it would tear the further wall away from the beams, which would be of little value as ties in such a case. Had the floors been in, though they had no bearing and no tie except on the cross beams, the gust would have been kept out of the interior of the shell, at all events, and would have had no hold on the inner surface of the further wall. The *Glasgow Herald*, in a leader of Nov. 4, asks whether this is not a case for reconsidering the building regulations of Glasgow:—

"The London regulations on these points are as clear as they well can be. They require that warehouses rising to the height of 70 ft. must possess walls with a thickness at the base of 30 in.; and also that every warehouse or other building used either wholly or in part for the purpose of trade or manufacture, containing more than 216,000 cubic

feet, shall be divided by party walls in such a manner that the contents of each division shall not exceed the above-mentioned number of cubic feet. If these rules are applied to the building which fell on Friday night, what is the result? In height Templeton's mill would be somewhat about 70 ft., but at the base the walls were not more than 25 in. thick, whilst they were only 18 in. on the upper floors. The cubical capacity of the mill must have been about double that mentioned in the London Act, and yet the precautions found necessary in the metropolis seem not to have been taken here. Are there any reasons why such a difference should prevail? Is the margin of safety too great in the one case or too small in the other? These are questions which seem to press for answers in the interests of the public."

As to the thickness of walls the writer of the above is mistaken. The walls of the Templeton mill appear to have been of the same thicknesses as prescribed by the Metropolitan Building Act, which, for height up to 70 ft. and "length unlimited," gives 26 in. for the lowest story of the wall. As to cubical capacity, that of the Templeton mill was a good deal more than double the 216,000 ft. of the London Act, but the restriction in this respect is made more with regard to fire risks than to constructive safety. It would be ridiculous to suppose that a building of that length and height cannot be constructed so as not to be in danger of being blown down. But the moral of the catastrophe is that a building should be constructed so as to be safe while in process of being completed as well as when completed. Once roofed and floored, we have no doubt the Templeton mill would have been perfectly safe against any wind, but it had too small a factor of safety to withstand an unexpected strain when not covered in; and by an unhappy chance a gale arose just at the critical moment to test it. Had the building been constructed in ordinarily calm weather, no question of its security would ever have arisen. What is clearly evident now, when too late, is that such a long and high wall was not safe during the time the building was standing empty and uncovered. The practical lesson is that in such cases either the floors should be filled in concurrently with the progress of the building; or, which is a much better way to look at it, that the wall should be rendered stable in itself by the good old Medieval engineering expedient of deep buttresses at intervals. We gather that there were no such buttresses. The result also seems to indicate that our Metropolitan Building Act provisions for walls of this height and of "length unlimited" are not adequate for every possible case, and will bear revision.

The detailed evidence which will be forthcoming at any inquiry which may be held may throw some new light on the matter; but we do not expect that there is anything further to be known which would materially modify the above view as to the cause and the moral of the calamity.

#### NOTES.

**I**T would be waste of space to criticise seriously the extraordinary article which Lord Grimthorpe has been allowed to write in *Murray's Magazine* on "Church Restoration Principles." As long as the public and editors of newspapers and magazines are so ignorant and silly as to believe that the whole architectural profession are fools or worse, and that Lord Grimthorpe is the only person who understands the subject, because Lord Grimthorpe tells them so, it seems useless to argue with them. The opinions of people who can be taken in by such ridiculous boasting are not worth taking into consideration at all. We may just remark that, as usual, Lord Grimthorpe entirely begs the main question as to what he has done at St. Albans; which, as we have said over and over again, is not whether such and such rebuilding or restoration ought to have been undertaken at St. Albans, but whether he was a fit and proper person to be allowed to carry out such work at his own pleasure on a great national building. How fit he is has been conclusively

shown by the monstrosity which he has erected at the end of the south transept of the cathedral, which is there for every one to see; add to the eloquence of that condemnation no protest of ours can add anything. Two things in the article are, however, too amusing to pass over. One is the remark that "nothing is more delusive than the noise that a very few people can make in newspapers that help them." Was Lord Grimthorpe thinking of his own repeated letters in praise of himself and in abuse of everybody else, which the *Times* has for many years so complacently printed? The other is the remark with which he introduces at the end of the article a laudatory Latin poem on his own work at St. Albans. He says "some persons, whose letters show their education, though unknown to me, have published their opinions, where they could," in favour of his work. "Here," he continues, "are some Latin verses sent a few months ago, with initials which will be recognised as those of one of our most distinguished Latin scholars, on these very transepts. Many persons who have seen both wish to see the lines published. I wonder how many great—or small—scholars have written poems in praise of any product of the Royal Institute of British Architects." This would be childish enough even if the verses were, as the reader is intended to think, the spontaneous tribute of one of the unknown admirers. Unfortunately, we happen to know that the signature of the verses, "J. G. L." is that of Canon Lonsdale of Lichfield, and that he is Lord Grimthorpe's brother-in-law. And it is this specimen of the "family puff" that Lord Grimthorpe has the effrontery to offer to the public as an example of the admiration which his architecture has aroused in men of cultivated minds!

**S**OME tentative excavations are being made by the Greek Government at Lykosuta, in Arcadia, which already promise to yield rich results. Lykosuta was accounted to be the most primitive city of primitive Arcadia,—in the words of Pausanias it was the first city "looked on by the sun." Just outside the circuit of its walls was the ancient sanctuary of a primitive goddess, known as Desponia the Mistress. To the description of this sanctuary Pausanias (viii. 38) devotes a whole chapter. Within it he saw altars and statues to Demeter, Desponia, and the Great Mother, and he notes as remarkable that the statues of Desponia and Demeter, the thrones on which they sat, and their footstools, were all carved out of one block of stone without any manner of join. The stone was not brought from a distance, but quarried on the spot in accordance with a dream oracle. The statues were by Damophon. Desponia was represented holding a sceptre in one hand and with a cist resting on her knees. Already the excavators have happily lighted upon the precinct; they have found three colossal heads and a portion of a large marble relief, countless votive terra-cottas representing rams and snakes; a few inscriptions show that the offerings were made to Desponia. She is a goddess whose worship was closely allied to that of Demeter, Persephone, and other under-world deities, but whose personality we should be glad to be able to fix more precisely. A brief notice of the excavations will be found in the *Berliner Philologische Wochenschrift*, October 26.

**T**HE able and enthusiastic speeches which were made at the first dinner of the Institution of Electrical Engineers were such as the occasion naturally called forth, with the merit of being on the whole superior in style and oratory to the average of after-dinner speeches at Institution dinners. But the event, the first convivial celebration of this Institution (in its newly-constituted form,—for it was formerly known as "the Society of Telegraph Engineers and Electricians"), and the prophetic tone of the speeches delivered, are too significant to be passed over. Young as the science of electrical engineering is, it



already feels that it holds a large part of the future prosperity of the human race in its hands. Perhaps the most striking remark made in the course of the evening, and the one suggesting most forethought as to the future possibilities of electricity in regard to the amelioration of the conditions of human life, is that of the Marquis of Salisbury in regard to the possible results of the distribution of electrical power:—"If it ever does happen that in the house of the artisan you can turn on power as now you can turn on gas, and there is nothing in the essence of the problem, nothing in the facts of the science, as we know them, that should prevent such a consummation from taking place—if ever that distribution of power should be so organised, you will then see men and women able to pursue in their own homes many of the industries which now require the aggregation at the factory. You may, above all, see women and children pursue these industries without that disruption of families which is one of the most unhappy results of the present requirements of industry. And if ever that result should come from the discoveries of Oersted and Faraday, you may say that they have done more than merely to add to the physical forces of mankind. They will have done much to sustain that unity, that integrity of the family upon which rest the mortal hopes of our race and the strength of the community to which we belong."

**THE** concluding sittings of the Railway Rates Inquiry last week were entirely occupied with the evidence of Mr. Findlay, the General Manager of the London and North-Western Railway, whose examination had not concluded when the inquiry was adjourned. Mr. Findlay was led upon dangerous ground in cross-examination by Mr. Balfour Browne, as to the effect of the legal decision in Hall's terminals case, and made some remarks which brought up Mr. Pope, Q.C., who was evidently apprehensive that his witness might compromise the company. Mr. Pope observed that the London and North-Western Company must not be held committed by any view taken by their General Manager in regard to an interpretation of the law. The great point in support of the companies' claim to make terminal charges appears to be that they perform duties and provide accommodation as "carriers"; a capacity which is distinct (according to their arguments) from that of conveying by rail. It is held that the latter service only is covered by the mileage rates, and Mr. Findlay stated that if the charges claimed were refused, there was nothing to prevent the companies from reverting to their original position,—that was, to convey the goods from place to place, leaving it for carriers to discharge the terminal duties, and make their own charges. At large towns these duties are certainly now inseparable from those of railway companies for many descriptions of traffic, whatever may be the case at smaller stations; and it would appear that a large proportion of the present rates is made up of terminal charges. A case came before the Railway Commission on Saturday last, in which it was admitted that a rate of 9s. 2d. per ton included sums of 1s. 6d. and 1s. 9d. for "terminal accommodation" and "terminal service" respectively at the forwarding station, and 1s. 6d. and 11d. for similar items at the receiving station. It may be mentioned that the mileage charge amounted to 2s. 7d. only, the difference being represented by the items just mentioned, and additional sums for sheeting and cartage. With the favourable legal precedent in Hall's case to back them up, it appears quite likely that the companies may gain their point in this respect.

**THE** seven representative mayors who are to figure after the life in the "Lord Mayor's Show" of to-day were elected within a period of 600 years. The beginning and the close of that interval were marked respectively by two important ordinances for regulating the construction of London houses. In

1189,—the year of Henry Fitz-Aylwyn's appointment,—it was ordered that all houses should be built of stone up to a height of 16 ft., with party-walls of stone to at least 3 ft., and that they should be roofed with slates or baked tiles. It may be worth while to remember that in old conveyances, the word *domus* was commonly employed for a stone building; and wooden tenements were designated as *edificia*. In 1774, a period to be typified by John Wilkes, was passed the lengthy Metropolitan Building Act, the first of its kind,—14 Geo. III., c. 78. Fitz-Aylwyn's mayoralty of twenty-four years was distinguished by the beginning of St. Mary Over's, or St. Saviour's, Church, Southwark; the completion of Peter of St. Mary Colechurch's London-bridge; the making of the "town ditch"; the demolition of Baynard's Castle, and the death (1191) of William Fitzstephen. To Fitzstephen's introduction to his "Life of St. Thomas à Becket" we owe the earliest account we possess of what London was like in the reign of Henry II. He speaks of its 126 parochial churches and thirteen conventual foundations situated within and without the walls, with their posterns and seven double-gates. He describes its numerous open spaces or "rone-lands," large gardens, and refreshing wells. The monasteries of the Austin Friars and the White Friars had not yet arisen; but among his list are to be reckoned St. Katharine's by the Tower; Rahere's Priory of St. Bartholomew; Holy Trinity by Aldgate, whose prior was alderman of Portsoken ward, which, together with Houndsditch and Aldgate, Lord Mayor Isaacs will traverse this afternoon; the Temple, St. John of Jerusalem at Clerkenwell, and the Cluniac monastery at Bermondsey. In 1285 (Sir Gregory de Rokesley, mayor) was begun the great stone conduit in West Chepe, supplied from the Tyburn; in 1397 (Sir Richard Whittington, first time mayor) Westminster Hall was repaired and enlarged by King Richard II. The period covered by Whittington's two later elections, for 1406 and 1419, was marked by the removal of the Guildhall from Aldermanbury to its present site, by a plague that killed some 35,000 inhabitants, and by an order that householders should hang out lighted lanterns after dusk between All Hallowtide and Candlemas day. In 1546 Henry VIII. founded St. Bartholomew's Hospital, and in 1547 (Sir John Gresham) was begun old Somerset House; in 1611 (Sir William Craven) Thomas Sutton bought the Charter House of the Earl of Suffolk for his new hospital; and in 1775 (Wilkes) Somerset House was begun to be rebuilt, as we now see it, after the designs of Sir William Chambers. These several mayors, together with Sir Edmund Shaa, will be personified in the "show."

**ONE** result of the paper that was read by Mr. Belcher at the Institute of Architects last session, on "Musical Requirements in Church Planning," is that the College of Organists have suggested the advisability of a joint committee of their body and the Institute to consider the subject more fully; an idea which will be carried out shortly. Mr. Belcher, Mr. Sedding, Mr. Stannus, and Mr. Statham will represent the Institute of Architects on the committee, and the College of Organists will be represented by Dr. Martin, of St. Paul's, Mr. Parratt, organist of the Chapel Royal Windsor, Mr. Higg, of the Royal College of Music, and Mr. Turpin, the Honorary Secretary of the College of Organists.

**WE** commend to the attention of students of architectural design the paper read by Mr. Bagge at the Architectural Association, and printed in another column, on the treatment of the angles of buildings. The subject is a rather new and very important one, and Mr. Bagge's treatment of it is full of valuable suggestions for young designers.

**WE** have received from Messrs. Hancocks & Co., jewellers, a description and a roughly-executed illustration of a casket made

to contain the address of congratulation from the Corporation of the City of London, presented to the Duke and Duchess of Fife. Of the execution of the work we can of course say nothing from the rough illustration sent; if jewellers want us to say anything of their workmanship they should send photographs. Of the design we can only say that it is the same kind of ill-designed and pretentious commonplace which is to be seen in almost all work of this kind executed in England for official presentations. It is a kind of temple with pavilions at the angles, mounted on steps, and with the City Griffin on a pedestal at each end. The lines of the steps and platforms are most clumsily designed, with not the slightest relationship between the parts, curves stuck on to squares and squares on to curves in a manner that would horrify any one with a feeling for architectural setting-out; and this kind of design is of course architecture in miniature. The decorative details of the upper part are of the most commonplace description; and even if they were better, a casket to hold an address should be a casket, and not a toy temple. No name of any artist is given as the designer, only it is stated that the griffin is copied from Mr. Birch's too notorious griffin on the site of Temple Bar. Otherwise this appears to be, like most things of the kind in London, a mere shop production. If the firm of jewellers who have produced it had gone to a high-class artist to make them a design they might have produced something which it would have been a pleasure to see and to record, and would have had our good word, which they cannot have for this kind of work.

**SOME** very great nonsense was talked by sundry artists at the closing meeting of the Art Congress at Edinburgh, in the discussion upon a very moderate and well-written paper by Mr. Spielman upon "Artists and Critics." Several artists present amused themselves (and some of their audience) by denouncing, in no very courteous terms, all art critics *en masse*, evidently regarding it as little less than impertinence for any one to criticise their works at all. Apart from the main question, we may suggest to artists that as long as their own sympathies in regard to art are so narrow, each class of artists might at all events learn something from the critics about other classes of art than their own. How necessary such teaching is for some of them we may illustrate by two or three examples from our own experience. Speaking to a painter whose works have for many years been hung at the Royal Academy, about a fine piece of sculpture in the exhibition of the year, he replied, "Oh, I never go into the Sculpture Room." Talking to a well-known and talented sculptor about Corot's landscapes, he replied, "Who is Corot?" One of the first landscape painters of the day inveighed violently to us one day against the ignorance of the art-critics in the *Times*, and in the same conversation told us that David Cox was one of the greatest humbugs that ever pretended to be a landscape-painter. If he had found any remark so stupid as that in the *Times* art-critiques, he would indeed have been justified in his diatribe. But let us ask two questions, more directly bearing on the *raison d'être* of art-critics. For whom do the artists produce their work? Not for each other, surely, but for the public; and are they alone of all mankind to maintain the position that the public, or the art critics as representing the cultivated public, are not even to have the right to say whether they like the work offered to them or not? Artists are to produce what they please, and the public are to be thankful for it, and have no opinion of their own! A tolerably modest position, certainly. And our second question is: suppose the critics take the artists at their word, and that next spring every daily paper, every weekly paper, and every high-class magazine, agrees to drop all notice of the Academy and the Grosvenor and the New Gallery, and the two water-colour exhibitions, and all the other displays of art: who would be the first to complain?



## LETTER FROM PARIS.\*

THE official decree closing the Paris Exhibition on the 6th of this month has been so far modified that holders of tickets can still be admitted between midday and 4 p.m. on to the Champ de Mars, and see all that is to be seen without interference with the work of removal. This arrangement appears to be considered generally satisfactory, as it leaves the exhibitors at full liberty to commence the removal of their goods, while it leaves a chance for the rural population, who are now set free from their labours of harvest-time, to still see something of the great show before it is entirely dispersed.

As soon as the Champ de Mars and the Esplanade des Invalides have been restored to their normal condition, the works will be commenced for the railway which is to join that which, at present terminating at the Champ de Mars, connects with St. Lazare by way of Montpierre, St. Cloud, Amélie, and Courbevoie. The section of the line remaining to be completed is about a kilometre. It will be formed in a deep cutting parallel with the Quai d'Orsay and crossed by three large bridges. The cost of the section comprised between the Champ de Mars and the Invalides is estimated at about 2,720,000 francs, and 4,500,000 for the construction of the terminus, which will have a monumental façade along the Rue de Constantin. This piece of line, penetrating into the heart of Paris, may be considered as a first instalment of the long-promised metropolitan railway for Paris, which M. Yves Guyot, the present Minister of Travaux Publics, is doing his best to secure the execution of.

The opening of a number of minor exhibitions when the great Exhibition had closed was to be expected; among the first of these, which was already open last week, were those of M. Bida and M. J. P. Laurens, who have opened exhibitions in the Durand Reel Galleries; the first, a collection of illustrations of the works of Molière and Shakespeare, the second, a collection of forty-two splendid drawings intended for the illustration of M. Thierry's "Recits Mérovingiens." Another special exhibition is that of the works of M. Albert Aublet at the Georges Petit Gallery; a collection including portraits, landscapes, sea-pieces, *genre*, &c.; about three hundred pictures altogether, many of which had better have remained in his studio, being little more than sketch studies for pictures. The collection includes, however, some really fine finished pictures, both landscape and figure subjects.

The École des Beaux-Arts has opened its doors, at the regulation period, for the exhibition of the "Envois de Rome," with which we are less satisfied than last year, except perhaps in regard to the architectural designs. In regard to the painting, the exhibition would give very poor promise for the future, if we did not know that the really clever men, the course of academic education once finished, are ready to throw off all its trammels as soon as they are clear of the Villa Medici, and to burn all the idols they have been officially compelled to worship. The architectural *envois*, however, are many of them of real interest, and at all events bear testimony to the thoroughness of erudition with which this branch of the École des Beaux-Arts is conducted. Among the drawings exhibited, M. Chedanne, who has been one year in Rome, exhibits, along with some admirable drawings of fragments of entablatures, an interior of a Roman house restored, showing both archaeological learning and refined taste. M. Derrasse exhibits some remarkable drawings, especially the reproduction of a fragment of a Pompeian mosaic, from the Naples Museum. M. André sends a restoration of the temple of Niké Apteros, and M. Espouy a restoration of the Basilica of Constantine at Rome, which are meritorious, but are surpassed by M. Redon's very fine restoration of the Temple of Baalbek. We have on previous occasions mentioned the ability displayed in the work of this young architect, and the present exhibit fully confirms the impressions we had already formed as to his brilliant promise.

There are on view at the same moment, at the Hôtel de Ville, the results of four competitions; three in painting and one in sculpture. The latter, for a memorial statue to Condorcet, includes no fewer than 86 models. Many of these represent an elegant and fashionable Condorcet; some show him as a sentimental dreamer, some as a public orator in a magnificently tragic

attitude; but there is not a single work of real power or originality, or in fact worth presenting.

Of the painting competitions, one is for the decoration of the Salle des Mariages for the Mairie of Nogent-sur-Marne. Three painters, MM. Debon, Karbowski, and François Lafon, have been selected to compete in the final competition. Their works are essentially modern in feeling, representations of domestic rural life. It is probable M. Debon's design will be the work ultimately chosen. The two others are competitions for the decoration of the Salons of the Hôtel de Ville, the "Galerie Lobau" and the salon called "Du Siège de Paris." Of the designs for the former the less said the better; they show an entire deficiency of decorative quality, and it is probable the competition will be annulled as having produced no satisfactory result. It is very different with the second-named competition, the results of which have been so remarkable that the jury have selected five instead of three of the competitors to take part in the final competition. These five, in alphabetical order, are M. Arus, a military painter who seems to have inherited some of the brilliant qualities of De Neuville; M. Paul Baudouin, a disciple of Puvis de Chavannes; M. Adolphe Binet, a much appreciated "modernist"; M. Delance; and M. Henri Dupray, the latter in collaboration with M. René Gilbert. These different painters have reproduced with talent almost equal though very different in quality, some of the principal scenes of the melancholy epoch to which the Salon in question is dedicated; the combats under the walls of Paris, the bombardment, the ambulances, and the crowd of women and children sheltering within a gateway from the storm of bullets. In the second competition, the real contest will probably lie between M. Arus and MM. Dupray and Gilbert.

We referred the other day to the scheme of M. Larroumet for the sculptural decoration of the Panthéon. We may now refer to the state of the equally-important scheme for the pictorial decoration of the same building. After many years (sixteen years we believe) M. Meissonier has at last submitted his sketches to the Commission des Beaux-Arts. This portion of the decoration is divided by columns into four compartments, but the composition forms a united whole. In the centre is the chariot of France drawn by lions and surrounded by protecting genii. In front horsemen carrying standards pass in front of an enthusiastic crowd of spectators. Behind the car follow men bearing on their shoulders statues symbolising "Les Arts," "Les Sciences," "Le Travail," and "L'Industrie." Above is a large frieze, each of the four sections of which illustrates a different period of French national history. The first relates to the period from Clovis to Charlemagne; the second, that from St. Louis to Charles VI.; the third from Jeanne d'Arc to Francis I.; the fourth from Louis XIV. to Napoleon I. This will certainly be one of the most curious portions of the Panthéon decoration.

The opening of the Lycée Buffon, designed by Vaudremer, will be shortly followed by that of the new Lycée Voltaire. This work, commenced in 1885, and occupying a large site adjoining the Avenue de la République, will have cost, when completed, about five million francs. It is to accommodate 1,200 pupils, of whom 500 will be day-boarders. The principal entrance is in the Avenue de la République, preceded by a large court planted with trees. The building is very well planned for its purpose, and does credit to M. Eugène Train, architect also of various other important scholastic buildings, notably the Collège Chaptal.

M. Bouvard, now known to fame everywhere as the designer of the central pavilion of the Exhibition, is occupied at present with the construction, on the Place du Château d'Eau, of a Bourée du Travail, of which the shell is already completed. It occupies the site of the old panorama of the Bastille. It was commenced in April last, and is to be inaugurated on the 14th of July next.

The Municipal Administration is establishing in each of the cemeteries of Paris a mortuary for the reception of the bodies of those who have died from any kind of contagious disease. The first is to be built in Père-la-Chaise. Each of these will be divided into two sections; the one containing the apartment for the deposition of the coffin, that for disinfection, and a room into which the public will be admitted. The other portion will include a room for the "exposition des morts," and five separate

chambers for the laying-out of bodies waiting for interment.

The sculptural decoration of the Tuileries, which has been interrupted for some years, is to be proceeded with. Statues of a similar type to those on the Pavillon de Rohan, and which symbolise the military glories of France, are to be placed in the niches disposed between this pavilion and the Rue des Tuileries. The new statues will be forty-six in number, and among the list of celebrities represented will be Carnot, Bouchardon, Jeanne d'Arc, Mame de Sévigné, Mame de Staël, as well as the principal *maréchaux* of the First Empire.

Another important piece of artistic work is to be taken in hand in connexion with the Collège de France, the Cour d'Honneur of which is to be decorated with fresco paintings, symbolising Art, Literature, and Science, with other allegorical decorative *motifs* referring to the various branches of study in the establishment. This scheme of decoration is to be completed by busts of the leading professors of the ancient Collège Royal, now the Collège de France.

At the École des Beaux-Arts the competition jury, under the presidency of M. Ginain, has given judgment on the work of the First Class of Architectural Students. The subject was "Un Palais à la Campagne," and among forty-two designs, a First Medal has been awarded to M. Schutzmann, pupil of M. Gerhardt; and Second Medals to MM. Chaussemiche and Curvalle, pupils of M. André, and M. Chiffot, pupil of MM. Daumet & Pascal, M. Bosis, pupil of M. Pascal, and M. Louis Masson, pupil of M. Ginain. The jury has also decided on the sketch competition in architecture, for which the subject was, stables and coachhouses for a château. Second Medals were given to M. Deperthes, pupil of MM. Ginain and Deperthes; and to M. Closson, pupil of M. Ginain.

In speaking of the École des Beaux-Arts we may add that, contrary to expectation, the École is still unable to make use of the Hôtel Chimay, purchased by the State in order to permit of the enlargement of the premises of the École, the ateliers of which are defective in every respect and quite insufficient for their requirements.

The year 1889 has been a very fatal one to French art: we had already lost Cabanel, and now Dupré has followed. This distinguished landscape painter was born at Nantes on April 5, 1811, and exhibited his first works at the Salon in 1831, at the age of 20; an "Intérieur de Forêt," with two other paintings. From this time up to the last moments of his long life, Jules Dupré worked without relaxation. Among the best known of his numerous works may be mentioned "Vue des Environs d'Abbeville"; "Dans les Landes"; "L'intérieur d'une Ferme," &c. Many of his landscapes are taken from the country on the banks of the Oise, where he lived. Two remarkable pictures painted for the decoration of the Hôtel of Prince Demidoff, "Le Matin" and "Le Soir," were purchased by the State in 1877, and placed in the Luxembourg Museum.

Dupré was the precursor of Rousseau and Troyon. He was the first to break from the commonplace conventionality into which French landscape art at that period had fallen; and has been the last survivor of an illustrious group of artists among whom were numbered Corot, Millet, Daubigny, and Diaz. He received the decoration of the Legion of Honour in 1849, and that of "officier" twenty-one years later. Higher honours which have fallen to others were not his, nor did his artistic reputation need any such aids to fame.

Among other recent deaths in the artistic world must be mentioned that of Robecchi, a talented decorative artist; Lucien Meline, a historical painter, and son of the eminent dramatic author of that name; and Mlle. Berthe Daudet, a clever painter, some of whose portraits have attracted much notice, especially that of M. Taskin, exhibited in the Salon of 1884.

**Exhibition in Berlin.**—The success of the Paris Exhibition appears to have touched the Germans, and the holding of a similar exhibition next year in Berlin is now warmly advocated in the press. It is proposed to invite Austria-Hungary to share in the undertaking. Recently the proposal was before the Berlin Association of Artisans, where it was also warmly embraced. A committee has been appointed to furnish plans and estimates for the exhibition.

\* Unavoidably postponed from last week.



THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:  
THE PRESIDENT'S ADDRESS.

THE opening meeting of this Institute for Session 1889-90 took place on Monday evening last, at 9, Conduit-street, Mr. Alfred Waterhouse, R.A. (president), in the chair.

Mr. W. H. White (secretary) announced the decease of the following members, viz., Mr. Samuel Masgrave, Fellow, of Hull; Mr. Gerard Ford, Hon. Associate, of Brighton; and M. Firmin Epellet, of Arras, hon. corr. member.

The Secretary also intimated that the Council had granted a certificate of competency to act as District Surveyor in London under the terms of the Metropolitan Building Act, to Mr. Geo. L. Crickmay (Associate), of 17, Parliament-street, Westminster. Certificates of competency to act as building surveyors under local authorities had also been granted to Mr. Robert Williams (Associate), and to Mr. Hugh Tasker.

*The Church of St. Mary-le-Strand.*

Mr. J. Macvicar Anderson remarked that a good deal had been said at the Institute, as well as elsewhere, in regard to the Church of St. Mary-le-Strand, and he therefore thought it might interest many to know that its restoration was now complete (applause). The removal of the hoarding had taken place that day, and he thought he might say with some amount of satisfaction that from his own knowledge the church had left his hands in some respects in an actually sounder state than that in which it left the hands of its original architect (renewed applause).

Mr. Ewan Christian added that he told a public meeting convened for considering the advisability of restoring the church, that the fabric was as strong and substantial as any building in London, and that it would be a monstrous shame to attempt to remove it. He was also sure that Mr. Anderson would make a good job of it if he took it in hand (applause).

Mr. Ralph Nevill suggested that the church should be open for inspection for a few days.

Mr. Macvicar Anderson said that the verger lived close by, and there was no difficulty in gaining admittance at any time.

Mr. James Brooks said he hoped that arrangements could be made for opening the church for a week.

*The President's Address.*

The President, who on rising was received with great applause, then delivered the opening address of the session, as follows:—

Gentlemen and colleagues.—When I had the privilege of addressing you from this chair at the opening of last session we were on the eve of an important event in our history. Having lived for upwards of half a century under our first charter of incorporation, we were about to start life afresh under a second. But last November the By-laws made under its provisions had not been finally approved, as the character of the Examinations through which Associates would for the future have to pass had not been then defined to the complete satisfaction of the Privy Council, nor had the terms and conditions of competition for certain prizes been inserted therein. This having subsequently been done and submitted to a special general meeting of the Institute, the Council were duly authorised to sign and seal the By-laws, which met with their lordships' approval on the 7th of last February.

Of these By-laws one of the most important authorises the alliance, under certain conditions, of non-metropolitan architectural societies with the Royal Institute. In consequence of this provision, and after the necessary negotiations, nine societies entered into alliance with the Institute, viz., the Sheffield Society of Architects and Surveyors, the Leicester and Leicestershire Society of Architects, the Manchester Society of Architects, the Glasgow Institute of Architects, the Northern Architectural Association (Newcastle), the Bristol Society of Architects, the Nottingham Architectural Society, the Royal Institute of the Architects of Ireland, and the Liverpool Architectural Society (applause).

The Presidents of seven of these nine bodies were in June elected members of the Council, and all the nine allied societies are now assisting in the conduct of local examinations under the new system, as Liverpool last year, and Glasgow, Leeds, and Manchester in previous

years, did most efficiently under the old. The alliance of these societies and their cordial co-operation for the advancement of our art are, I think, among the most pleasing and satisfactory results of the working of the new Charter, and a happy augury for the future. I trust the time may be not far distant when other non-metropolitan societies may be enabled to ally themselves with the Institute, and that in this way our scheme for progressive examinations may be carried out more generally than is at present possible, and, in fact, leave no part of the United Kingdom to feel itself neglected in this way (applause). I should add that the Australian societies are desirous also of entering into alliance with the central chartered body at home, and that the question of holding examinations in Sydney and Melbourne—which is a more difficult one than that at first appears—is engaging the attention of those who have had most to do with the establishment of our progressive examinations.

The members of the present Council are the first who have been elected by voting-papers sent and returned by post; but notwithstanding the facilities thus offered, only about 500 members voted out of 1,200 who had the power to vote. Since then there has been a large accession of new Fellows and Associates, and I sincerely hope that on the next occasion a greater proportion will take sufficient interest in the affairs of the Institute to record their wishes as to who shall represent them on its Council.

Perhaps I may be allowed to state, without wearying you with statistics, that during the session which has just terminated, 112 gentlemen were admitted to the Examination in Architecture. Of these, eighty-two passed, and eighty-one Associates were elected during the session (applause). Instead, therefore, of the obligatory Examination being a deterrent, it seems to be a positive attraction to the young architect, and no sign could possibly be healthier, no evidence more encouraging, to those who have our practical examination system at heart (applause). Besides which, sixty-two Fellows were elected, of whom twenty-six had been Associates, so that, with this satisfactory increase, the number of subscribing members reached a net total last September of 1,350, as against 1,200 in 1887, and 1,190 in 1885, at the same period of the year. With such additions to the classes of Fellows and Associates, with the certain prospect of still further additions, and with a Council increased from twenty-one to thirty-four members, comes the pressing consideration of how we can best gain the needed expansion of our premises here, and on this your Council may shortly be expected to submit an important proposal. We want greater space for our always-increasing library, and better and more private accommodation for the conduct of our business, which has also largely increased.

The Library, which is open every working-day and evening in the year, now consists of upwards of 8,000 volumes, and is, I believe, the only special architectural library in the United Kingdom. Its formation is associated with the honoured names of Donaldson and Papworth; of Nelson, Tite, the Wyatts, Hardwick, Mocatta, Fergusson, and others; of some of the most distinguished European architects and archaeologists in Europe; and last, but not least, with that of Mr. David Brandon, who has so generously defrayed the entire cost of a new and complete catalogue, arranged under the three separate heads of subjects, authors, and countries, than which no gift could have been more opportune (applause).

The Royal Gold Medal for the Promotion of Architecture, after having been given previously in three successive years to three practising architects,—two foreigners and one Englishman,—was awarded last June, with her Majesty's gracious sanction, to a learned English archaeologist. The presentation of this medal to Sir Charles Newton was a tribute not only to his personal attainments, which are great, but also to the merits of that great Institution with which Sir Charles has been so long connected, and which is so rich in treasures of classic art. With the conspicuous exception of the Royal Medal, British architects have been content to do their work without much intervention, or even recognition, from the State. If their creations are noticed in either House of Parliament it is generally with very equivocal praise, if not with open abuse; though that need not very much disturb us (laughter). Our legislators have perhaps little leisure for the con-

templation of the beautiful in art, and seldom rouse themselves to any studious appreciation of architecture, unless it be to such adverse criticism as politicians in opposition find convenient for the Parliamentary harring of a First Commissioner of Works and Public Buildings!

An eminent German, a member of the German Parliament, Dr. Reichensperger, who was one of the judges in the great competition for Lille Cathedral, and who enjoys a cosmopolitan reputation, has explained the attitude of the State towards the British architect in, to us, interesting terms. He says, to quote his words:—

"The well-known aversion of the English to bureaucratic overgovernmentation exhibits itself even in the domain of art, especially in that of architecture. There is on the other side of the Channel no hierarchically classified and belittled band of architectural officials; neither do we meet in England with establishments founded and supported by the State for the education of architectural students, nor with governmental examinations, nor with official diplomas thereupon granted. Nevertheless, the English continue to execute architectural works of all kinds, not only in no respect inferior to our own, but, in my estimation, actually superior from an æsthetic point of view."

This praise from a well-known German, coming as it does with almost similar eulogistic comment from French architects of distinction, ought to be some consolation to us, if we are tempted to think that from authorities at home abuse comes more naturally to us than honours (hear, hear). There has, however, been a very gratifying instance to the contrary during the past year, in the knighthood conferred on our colleague and former vice-president, Sir Arthur Blomfield (cheers), at which we rejoice, not only on account of his personal qualities, and because of our knowledge of the beauty of the buildings he has executed, but because it is a recognition from the Throne itself of the excellence of English architecture, as illustrated in Sir Arthur's works.

Among the subjects which engaged our attention during the past Session, was that of a new, or rather amended, form of Articles of Pupilage. Though carefully prepared at the instance of the Council by the Practice Standing Committee, it was rejected at a special general meeting of the Institute, in consequence of the omission,—due to a desire expressed by a majority of the Council,—of the words "and surveyor" from the title of the third party to the contract, namely, the architect. The difference of opinion raised by the discussion was not open to further argument; but I think the desirability of publishing such a form of Articles of Pupilage as an Institute paper is so great, and of such important consequences to our profession, that I venture to suggest a compromise, which may, I feel sure, be accepted by both those who style themselves only "architects" and those who style themselves "architects and surveyors." I would propose, in the form which is to be issued, to omit both one and the other,—to leave simply a blank, in which you, gentlemen, and colleagues, may insert the word "architect," or the words "architect and surveyor," at your pleasure, and as you may deem fit (applause). The new form, the substance of which was approved by you, makes provision for such absence from the office as may, in the opinion of the principal, be reasonably allowed to the pupil for qualifying himself by attendance at lectures and classes for the Institute Examinations; and, further, it contains a clause arranging for the refunding, before a given date, of a portion of the premium in case of the inability of the principal to perform his side of the engagement. We must all be well satisfied that such reasonable stipulations have been suggested for incorporation in a form of Articles of Pupilage to be issued with our authority. There is no doubt but that they have been already acted upon by many architects; and the public should, without further delay, be enabled to profit by a very excellent form of Articles, which, however, cannot be published as an Institute paper without your sanction.

On another occasion, during a very important discussion which took place last April in this room on the scope of the Institute Examinations, some remarks were made by the Professor of Architecture at the Royal Academy which appeared to me to have great weight, though they were not supported. The Professor would make no inquiries in these Examinations as to the historical or archaeological knowledge of the student under examination, but simply test his fitness as a building constructor, entirely irrespective of archaeological peculiarities or, in

\* See *Builder* for Dec. 9, 1888, page 407.



other words, styles of architecture (hear, hear). Now, though I disagreed with him to this extent, that I thought it would be most desirable for every architect in this end of the nineteenth century to know a little about the styles which have brought architecture to its present position, it is most important that our Examinations should never have anything about them likely to fetter the student in any way; and I think that, under the present system, the utmost freedom is allowed our students in all that concerns the inventive side of their art. It is better, in my opinion, to encourage independent judgment and invention in devising means to a prescribed end than any slavish conformity to ancient precedents. But, at the same time, we should be very unwise to refuse to take advantage of the accumulated experiences of the past—(hear, hear)—or to completely sever that tie of tradition which makes the acquisition of architectural knowledge partly a study of history, and connects it from age to age with the life of a nation (applause). Again, a discussion took place here last January, on the award of the Soane Medallion and other prizes, when it was advocated that we might preminate a design, which did not fulfil the prescribed conditions, and was avowedly unfit to be applied to the purpose for which it was intended, if only it displayed some excellence of design, or rather some originality in external appearance, obtained, perhaps, at a sacrifice of internal convenience. Now, in my opinion, this is a very mischievous doctrine (hear, hear). If our structures are not fit for their purpose, we cannot hope for much public appreciation, however striking their appearance may be. Architecture, moreover, differs from painting and sculpture, in being nearly always intended primarily for utilitarian purposes, and afterwards, and without in any way interfering with these purposes, being invested with a purpose of art (applause). Buildings without their artistic qualities, arouse our enthusiasm as antiquaries or archaeologists; but, depend upon it, we should look upon them with other feelings if we had had to pay for them ourselves or if we were to try to use them. Architecture, to me, implies art under certain well-defined conditions. If unrestrained by these conditions it lacks its first requisite, its adaptation to certain chief human requirements, and becomes a kind of constructive stage scenery. The more closely our students, and in fact all of us, stick to the conditions of the problems we have to solve, while striving at the same time to give our work the highest artistic expression of which we are capable, the sooner, in my humble judgment, will modern architecture secure public appreciation.

The most noteworthy event of the current year is the International Exhibition in Paris. Though its cosmopolitan character has been only partially realised, on account of the abstention of Germany, Austria, and other countries from joining as nations in the show, the French themselves have done wonders, both in the way of exhibits and in the buildings in which they are displayed. Although it may be difficult in every instance to admire the details of some of these buildings either in their form or in their colour, it is only right to pay a tribute of unstinted admiration to their originality, to the acceptance they display of new conditions and new materials, involving new forms and expressions. The domes of the two Palaces of the Fine and Liberal Arts, by M. Formigé, give even more than this. They satisfy æsthetic critical faculties by their pure form and admirable colour, the latter imparted externally by a covering of dull blue and white faience. The constructive ironwork of the buildings is everywhere visible, and is filled in, not overlaid, by panels of bright buff or pinkish terra-cotta, the ornamentation of which, though it has necessarily suffered from the hurry inseparable from such work, is bold and clever. The Eiffel Tower, so greatly dreaded by the lovers of old Paris,—architects and the public alike,—was, perhaps, to many an agreeable disappointment. I confess it was to myself. Its individuality, its web-like construction, seemed to remove it from all sense of competition with its neighbours of ordinary dimensions in brick and stone. They seemed to hold their own, and were not so disconcerted by its neighbourhood as I had anticipated. Perhaps this arose from the strikingly unusual

and fantastic forms of the other Exhibition buildings. As in many another less ambitious fabric, it was not the constructive details of the tower which gave dissatisfaction, but some of the attempts at decoration,—notably, the somewhat awkward and heavy arading of the galleries, which I think displeases both in itself and in the way in which it breaks the grand sweep of the angles of the tower. No doubt a break in the sweep at this point is desirable æsthetically, but not such a break, I am inclined to think, as the line of the tower has received by the peculiar design of the gallery arcade. Though thus confessing a certain admiration for the tower, I yet feel the greatest repugnance to the prospect of a sister tower being erected in London (cheers). One may look with equanimity on one such colossus as a wonder of the world, without desiring to see it reproduced elsewhere. Another at home would not have the charm of novelty; no such unexceptional site for it could be found in the heart of this crowded city, where it would be nearly certain to prejudice the effect of some of those structures which have been bequeathed to us, and which help to make London, in spite of its skies of fog and smoke, one of the most beautiful cities in Europe (applause). Some eyesores may be tolerated for their undeniable public utility, though needless disfigurements, as Charing-cross station and bridge, which have not certainly improved our grandest river view; but the threatened tower has not even the excuse of a necessary evil.

In the matter of tree-transplanting the Parisians have much to tell us. Nothing was more surprising to me than the vigour of growth and foliage of the immense trees which embower the gardens of the Exhibition, and which last winter had their roots in other places. Moreover, beyond the boundaries of the Exhibition, the trees of Paris are one of the city's greatest charms. If their size and height now in some weathers darken the adjacent houses, their shade and beauty attract crowds which would not otherwise resort to the streets and boulevards where they flourish; and so the shop-keeper perhaps gains more by the numbers of passers-by than he loses in diminished daylight. It is devoutly to be hoped that our County Council, when they have time to consider the beauty of London, will see fit to ordain that the wider thoroughfares of the metropolis shall be graced with a mode of decoration at once the least expensive and the most effective that can be used for the adornment of a great city (applause). There is hardly a more beautiful tree in existence than the plane tree, and no place in which it flourishes better than in our somewhat dingy city. Why should not London be known as "The City of Plane Trees"? It is, in my opinion, a great mistake to suppose that trees in most cases hide a building to its detriment. By their contrasting forms they heighten its effect, and this not only in summer but in winter also, when the curves of branch and twig form an admirable foil to the rigid stability of architecture seen through and above them.

But to return to Paris. To me the most interesting part of the Exhibition was a gallery, or rather a pair of galleries, which were not, strictly speaking, part of this year's show; probably they would not have been included among the number of places to which my jury-button was an "open, sesame," had not one of them contained the *Exposition Retrospective* of French art-workmanship, a collection of both gold- and black-smith's work such as has surely never been brought together before. This most precious collection was exhibited in the covered gallery forming the western wing of the Trocadéro Palace. But it is not of this loan collection of masterpieces in metal-work that I would now invite attention, but to the museum of architectural sculpture, which occupies the whole of the east gallery, and which appears to be destined ultimately to fill the whole of the western also, for across both galleries, at regular intervals, are erected the fac-similes in plaster of the grand stone portals of Charenton, Beauvais, Nancy, Vézelay, Chartres, Clermont, Moissac, Saint-Gilles, Toulouse, and that of the Grosse-Horloge at Rouen among other examples. Through these portals the visitor passes. The eastern gallery is completely furnished already with casts of all that is most interesting in the way of architectural sculpture in France from Gallo-Roman times to the Renaissance, while occasionally, side by side (with apparent intention), are placed casts of sculpture of different ages or from different provinces when it

seems specially interesting to invite comparison, showing at a glance not only the differences arising from lapse of time, but in contemporary art, between one province and another; for, according to Viollet-le-Duc, there were twelve distinct schools in France alone in the twelfth century. It is clear that this most fascinating collection owes much, if not everything, to the enthusiasm and learning of Viollet-le-Duc, and to the veneration in which his name is held by those who knew him and who can appreciate his value. To do him honour the Museum of French Sculpture was instituted, on the lines which he himself had indicated, to show the country's gratitude to the man who, more than any other, during forty years "raised up, restored, brought back to life and light," by his labours and his genius, the incomparable historical monuments to be found in every part of France (applause). At the eastern extremity of this eastern gallery is a vast apartment, the Salle Viollet-le-Duc, in which are hung some of his water-colour plans and elevations of mountain structure,—more marvellous, I think, than even his delineations of architecture; and, besides these, in portfolios, an exhaustless store of studies, sketches, and cartoons from his facile pencil, with the manner and perfection of which we are all more or less acquainted.

It is, perhaps, useless to hope that our Government will imitate the example set them in France, and give us the advantage of a similar educational museum on this side the water, especially as we have at the South Kensington Museum two galleries which contain a variety of plaster copies of celebrated monuments. I would, therefore, strongly commend the Galleries of Comparative Sculpture at the Trocadéro to the notice of the English student. He can there draw under cover, and without molestation, from morning till night; and he can there enjoy the advantage of comparison, so difficult when his models are, it may be, hundreds of miles apart. He can there consider the type of ornament most likely to subserve the development of the architecture of the future, whether natural or conventional, and speculate on the possibility of the more archaic forms offering the greatest attraction to the student of the twentieth century.

This brings me to another subject for our consideration, to which I alluded last year, also associated with Paris, and which, I think, might be greatly assisted if due advantage were taken of all the lessons to be learnt from this museum by the thoughtful student. M. César Daly gave us, at the International Conference in June, an eloquent address on the subject deeply interesting to us all, which he calls "Les Hautes-Études d'Architecture." He said that architecture more than any other art required studies of a various and elevated character, and not only a profoundly learned and philosophic conception of the past but a knowledge of the needs of the present, of their relation to the past, with foresight into the tendencies of the future. The end he would set before us is to penetrate the future of our art—not ignorantly, but by an intelligent study of the relation which its contemporary architecture has borne to the social, religious, and political life of the past. In times like the present, when we may be said to be in a state of transition socially, politically, and religiously, we cannot expect a strong and united architectural expression,—nor do we find it. We belong to diverse schools, classical, Gothic, scientific or rationalistic, and finally eclectic, in which each individual borrows from Antiquity or the Middle Ages, from the East or West, the North or the South, from every age and every country, what pleases his own fancy. This eclecticism, this individualism, is hateful to M. Daly, and he would have those among us who are fitted for the task prepare the way, by a philosophical study of the relation of architecture to life in the past, for an enlightened and earnest practice of it in the future. This would be to put our knowledge and admiration of the past to noble use; it would convert us from mere archaeologists into benefactors of the present and succeeding generations. We should then learn to discriminate between what in bygone art was based on constant laws and applicable to our own work and to all time, and what was ephemeral in its nature, begotten of a state of society or religion past, and never to be resuscitated, and with which, therefore, we as practical artists have no further concern. I confess I entirely sympathise with M. Daly in his enthusiasm on this subject, and hope that his earnest appeal may not be made in vain, but



that the more learned among us may apply themselves to studies from which so much may be hoped. The habit of analysis recommended by Mr. Appleton is his admirable Presidential Address to the Architectural Association last year\* would tend in this direction, and would prepare the mind of the student for the "*Hautes-Études*" so eloquently advocated by M. Daly.

Mr. Leonard Stokes, in his excellent address as President for this Session of the Architectural Association† has also treated very fully the great subject, annually becoming more urgent and irrepresible, of professional education (applause). He maintained that the time had now come when the Institute and the body he represents should work together more than they have yet done, to effect this their common object,—to prepare for examinations as well as hold them,—and he instanced the desire expressed by the late Mr. Street, in the powerful address delivered from this chair,‡ that the two bodies should be drawn closer together. I commend Mr. Stokes's utterances on this point to the attention of every member of the Institute and the Association, believing, as I do, that the senior and representative body of the architectural profession will do wisely, if the way can be made clear, to give substantial help to those who, during a long and prosperous period, have shown an earnest determination to help themselves.

There has also been a proposal, to which Mr. Stokes alluded, that an appeal be made to the public for a large sum to establish and endow a college for the systematic study of architecture.§ Those in favour of the proposal seem to think that not enough is done for the student, and that he is left too much to his own devices. When, in my address at the opening of our last session,¶ I compared what is now done for the earnest student with what was done for him only a generation ago, I confess I was hardly prepared for such a suggestion. It is possible that many who ought, one would suppose, to know what educational advantages they possess, have hardly gone to the trouble of realising them. I shall take the liberty, therefore, on this occasion of briefly enumerating some of them.

In this country there is no single or complete and unalterable course of architectural education, apart from the practical knowledge the student may acquire in the office of his master. I do not think this is to be regretted. You have heard me read the opinion of the English system (or want of system) expressed by the German onlooker. It is better not to be all cast in the same mould,—in fact, as artists, it is most important that we should not be so (hear, hear). There are certain matters, however, that all architects must be versed in, if they are to do their work with ease to themselves and advantage to their employers. Let us see how these essentials are to be secured; what existing institutions will aid the student in his search after knowledge. To begin with this Institute, which is not, and was never intended to be, a teaching body. It holds no classes, and gives no formal instruction. It has no professors, as such, upon its staff. At the same time it does definitely promote and encourage, or, to use the words of the Charter, it "further" the systematic education of the young architect,—(1) by its system of examinations; (2) by its annual prizes and awards; and (3) by its library (applause).

In the first place, the Royal Institute of British Architects admits no architect or architect-student to the position of Associate (A.R.I.B.A.) until he has satisfied its Board of Examiners that he has acquired a satisfactory basis of education in design, construction, the nature of materials, sanitary science, the general history of the art, the characteristics of the leading styles, and the methods of modern practice. By the syllabus issued to persons intending to prepare for these Examinations the Council of the Institute are careful not only to point out to the student the outline and scope of the subjects with which he has to make himself conversant, but also to direct his attention to the chief literary and artistic works he should consult, to the buildings he should visit, and to the method in which he should pursue his

studies. The Examination he has to undergo is a searching one, both graphic and oral, extending over many days, conducted under strict scrutiny, either here in the rooms of this Institute, or in one of the chief non-metropolitan cities where local societies allied to this Institute lend us their valuable aid for the purpose. Moreover, the Council have now put in force a scheme for three Examinations following each other at intervals of not less than two years,—a scheme which during the past session was submitted to and received the approval of the Institute. The first of the progressive examinations (the preliminary) is to test the general knowledge of aspirants about to enter the profession, thus setting a standard, and, from the nature of the examination being known beforehand, directing education into channels likely to be specially useful. Being then, at the commencement of his pupillage, admitted a Probationer by the passing of this first Examination, his studies for the next two or three years in the office, at home, and at the Architectural Association, instead of being desultory, will be guided by the programme of the Intermediate Examination, an Examination which, by means of testimonies of study and drawings to be submitted, will prove that the student has been diligent in the earlier portion of his pupillage, and is in a fair way of becoming at least an efficient draughtsman, while the Examination itself will test his acquaintance with the elementary principles and practice of architecture both as a science and an art. These two, the Preliminary and Intermediate Examinations, will enable the student with more ease than hitherto to prepare for the Final one, qualifying for candidature as Associate of the Royal Institute of British Architects, after two or three years' further study. By this time he will probably have completed his term of pupillage and passed a further period in some other office so as to see variety of practice. It is believed that these three steps or divisions will make the Final Examination of greater value, and, while still avoiding the groove of an academic course, be a more absolute test of competency than the single Examination hitherto held. Here, perhaps, I may be permitted to forestall the report of our Board of Examiners, and inform you that for the Preliminary Examinations to be held this month in London and various parts of the United Kingdom, 107 candidates have been admitted (applause); and of these, forty-one, having been declared exempt, are already registered as Probationers of the Royal Institute.

Secondly, the student is incited to effort by prizes offered for the design and construction of buildings or parts of buildings in some prescribed style or for some special purpose; and for the best essays on given subjects. Also by travelling studentships, the winners of which have, according to the nature of the respective studentships, to submit illustrated memoirs on modern architecture abroad and modern practical subjects generally; studies of colour and decoration; and measured drawings of celebrated buildings at home and abroad. Some of these are of considerable value, and all are open to students, from whatever part of the United Kingdom they may present themselves, with, in most cases, a stipulation as to age. An exhibition of the drawings submitted for these prizes and of the work done by the travelling students is held annually, and this, I venture to think, may be regarded as distinctly educational work.

Thirdly, the Library is open not only to the members of the Institute and the Association, but to all *bona-fide* students of architecture. The Institute offers them access to all the more famous books on our art, and to all the smaller educational treatises on architecture, and allows the students not only to consult them in the rooms of the Institute, but, under certain limitations, to take some of them away for home perusal.

In the schools of the Royal Academy the architectural student can, on certain evenings of the week, design a building or part of a building under the direct supervision and instruction of architect-members of that body, who attend in rotation as visitors for that purpose, and prescribe the subjects on which the students are to exercise their powers. The designs thus prepared, or certain of them, are put in competition for Academy prizes, the most valuable of which are two travelling studentships, one of 60*l.* for the study of English architecture, another of 200*l.* for foreign travel, given in alternate years. Probationers are required

to draw a subject or two from memory only, which I regard as a most valuable exercise. The students have many privileges, not the least being access to the splendid library of the Academy, and attendance at certain courses of lectures given by the Royal Academy professors.

Then there are the lectures delivered by the Professor of the Arts of Construction at King's College; the three courses on Architecture, as an Art, as a Science, and as Modern Practice held by Professor Roger Smith at University College; the classes on Scientific Masonry and Applied Geometry at the City and Guilds of London Institute. There are also the pupils' rooms or studios of those private gentlemen who of recent years have begun with much success to supply the needs of those who wish for (and can afford) a more personal attention than can be given by a professor to a large class, or by the visitors to the Architectural Association classes.

It will be seen from what I have set forth that the student of architecture need not now be under any difficulty in ascertaining what is the least he ought to know, nor how he can, with diligence, acquire the requisite knowledge. Familiarity with the practical work of carrying out a building will be obtained in the office of the master whose pupil he is, and original design can be practised at home, in the schools of the Royal Academy, in the classes of the Architectural Association, or elsewhere. What seems to me to be wanted now, more than anything else, is the self-denial and enthusiasm necessary on the part of the pupil to fully avail himself of the advantages and privileges at his disposal.

I have described most of the advantages which a student in London can enjoy if he choose, but I have said little yet about the methods of teaching adopted by the Architectural Association, which have had, in my opinion, remarkable results,—results which, like many other great things done in this country, have been due principally to voluntary effort. The Architectural Association has been a great success, and it is still so much a success that I hope every one of the non-metropolitan Societies allied to the Institute will soon have connected with it an Association of juniors similarly constituted, and doing equally beneficial work (hear, hear). Without such teaching bodies to feed a professional Society, not only education languishes, but the Society itself may die of inanition, for I cannot refrain from recording an impression that the great progress which has attended the Institute during the last few years has been largely stimulated by the efforts of the junior body, fostered as they are by the close and cordial relations existing between the Institute and the Association (cheers). In urging upon the allied societies the desirability of organising, or perhaps in one or two cases of developing, classes of instruction for their juniors, I feel I cannot do better than offer them as a model the methods of mutual instruction so long successfully practised by the Architectural Association of London.

At the same time, I can quite understand the difficulties under which the Association labours, aggravated as they must be by the increased obligations entailed upon its committees and officers from the development of our Examinations, followed as they now are by the registration of successful candidates as Probationers, Students, and Associates of the Institute. The chief cause of complaint, it seems to me, is that the many classes held by the Association are not so well attended as they ought to be; and, after reading the Report of the Association Committee for the past session, I have been induced to think that too much is attempted, considering the comparatively limited time which can be given to each subject by students who are occupied most of the day in their masters' offices, and by members of committees and visitors, who have their own business to attend to. Omitting all mention of the classes composing the elementary division, I find that the advanced division consists of at least nine classes of instruction with six courses of lectures, carried on by voluntary labour, chiefly honorary or gratuitous. It is not surprising, therefore, that the elder workers at present taking part in the educational labours of the Association should ask virtually for a reconsideration of the method in vogue, should appeal in fact for the opinion of the senior body, and, if necessary, for its help; while others cry out in the wilderness for a college to be

\* Printed in the *Builder* for October 27, 1888.

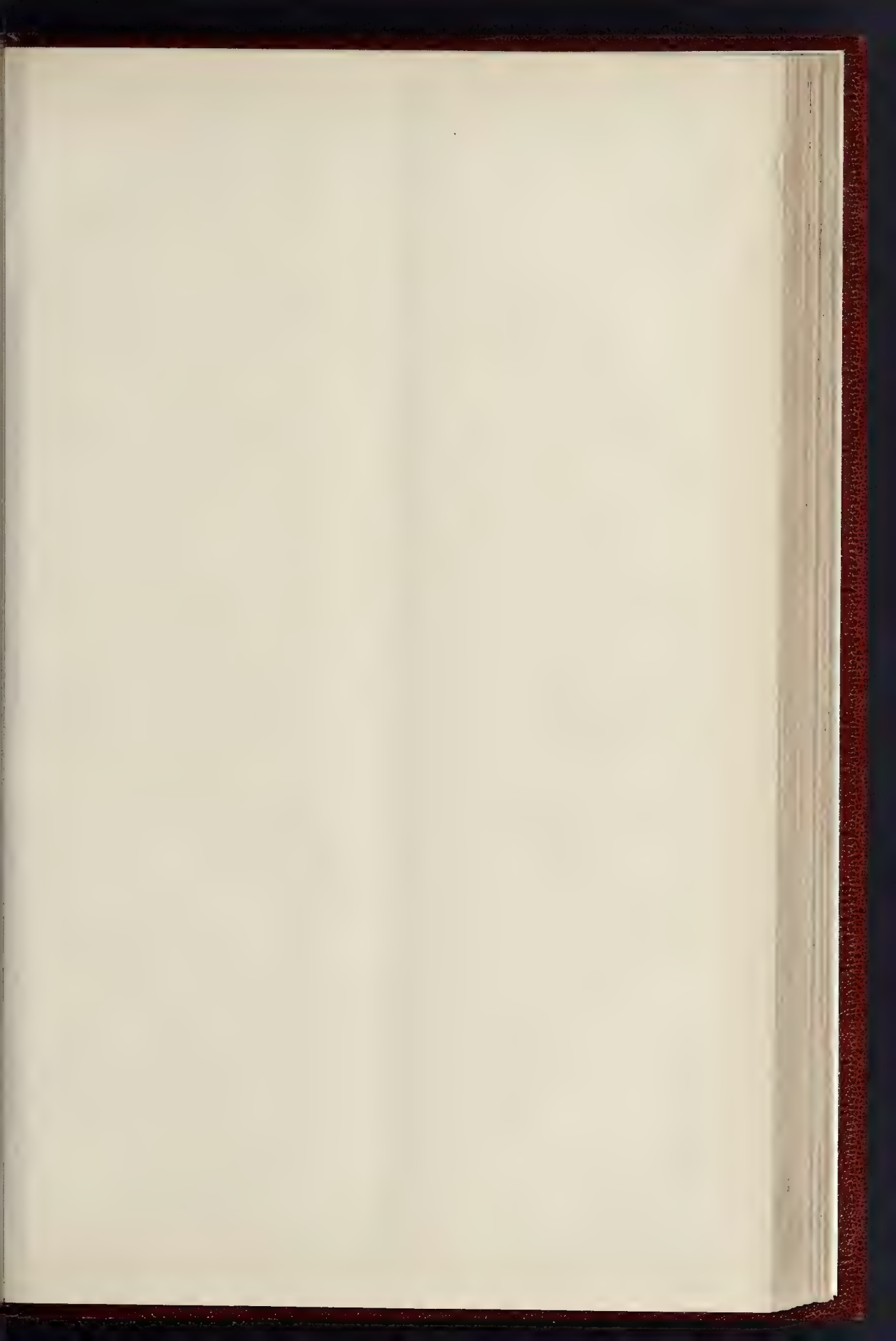
† See *Builder* for Oct. 29 last, pp. 291-3.

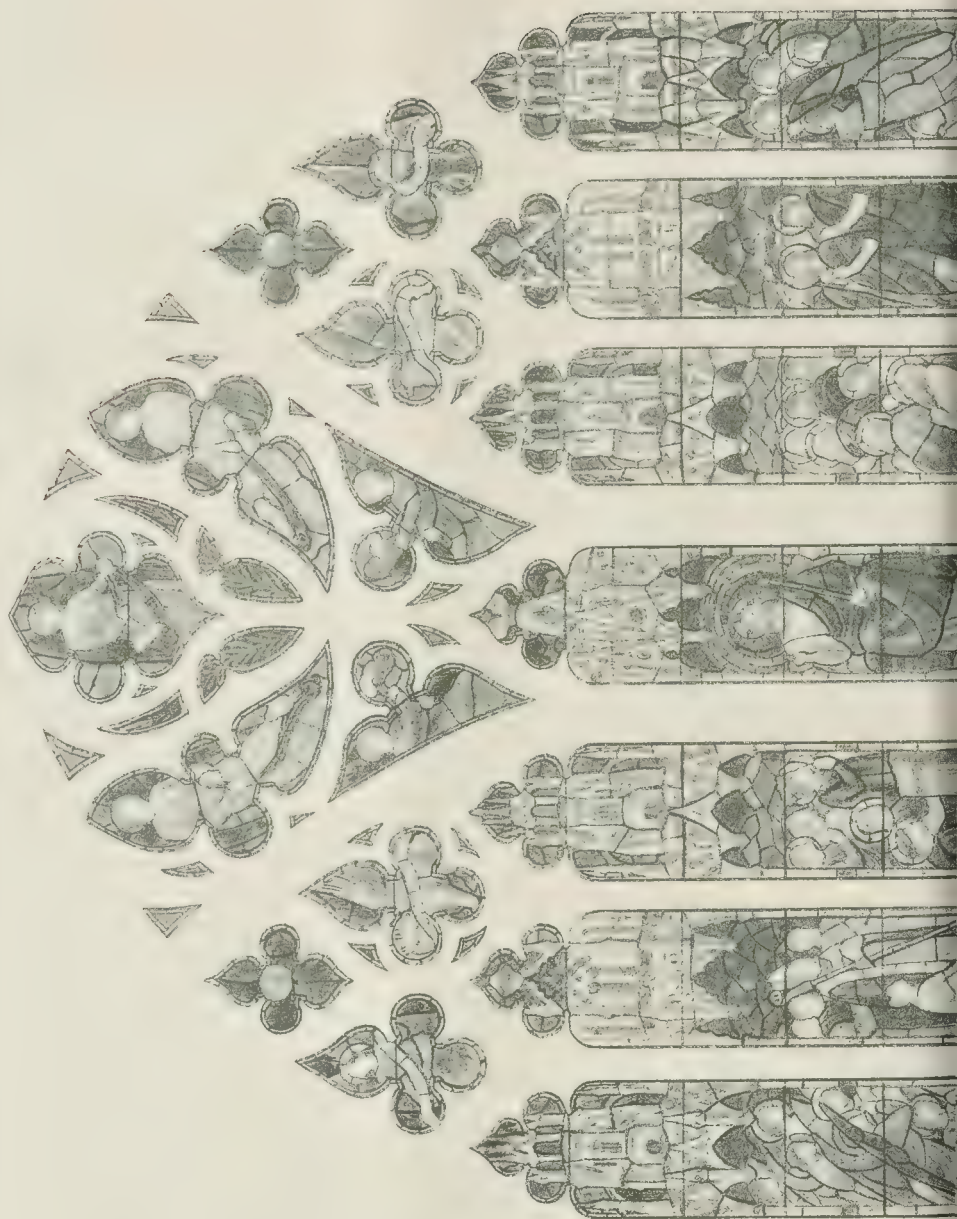
‡ Printed in the *Builder* for Nov. 12 and Nov. 19, 1887.

§ Mr. Barle, the author of the "appeal" referred to, writes to say that he did not propose a college of architecture, but a central building where all opportunities for study and examination could be concentrated.

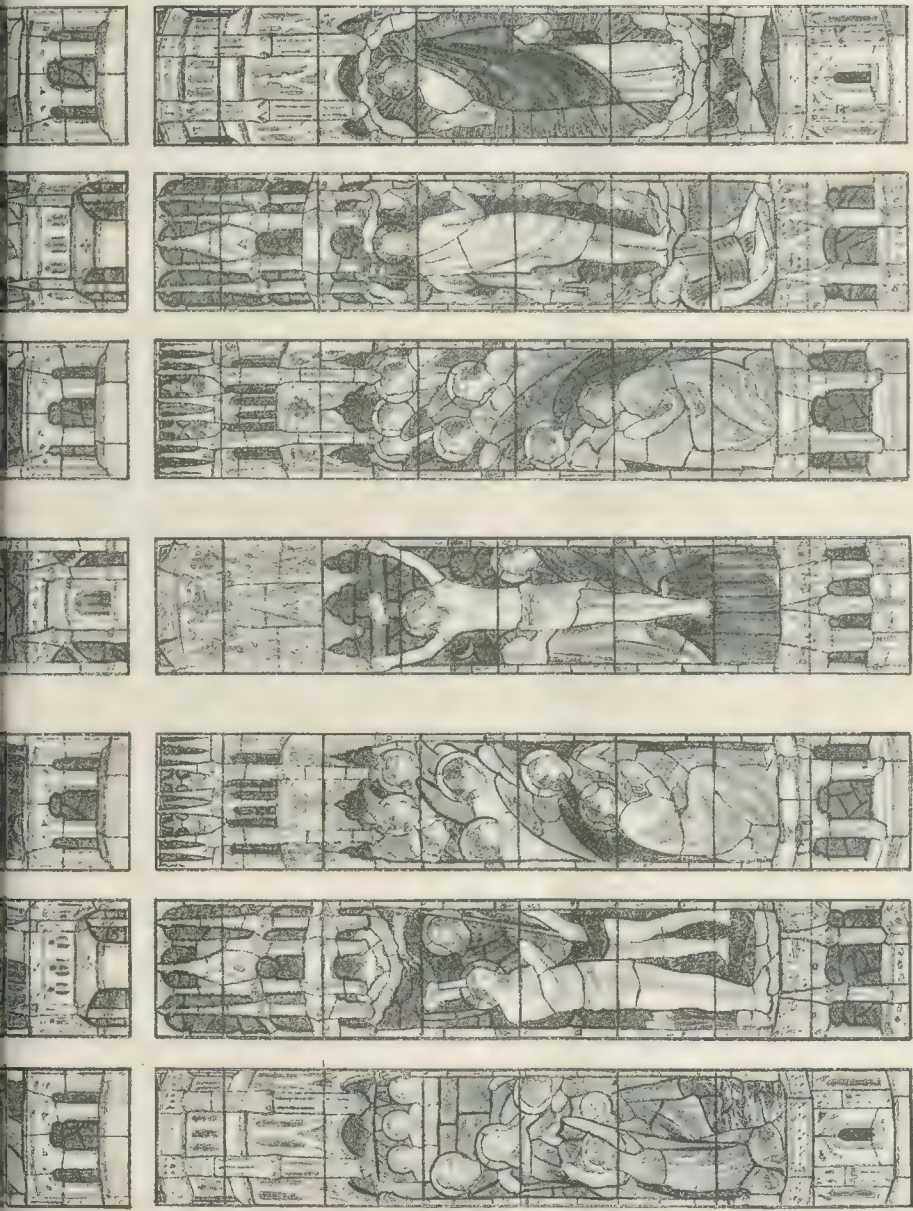
¶ See *Builder* for Nov. 10, 1888.











PROJECT FOR THE WEST WINDOW-OF CHESTERFIELD CHURCH BY MR F. HAMILTON JACKSON



so much beauty and originality, it would be to say that in my humble judgment the detail is a trifle too delicate for the atmosphere of a smoke-begrimed city, though on that matter of detail I would not now insist; but rather on this, that if we all as architects gave the same amount of loving attention to our work that has been bestowed on this, and brought the same inventive genius into play, we should not long have to wait for an appreciative public (hear, hear). We hear the complaint raised in all quarters that the public cares nothing for our art, and the way in which our buildings are sometimes treated bears witness to this; but are we sure that the fault does not, in some measure, rest with ourselves? Do our buildings tell their own story with sufficient distinctness, are their details always designed to suit the materials employed, and is the ornamentation the product of our own invention? The consideration we receive may not equal what we conceive to be the merits of our art, and I do not think it is in some cases. Indeed, I have been told by a citizen of Birmingham that for his part he did not care for the building I have just singled out for commendation, nor did he think it had created much enthusiasm among those for whom it is intended (laughter). It will be a work of time to awaken an interest in our art; but I do most certainly believe that public interest will be aroused if we are only true to ourselves, if we strive to be more inventive, when invention is required, and determine that everything we do shall be of our best.

My impression, moreover, is that we are surely advancing. The education of our students is now based on something of a system, and we see among the productions of some amongst us a true artistic sense of the beautiful overlaying a desire for the fitness of their work as means to a useful end. There never was a time when there was a higher tone in the profession, when the necessity for clean-handedness was more generally understood. The regret everywhere felt among us if a member of our body forgets or disregards his obligations in this respect is to me a proof of the rarity of the occurrence. I think, therefore, we may take a hopeful view of the future of the profession. Its progress under its altered circumstances during the next few years will be watched by many of us with interest, and with a few, perhaps, with some anxiety also, lest any part of the new machinery should fail to work quite smoothly. Should that be the case, we have happily those who devised it at hand to set it right. A natural fear may, of course, linger, lest the inventive artistic faculties which every architect must possess in some degree should not have free play in the course of our examinations; but if this is guarded against by the present system I see nothing to prevent our noble profession achieving in the near future great results.

Sir Arthur Blomfield, A.R.A., at the conclusion of the address, said:—Gentlemen,—I feel it an honour to be asked to undertake the pleasing duty of proposing a vote of thanks to our distinguished President for the able address we have just heard. I am sure that all who listened to it must have done so with very great interest and pleasure. A good deal of the subject-matter which we have just heard must give us ample food for reflection for some time to come, and I think that the President has shown us that we have great grounds for satisfaction and for hopefulness (applause). He has shown us that we have a very bright and cheering prospect for the future, and the account of what has been accomplished during the first year of his tenure of office will, I think, bear favourable comparison with the record of any year since the foundation of the Institute. Amongst the interesting subjects to which he has referred, perhaps the most interesting, and the one which we can view with the greatest satisfaction, is the subject of the Examinations. These have met with a degree of success which far exceeds any reasonable expectations which could have been made of the results possible in so short a time. I need not remind you that that success is due entirely, or nearly so, to the admirable manner in which the whole scheme has been thought out, the machinery prepared and organised, and the Examinations conducted, by those gentlemen who have devoted themselves with untiring energy to the work, and to whom the profession owe a deep debt of gratitude (applause). With regard to professional education, I was glad to hear our President raising a note of

warning against too hastily abandoning our English system,—or, as he said, want of system,—which has been going on for so long, in favour of new ideas and methods borrowed from Continental sources. I think with him and many others that a too-hasty launching on that course of innovation may land us possibly in evils greater than those we wish to correct (hear, hear). We all recognise that evils exist, but I myself, and many others, think they may be remedied by slower and gentler means (applause). This is not an occasion which I should choose to mention any matter personal to myself, but I feel that, under the circumstances, you will excuse me if I, for a moment, refer to a point mentioned by the President, viz., the honour which the Queen has been pleased to confer upon me (applause). The President mentioned it in a most kindly and generous manner, as he was sure to do; but, Gentlemen, when I consider the many important and beautiful works which have been carried out, and the high services to art rendered not only by himself, but by others whose names it would not be becoming in me to mention, I cannot help feeling deeply and regretfully how very insignificant are my own qualifications to distinction in this respect ("No, no!"). I may, say, however, without vanity, that I have a great love for my art, and a great regard for the noble calling to which I am proud to belong—(applause)—and if I might venture to think that in that respect you may consider me to be not unworthy of being one of the representatives of the profession, I should feel a satisfaction without which the honour would be but an empty one (applause).

Colonel Edis, F.S.A., seconded the vote of thanks, and complimented the President on the thorough manner in which he had dealt with the subjects touched upon. He was glad the President was not in any sense inclined to favour any college, whether Heaven-sent or otherwise, because the art of this day and generation in England must attribute its success to the individuals who had carried it out. If people were more unbiassed by the narrowness which led them to admire everything on the other side of the Channel, they would acknowledge at once that this London of ours was one of the most picturesque cities of the world.

The vote of thanks, on being put to the meeting, was carried by acclamation. The President, in reply, said:—Gentlemen, I feel deeply indebted to Sir Arthur Blomfield and Colonel Edis for their kind and too flattering words, and to you for the way in which you have responded to them. I feel I owe you an apology for making so much of the educational advantages of the student ("No, no!"). But my remarks were not intended so much for your eyes as for those students who may by chance see my address. I should like also to endorse what Sir Arthur Blomfield said about our gratitude to the Educational Committee for the exertions they have made, and which have been so eminently successful. Of course, the fact of those exertions having been made during the year of my presidency is a mere accident. I cannot flatter myself that I have had much or anything to do with the work of the Educational Committee, though I feel very proud to have been your President at the time when the labours of the Committee have been brought to such a successful issue (applause).

The proceedings then terminated.

**Society of Arts.**—The opening meeting of the Society of Arts will be held on Wednesday evening, November 20, when an address will be delivered by the Duke of Abercorn, C.B., Chairman of Council. The papers fixed for reading at the Wednesday evening meetings before Christmas are as follows:—November 27, "Scientific and Technical Instruction in Elementary Schools," by Dr. J. Hall Gladstone, F.R.S. On this occasion the Right Hon. A. J. Mundella, M.P., will take the chair. December 4, "Rabies and its Prevention," by Armand Ruffer, M.D. December 11, "The Paris Exhibition," by H. Trueman Wood, M.A., Secretary to the Society. Sir Philip Cunliffe-Owen, K.C.B., will preside. December 18, "London Sewage," by Sir Robert Rawlinson, K.C.B.

**The Art Congress at Edinburgh.**—Mr. Biton Riviere's presidential address in the Section of Painting at the Edinburgh Art Congress is again unavoidably held over.

## Illustrations.

### DESIGN FOR NEW FAÇADE FOR MILAN CATHEDRAL.

THE accompanying view shows the proposed rebuilding of the white marble façade of the celebrated Duomo, it being one of the fourteen premiated designs in the late international competition, the particulars of which have appeared in this journal. The original drawing was exhibited in the Royal Academy exhibition of this year.

In the opinion of the judges, the style of this design was not sufficiently in accord with the existing architecture and its detail, an opinion to which the author of this design is disposed to give a qualified assent. It was thought by him desirable to avoid the endless repetition on all sides of the fussy, intricate, and incongruous details of the general structure. All other good examples of cathedral architecture have, for main fronts, separate character of their own, original and distinct from their other fronts, without being out of harmony therewith.

The accepted design has certainly the merit of full accordance and similarity with the present work, even to the extent of being remarkably like the front now condemned—the great sprawling, depressed gable—flat, unbroken front, stiff tracery and attenuated pinnacles are reproduced here. Remove the Italian Renaissance doors and windows of the present façade, and by the substitution of Gothic ditto, a very creditable façade would result, at an extremely moderate expenditure. D. BRADE.

### THE LADIES' RESIDENTIAL CHAMBERS, CHENIES-STREET.

THESE chambers have been built by a company formed to provide better accommodation in the way of residences for educated women of limited means living in London and earning their own livelihood. The building consists of two, three, and four-roomed self-contained flats, each complete in itself, including a scullery, and, in the larger sets, a kitchen, a w.c., dust-shoot, larder, cupboard, coal-bunker, &c. The entrance in Chenies-street leads to a hall and spacious stone staircase, both lined to a height of about 5 ft. with glazed pattern tiles; from the landings the different sets open on each floor.

On the basement floor is a "common room" or club-room, where meals are served to the tenants at moderate prices, and attached to this is a capitally-appointed kitchen.

For sound-deadening and fireproofing purposes the whole of the ceilings and many of the walls are lined with silicate cotton and plaster slabs on Mr. R. W. Hitchins's system.

Externally the building is faced with red brick, with Portland stone for the quoins, cornices, doorway, &c.

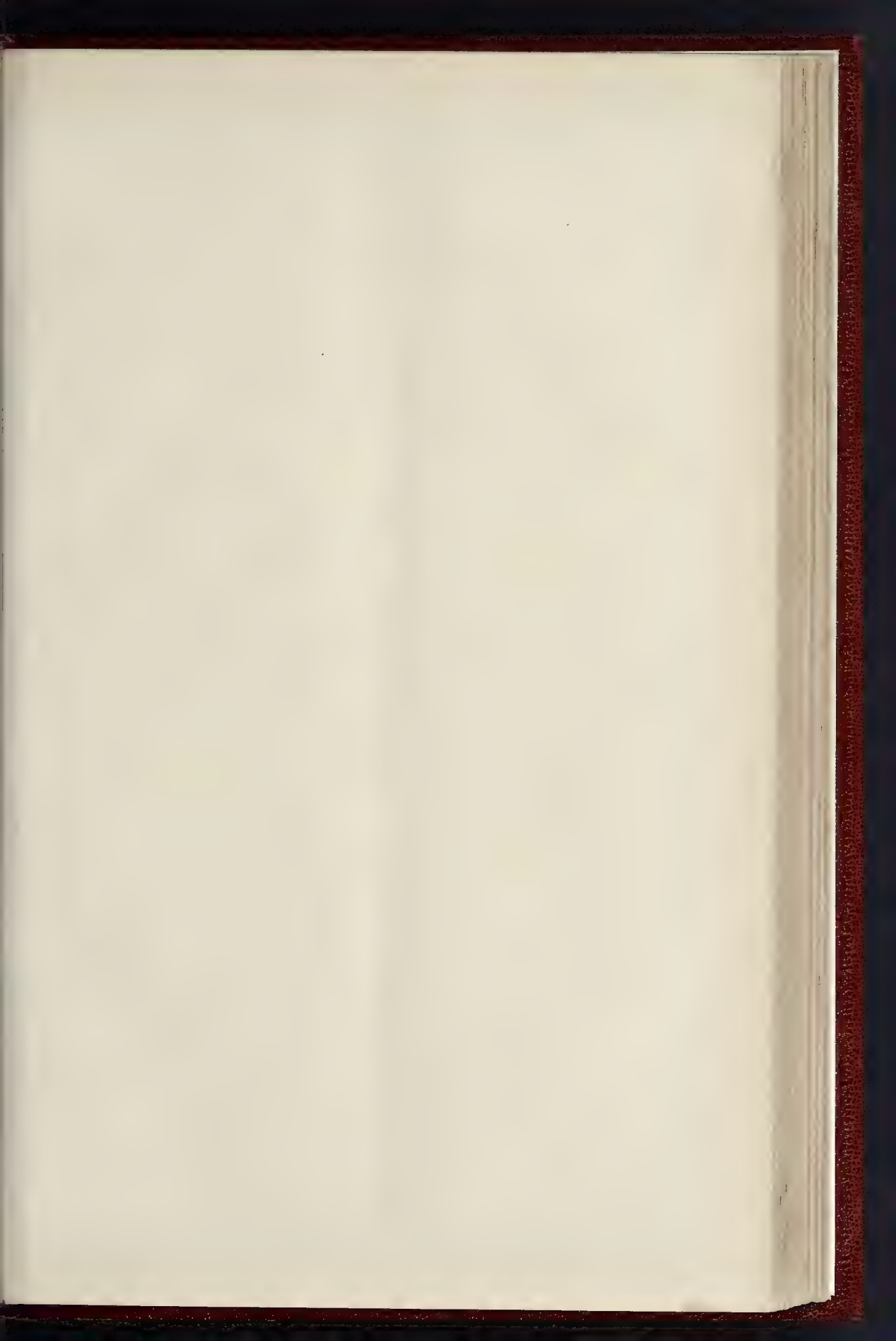
The general contract has been carried out by Messrs. Brass & Son; Messrs. Wenham & Waters, of Croydon, doing all the internal plumbing, gas-fitting, and bells; and Mr. Thos. Elsiey the wrought-iron railings and the grates throughout, all under the superintendence of the architect, Mr. J. M. Brydon.

Our illustration is taken from a drawing which was in this year's Royal Academy Exhibition.

### PROJECT FOR WINDOW, CHESTERFIELD CHURCH.

THE general idea of this design was suggested by the Te Deum. At the bottom, in the centre, is the Crucifixion, flanked by Adoring Angels; and on one side the Nativity and the Baptism of Our Lord, on the other side the Resurrection and Ascension. Above the Crucifixion is Our Lord in Glory, his throne supported by Cherubim and surrounded by a rainbow. At one side, Apostles and Prophets; at the other, Martyrs and the Holy Church. Adoring Angels close the subject on each side. Above Our Lord, in the tracery, Angels with censers, offering the "prayers of the Saints" and palms of victory. Above the three lights on each side, the symbols of the Evangelists and Cherubim. The colour is largely composed of varied rubies and dark blue, with a still larger proportion of varied whites and stains, which experience teaches is always a successful combination for a large window. Unfortunately the camera reverses these contrasts to a great extent; for instance, the Cherubim in the Ascension are pale ruby on a dark-green blue, and the hills

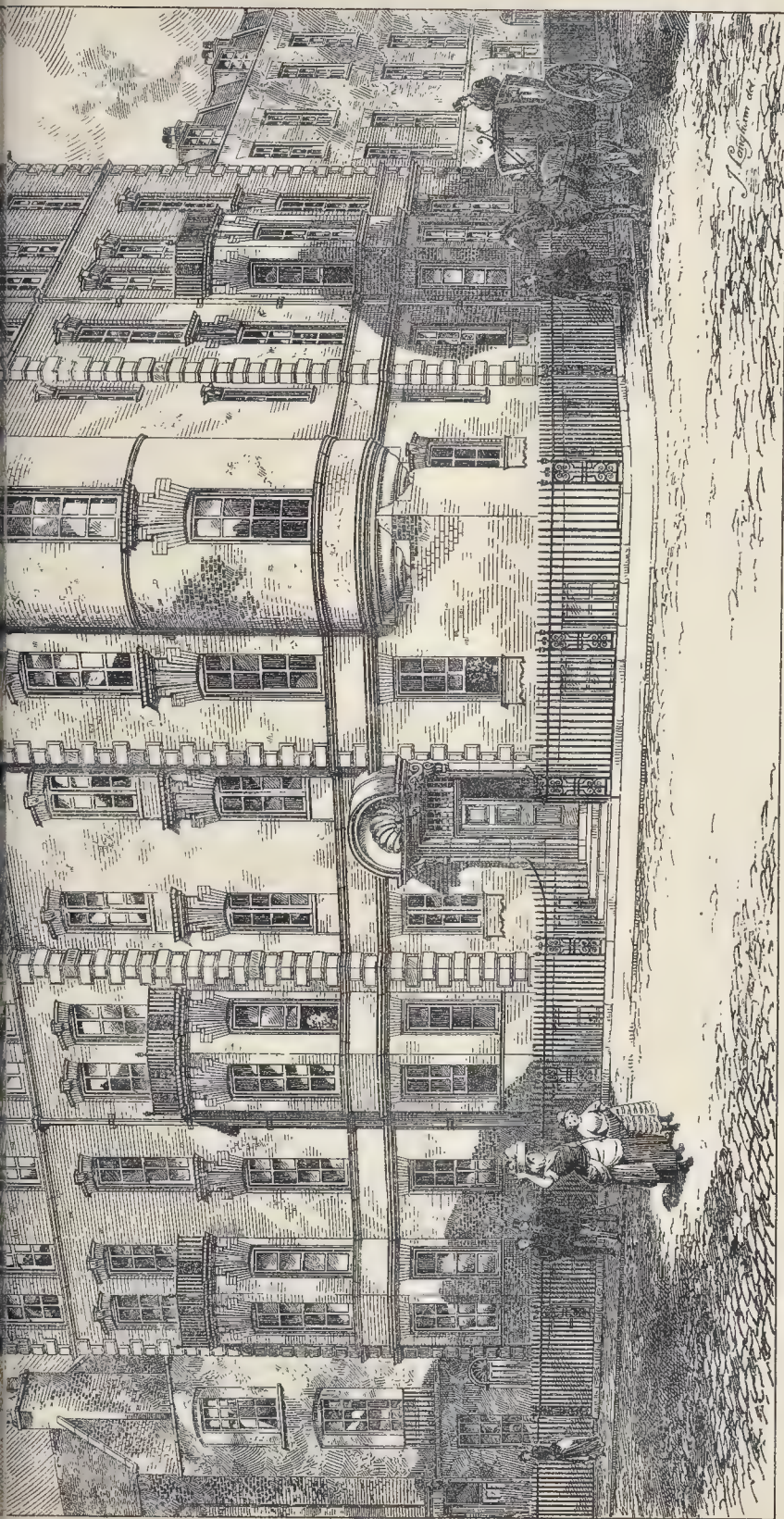




THE BUILDER, NOVEMBER 9, 1899.

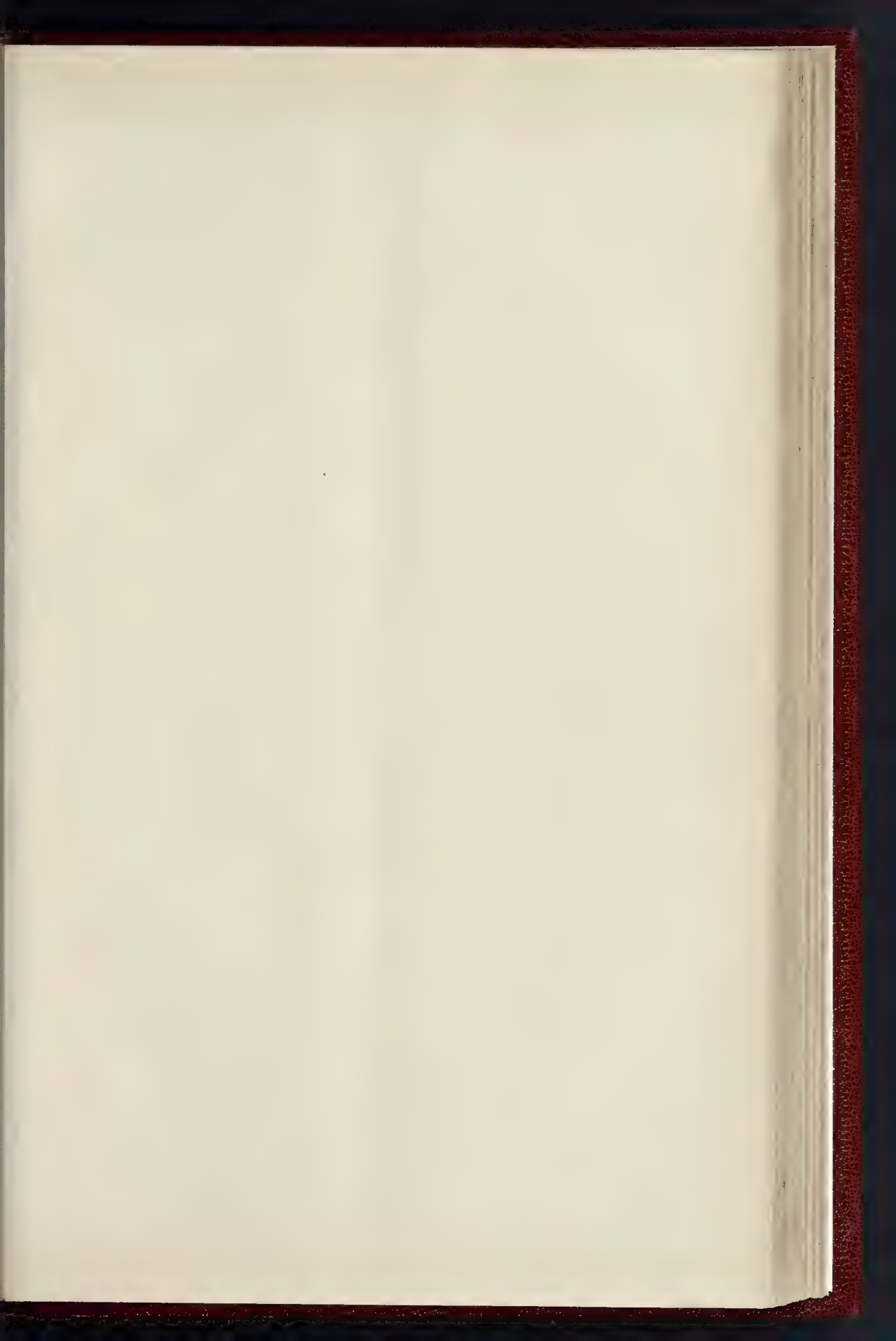




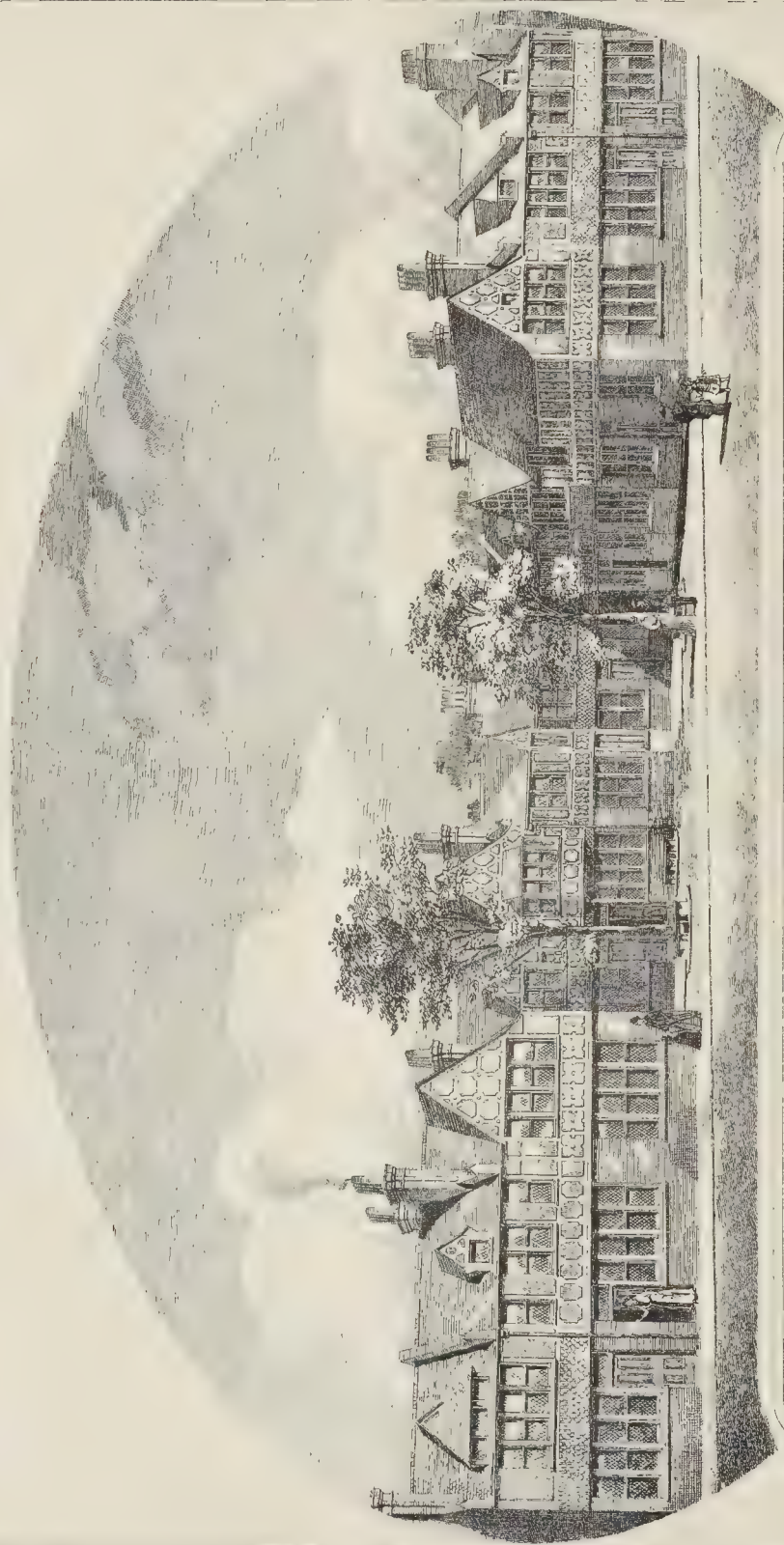








THE BUILDER, NOVEMBER 9, 1889.



COTTAGES AT Little Suffolk Street Southwark for the Rev<sup>d</sup>. T. C. V. Baslow.

E. HOOLE F.R.I.B.A. ARCHT.

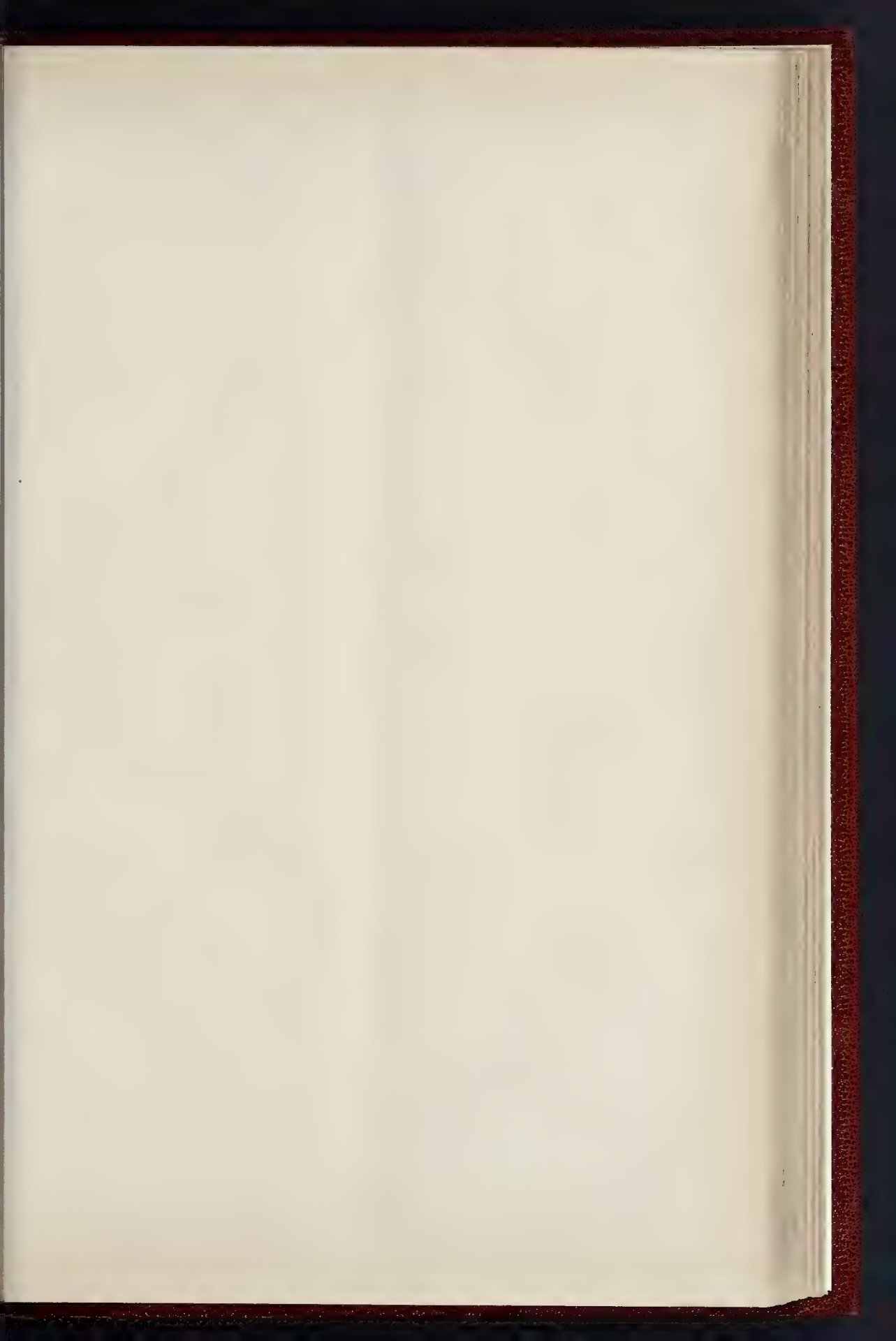




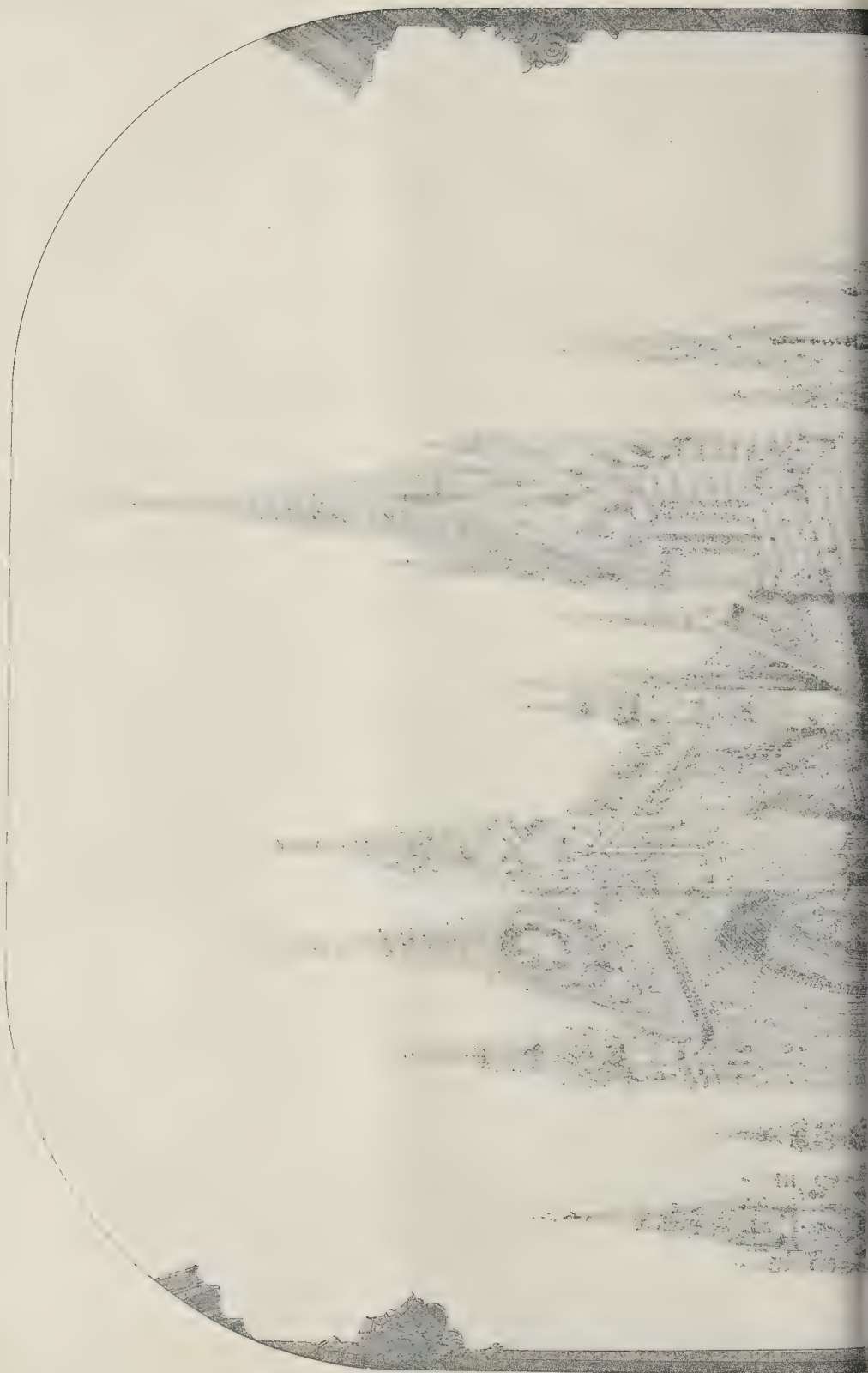
THE REDCROSS HALL, SOUTHWARK. —MR. E. HOULI, F.R.I.B.A., ARCHITECT  
*The decorative paintings by Mr. Walter Crane.*



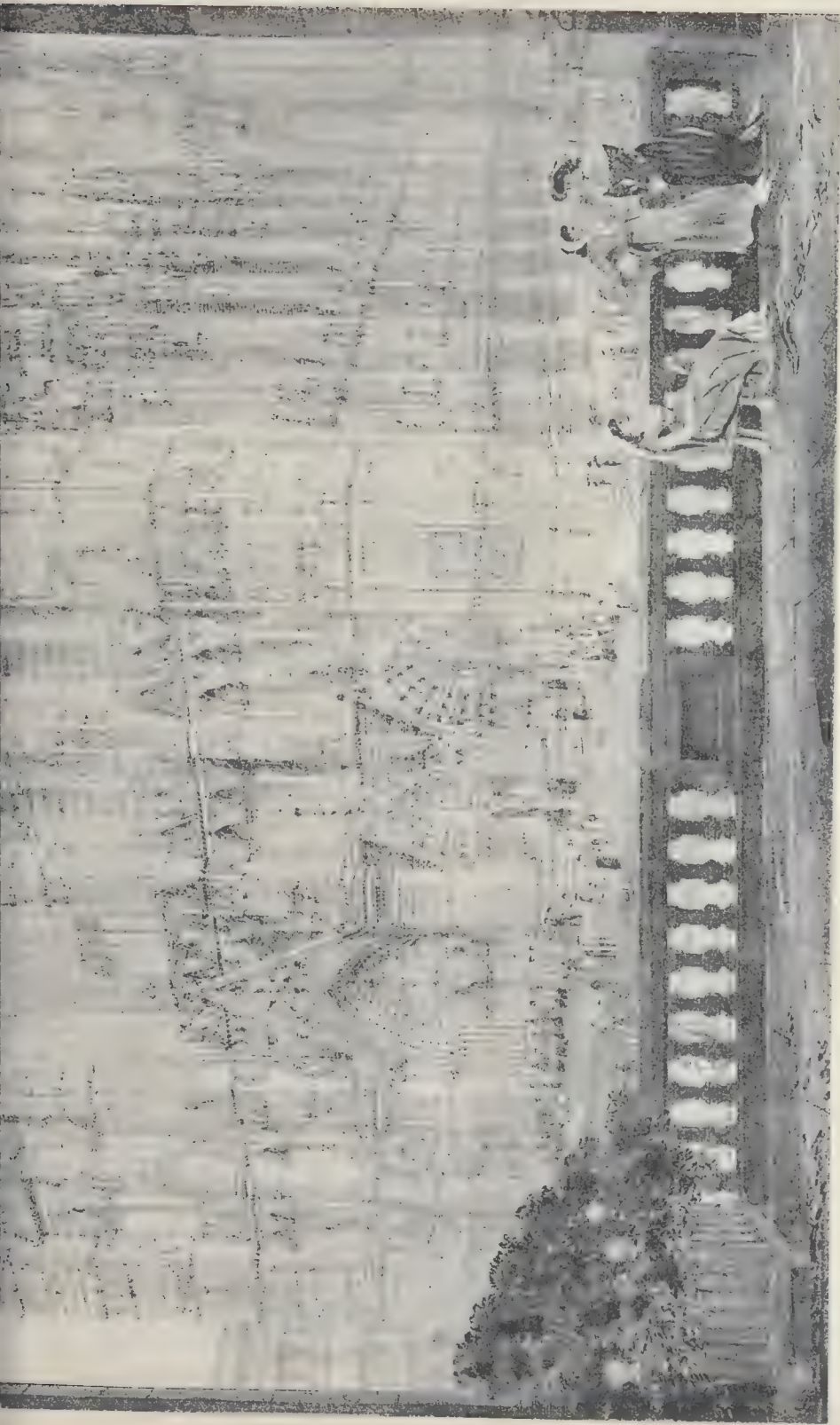




THE BUILDER, NOVEMBER 9, 1889.



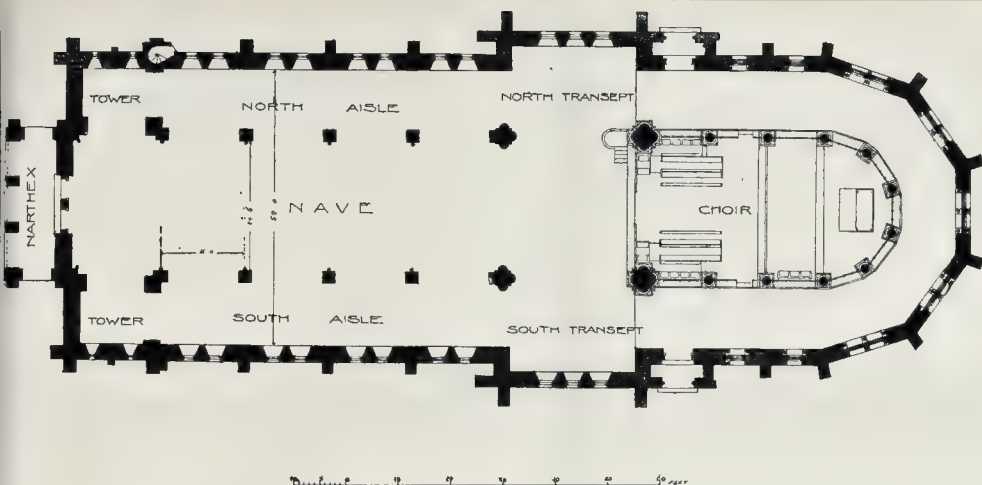




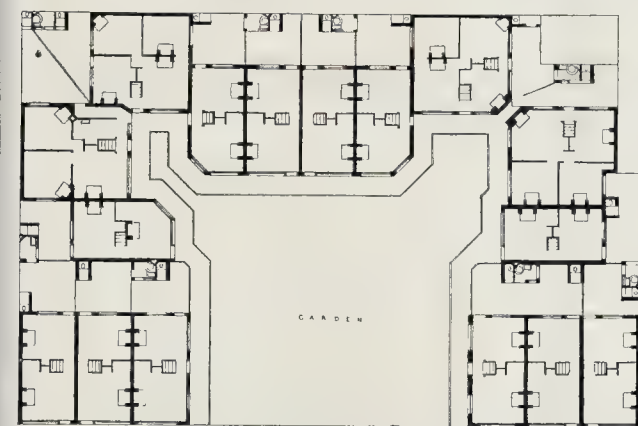
PROPOSED NEW WEST FACADE FOR THE DUOMO, MILAN.—ONE OF THE PREMIATED DESIGNS.—MR DANIEL BRAD, F.R.I.B.A., ARCHITECT







*Honolulu Cathedral: Plan.—Messrs. Carpenter & Ingelow, Architects*



*Cottages, Little Suffolk-street, Southwark: Plan.*

below a green of the same tone as the sky. In the photo-lithograph the cherubs and the hills come out dark, and the sky light. The great variety in the canopies was dictated by a desire to make the window a whole by carrying the colour across the transom in large patches, the ground of the lights being alternately ruby and blue. The plate is reproduced from a colour sketch of the same size, which was in the Royal Academy Exhibition.

F. HAMILTON JACKSON.

#### COTTAGES AT LITTLE SUFFOLK-STREET, SOUTHWARK.

SEPARATE cottages are greatly preferred by the working class to sets of rooms in a block of industrial dwellings, where the inmates are very much thrown together on public staircases, &c. Some small houses having been removed in Little Suffolk-street, Southwark, afforded an opportunity for building cottages, which have been planned to leave an open space in the centre of the site for trees and seats, upon which the front windows of the cottages look out, while each cottage has its own yard in rear, containing wash-house, w.c., &c. Messrs. Macfarlane Bros., of Hornsey-road, have carried out these cottages, which are now occupied, and are under the management of Miss Octavia Hill, who collects the rents for the owner, the Rev. T. C. V. Bastow. Red brick has been employed for the walls of the ground story, the upper floors

being either rough-cast or tile-hung. The roofs are covered with red tiles, and lead quarry glazing has been used in the windows. Mr. E. Hoole, architect, has designed and superintended the erection of these buildings.

#### RED CROSS HALL, SOUTHWARK.

RED CROSS HALL, which adjoins a public garden between Red Cross-street and White Cross-street, Southwark, has been built for Miss Octavia Hill and a body of trustees, who have also laid out the garden. Both hall and garden are designed for the use of the tenants of a number of adjoining industrial dwellings and cottages, of which the Ecclesiastical Commission are the ground landlords. The hall is used for a variety of purposes, being reading-room, gymnasium, and concert-room by turns. Adjoining the hall are club-room, committee-room, and caretaker's rooms. Mr. Walter Crane's decorations will, when complete, be the most interesting feature of Red Cross Hall. The subjects are taken from deeds of heroism in the daily life of ordinary people, and are not fanciful, but are records of real occurrences. Among the subjects will be seen Alice Ayres, the nursemaid, a local heroine, rescuing her master's children from the flames, in which she herself perished. Another panel will represent the navy who removed a fallen mass of rock from the rails, but was himself struck down by the train he had saved. Ten subjects of this kind will be treated in a very striking and decorative manner,

with great richness and force of colour. The paintings will be executed on large panels of fibrous plaster, which will then be attached to the walls and finished in place. Those parts of the walls and piers not covered by these groups will be decorated from Mr. Walter Crane's designs in colour to harmonise with the figure-subjects. The Hall has been built by Messrs. MacFarlane, of Hornsey-road, from the plans and under the superintendence of Mr. E. Hoole, architect.

#### HONOLULU CATHEDRAL.

LAST week we published a double-page view of the west front of this cathedral, which is now being erected under the direction of Messrs. Carpenter & Ingelow, architects.

The accompanying plan, which was sent too late for publication at the time, was prepared to show the church in its completed state, and, with some modifications, the work has been or is being carried out in accordance with it. Only the plan of the church itself is here given. The chapter-house, sacristy, vestries, cloister, and other buildings usually annexed to a cathedral would be placed on the north side; but all these are left to the future.

#### THE TREATMENT OF ANGLES AND TERMINAL FEATURES.\*

WHEN the design of a building ceases to depend for its effect solely upon the grouping of the parts and features, or upon their proportions; when, in fact, it becomes a question of adding something in the way of ornament, or of modifying form to produce an ornamental effect, certain parts of the building immediately offer themselves for treatment. Of these parts the angles are sure to be among the most prominent. They are the terminations of the several faces, and, which is more important, two of them must, in every view, form the terminating features of the whole composition; they are, too, the points at which, if a change of architectural treatment is required, that change must be made. An angle is generally even more important than the middle of any front, for while the latter is important to one face of the building only, the treatment of the angles affects the whole.

It is customary to say that the angle of a building requires strengthening—apparent strengthening, that is, for, as a matter of fact, it is, in many buildings, one of the strongest parts of the walls. This want is greater if the walls are much cut into by large windows that appear to destroy the horizontal tie, and again greater if they are practically reduced to a series of piers, as in many buildings for business purposes, where light is of extreme importance; and it becomes

\* A paper by Mr. F. T. Bagallay, F.R.I.B.A., read before the Architectural Association on the 1st inst., as elsewhere mentioned.



a practical necessity if the walls are cut into by arches having an outward thrust.

But in the simplest case of a building with plain walls, broken only by ordinary windows, there is an immense æsthetic advantage in any arrangement which gives, or seems to give, to its angles a stability sufficient to hold up the mass between them—or at least to assist it to hold itself up. It would be an exaggeration to say that without some such arrangement a building looks as if it would fall; it does not do so; but it is no exaggeration to say that every building looks as if it *might* fall, and that sturdy-looking angles seem as if they would help to hold it up, and therefore add an element of apparent stability to the structure, which is of the utmost importance.

Another common saying is that the angles of a building require to be emphasised. Whether or no this dogma is to be accepted depends very much upon how it is interpreted. On the one hand I have seen old buildings and some few drawings of modern ones in which the actual angles,—the arises dividing two main faces of the building,—were deliberately rounded off, and the effect was not only inoffensive but decidedly good. Quite apart from the quaintness of the idea,—and that always goes for something where more important qualities are not sacrificed,—the absence of the hard line and the substitution of a soft gradation from light to the shade was decidedly pleasant. Again, in using such features as pilasters and buttresses at angles, it is always more effective to plant them a short distance within the faces, and leave the actual angle severely alone, rather than to put them absolutely on the angle. In the case of the pilasters this arrangement gives three arises instead of one, and in the case of the buttresses three instead of two; in both cases serving rather to confuse the actual angle than to emphasise it.

But if we understand that it is a point in the design rather than the particular line which is to be emphasised, then no maxim of design is worthy of greater respect. There is no sort of design, architectural or otherwise, more poverty-stricken and contemptible than that which seems to come to no definite conclusion, and to have no bounds which it might not overstep; which looks as if, supposing it to be a street front, it might be continued up the whole length of the street. We are all familiar with this kind of design in street fronts, in which the windows, piers, columns, pilasters, and other features are all set out at equal distances, all the same width and similar in design; fronts which look as if they were sliced cut from a huge bar or sheet, and sold by the lineal yard, like calico or wall-papers. Sometimes there is a central feature with a slice of the "stock article" on each side; but that does not help much; the whole affair looks like the middle of a design without the ends. It, in fact, cannot be called a complete design at all. The effect is not quite so noticeable in detached buildings, but even in them it is sufficiently disagreeable.

An angle, therefore, demands especial treatment, and is the architect's opportunity. But it is also prolific of difficulties and dangers; and the success or the reverse with which a designer seizes the opportunities, overcomes the difficulties, and escapes the pitfalls, is no mean test of his skill. Some of the difficulties that occur at angles are familiar to every student. There is the Greek Ionic capital, the volutes of which have to be so awkwardly bent out. There is the difficulty in spacing triglyphs and modillions at angles, to say nothing of the corner dentil; and there is the enormous projection of every cornice when seen across the corner, made so much worse when there is a corner column beneath it. One may take it as a good safe rule that columns at corners should be avoided if possible. The Greeks, it is true, used them in their large peripteral temples, but for one thing the Greek columns had such an excess of strength that any little comparative weakness of appearance, due to position, was of small importance; and, secondly, the introduction of a fresh feature at the angle would have been fatal to the simplicity at which they especially aimed. But the Greeks, too, showed their appreciation of the fact that angle columns do not naturally look weak by giving them an inclination inwards, and by making the intercolumniations at the corners comparatively small. One may draw one more illustration of a difficulty in dealing with an angle from Classic and Renaissance architecture. It occurs in the internal angles of buildings, the interiors of which are decorated with pilasters. Pilasters or antæ

come in very well on the plain faces of the walls, but when they come to meet in the corner, one is very apt to get an extremely ugly little slip or corner of one of them; or else a sort of pilaster with a bend up the middle of it, which is not much better.

These are some of the difficulties; the chief source of danger is the habit of drawing things in elevation only, forgetting to think how they will look in perspective, or from other points of view. That is, of course, a highly dangerous and frequently fatal practice with reference to anything; but it is doubly dangerous in the case of angles. Since an ounce of experience—even sometimes other people's experience—is worth a ton of theory, I will make public confession of a case in which I fell a victim, in this way, to my own carelessness, and hold myself up as an "awful warning" to others. I had to design a gable end to a small church; the gable was already drawn, with a narrow bell-turret on one side, making it look rather like a pig with one ear; and the whole end was, too, rather low in proportion, being cut in half by a pinnace opposite the turret, and the coping of the gable out horizontally, and made it all as high as I dared. In the side elevation the height of the roof prevented my noticing anything wrong. Well, one day I went down to the works, and saw this buttress and pinnace executed, and my heart almost stood still. The buttress did not project very much in the upper part, and the gable wall was only 9 in. thick, so the whole thickness from back to front was only about 18 in. To make matters worse, I had no parapet on the side, and the overhanging eaves came down rather low; so there was this great stick of brickwork standing up like a square, tall, ugly chimney-stack.

Beginners sometimes go so far as to draw two elevations of a building with so little reference to one another that, when they come to be put together, they will not fit; the cornices and strings are at different levels, or some of those on one face come to a sudden stop at the corner and disappear on the other side. This, however, is so elementary a fault that it is not worth dwelling upon. If strings or cornices or other features are wanted on the main-front of a building, and not upon an adjacent side, the manner of stopping them requires very careful consideration. If all the similar features can be confined to one front, it is simple enough; you return them all upon themselves before they reach the angle at all, as is so often done in modern street fronts, the angle being left bare. But this cannot be done with an odd string here and there. There is one thing that must not be done, they must not be cut off square and left. The best thing, if it can be managed, is to have some special angle feature, such as a pier, against which the horizontal features can be stopped, or round which they can be carried, just as may be convenient. If this is not possible, then it is best to return them, for a short distance at least, round the corner, and, if there is no feature or excuse there to stop them, one had better be improvised; a good many things would do, but most people fall back on a bit of carving, which at least, brings them to an honourable end.

If one considers the various ways in which the external solid angles of buildings may be treated, and tries to arrange them into groups, they fall naturally under three heads. Under the first is a single, simple, but exceedingly effective treatment. It consists merely of leaving the angle alone, that is of leaving a breadth of plain, unbroken wall on each side of the aris, of greater or less width according to circumstances. Allowing, probably, the main cornice and plinth, and perhaps some other important horizontal features, to run round, but stopping the rest of the breaks some distance from the angle. This splendidly simple treatment is especially effective if the other parts of the walls are much broken up, and particularly if the breaks consist of a long range of regular features such as an arcade, colonnade, or series of large openings. But in the plainest and simplest buildings the amount of effect one may get by merely crowding up the openings a little towards the middle of each front, so as to leave a good width of plain wall surface at the ends is hardly to be exceeded by that which may be obtained by the most elaborate means. Examples of the plain solid angle are so common—they grow and multiply so naturally if people will but let them alone, as they did in times less fussy and ambitious than the present—that we

are apt to overlook its value. But one or two prominent modern instances may be pointed out; such as the new building for the Faculté de Médecine at Paris, the library at St. Geneviève at Paris, and the public library at Boston, in America. These buildings owe nearly the whole of such architectural effect as they have to the broad, solid simplicity of the angles. If, in the views of them, you cover up the greater part of the angle piers, you see that very little such effect remains; and if you break them up with pilasters or buttresses, or put niches in them, or add turrets or buttresses, you find much easier to spoil the design than to improve it. A shield or cartouche, or some such ornament,—evidently applied on the surface of the wall,—adds a little interest perhaps, and is decorative without detracting from their breadth and solidity of the pier. But, in most cases at least, it would be difficult, if not impossible, to interfere with their bare simplicity without detriment to the design as a whole.

In the second group I propose to put all such treatments of angles as arise from the use of such simple features as quoins, piers, pilasters, columns, buttresses, and so on, either singly or in groups. And in the third come the more important angle features.

As regards quoins, it is not necessary to say very much. In looking up examples and preparing this paper, I have been rather surprised to find how seldom ordinary quoins have been used in important buildings, or by the best architects of Renaissance and modern times. The most prominent examples I have come across in well-known buildings, are those of a few of the Florentine palaces and of some of the London clubs, notably the Travellers' and the Reform. But in his later works, even Sir C. Barry abandoned their use. The fact is, that although quoins do emphasise and strengthen an angle in a simple and logical way, they have a tendency, which it is difficult to overcome, to dwarf a building by destroying its scale. If you think of almost any building with quoins, and imagine how it would look without them, you will understand my meaning at once. I would not be understood to condemn quoins altogether, but only to point out that there is this tendency, and that, for that reason or some other, many of the best architects have usually avoided them. They are, or pretend to be, especially big, heavy stones; they are very conspicuous,—it is one of the objects of using them to make them so; they are apt to give their own scale to the whole building; especially as they are tailed into the walls, and do not appear as a separate feature. The simplest way to counteract this tendency is, evidently, not to make the contrast between the quoins and the general wall surface too marked; in using stone quoins with brickwork, not to project them beyond the general wall-face, nor to make them very large; in using rusticated quoins with plain stonework, not to make the rustications too heavy, and only to resort to rock-facing when the rest of the wall is rusticated.

I think that in all times and countries the feature most commonly used for the purpose of marking the angles has been the obvious one of a strong pier, marked off by its projection beyond the general wall surface, or by its special treatment. It is unnecessary, perhaps, to go back to the ancient architecture of Egypt and Assyria, though we could find illustrations there two or three thousand years old. But, of the Greek and Roman periods, the little temples, "in antis," to many people the most satisfactory of their architectural compositions, may be quoted; even in the peristylar temples, the angles of the wall behind the peristyle were generally marked by ante, and in the Roman basilicas and tombs, the external arcades and ranges of columns or pilasters were stopped at the angles by piers. In Byzantine architecture, the only style that can be said to have existed in Europe for several centuries after the fall of the western empire, the exterior of the buildings seem to have received so little consideration that it is not surprising to find no particular attention given to the angles. But in the Romanesque, which appeared after the period of barbarism, they are again marked by piers or, as Sir G. Scott called them, "pilaster-strips," which were always wider, and usually a great deal wider, than the strips by which the rest of the walls were divided up.

The pilaster-strips, we know, became in time the shallow buttresses of the later Romanesque and Norman styles, and through them the ancestors of all the subsequent developments



## THE LONDON COUNTY COUNCIL.

THE London County Council held its last meeting during its first (official) year of existence on Tuesday afternoon, in the Council Chamber, Guildhall, Lord Rosebery in the chair.

*The Tenders for Works at Cane Hill Asylum.*—The Asylums Committee brought up the following report, dated October 29:—

"Your Committee have to report that in pursuance of the resolution of the Council of the 22nd inst.,\* they have reconsidered their recommendation to the Council to accept the tender of Messrs. Brass & Son for the execution of the works for the extension of the County Asylum for pauper lunatics at Cane-hill, Coudson. The further consideration of the subject has induced your Committee not to recommend the acceptance of Messrs. Brass & Son's tender, and inquiries are now being made as to the capacity of some of the other firms who tendered for the work. When the report as to these inquiries has been considered, your Committee will probably make a further recommendation as to the acceptance of one of the tenders, a list of which was submitted to the Council on October 15."

This report was adopted unanimously and without discussion, on the motion of the Chairman of the Committee, Mr. P. M. Martineau.†

*Gates and Bars.*—The Parliamentary Committee brought up a report of which the following formed the first paragraph:—

"On July 23 last, the Council referred it to your Committee to take steps for the removal of the bars situate in Farringdon-place, Gordon-street, Upper Woburn-place, and Regent-place. Your Committee have accordingly prepared a Bill for this purpose, which omits all reference to the Lands Clauses Consolidation Act, 1845, and does not include any provision for compensation. The Bill also empowers the Council, in default of agreement, to give notice to the owner to remove the gate or other obstruction to which the notice relates within a stated time, such time not to be less than three months after the date of the notice, and failing compliance, the Council may take steps to remove the obstruction. The Bill also declares that, when the obstruction has been removed, the thoroughfare shall thereafter remain open and uninterrupted. Your Committee recommend—

\*That the draft Bill as to Bars and Gates, now submitted, be approved, and that the necessary steps be taken for its introduction into Parliament as a private Bill."

These recommendations were agreed to.

*The Strand Improvement.*—The second paragraph of the Parliamentary Committee's report was as follows:—"Your Committee have considered the resolution of the Council of the 29th ultimo, authorising them to include in the application to Parliament for powers to remove the south side of Holywell-street, Strand, powers to acquire the land and buildings on the north frontage to Holywell-street, sufficient land and buildings on the north side of St. Mary-le-Strand Church, and a portion of the enclosure at the west end of the said church, so as to form a practicable roadway with frontage thereto. Your Committee have accordingly given the necessary instructions for the preparation of plans, estimates, books of reference, and Parliamentary notices, and have directed the solicitor to include the acquisition of the property in the Bill. In connexion with the subject your Committee have directed their attention to the terms in which the clauses relating to compensation, and the provisions (if any) affecting 'betterment,' ought to be framed in the draft Bill; and, being unanimously of opinion 'that it is just and expedient that the owners of adjacent property, the value of which is increased by improvements, should contribute to the expense of those improvements,' they have (a) instructed the Solicitor to include in

\* See *Builder* for October 26, p. 294.

† See *Builder* for Oct. 19, p. 285, and for Oct. 26, p. 294.

‡ Since this report was in type, and just as we go to press, Messrs. Brass & Son send us a newspaper cutting containing copy of a letter which they addressed to the Chairman of the Asylums Committee on the 24th ult., as well as a copy of a letter which they have received from the Office of Works. The first letter denies the accuracy of some statements made at the meeting of the County Council on the 22nd ult., and the denial is supported by the letter from the Office of Works. If Messrs. Brass had sent the correspondence to us in the first instance, instead of a morning paper (from which they send us a cutting at the last moment) we would have endeavoured to make room for it.

§ See *Builder* for Nov. 2, p. 314.

the Parliamentary notices of the Bill provision that owners of property within the Strand District, or such part of it as may be defined in the Bill, not purchased by the Council, but likely to be improved by the operations of the scheme, shall be required to contribute towards the expense of the improvement in proportion to the enhanced value of their property, due to the improvement. (b) Your Committee have also given instructions to the Solicitor and the Parliamentary Agent to embody in the notices a clause to the effect that the provisions of the Lands Clauses Consolidation Acts shall be varied in the Bill for carrying out this improvement, as regards the principle on which compensation shall be assessed in the case of properties to be taken by the Council, and enacting that no compensation shall be paid for compulsory purchase, and that the amount shall be agreed at a fair value, having regard to all the circumstances. Your Committee have issued to the Council a copy of the proposed clause as regards compensation, and your Committee recommend:—

\*That the course taken by them, as above set out under headings a and b respectively, be approved."

Considerable discussion arose on these recommendations, Major Probyn moving an amendment (which was seconded by Colonel Rotton and supported by Colonel Hughes, M.P., Mr. Boulnois, M.P., and others), to the effect that the report be referred back for further consideration. In support of the amendment it was urged that the seeking of powers to obtain partial recoupment from the owners of property in the way specified would jeopardise the carrying of the Bill through Parliament, and would delay the execution of the improvement. On behalf of the Committee, it was replied that Parliament must take the responsibility of rejecting the Bill if it so chose. Eventually, the amendment was lost, on a division, by 69 votes against to 30 votes for, and the recommendations of the Committee were agreed to.

*The Housing of the Working Classes.*—Earl Compton, the Chairman of the Committee on the Housing of the Working Classes, brought up a long report containing some important recommendations\* as to suggested amendments in the law relating to artisans' and labourers' dwellings. The report was approved by the Council, and it was referred back to the Committee, with authority to make representations to the Secretary of State for the Home Department, with a view of ascertaining whether the Government will take steps to procure the amendment of the law referred to.

*Thanks to the Chairman and Vice-Chairman.*—On the motion of Mr. Boulnois, M.P., seconded by Mr. James Beal, a vote of thanks was accorded to Lord Rosebery for his great services as Chairman of the Council; and a similar compliment was paid to Sir John Lubbock, M.P., the Vice-Chairman, on the motion of Mr. Strong, seconded by Mr. Antrobus. The proceedings then terminated.

## ARCHITECTURAL SOCIETIES.

*Royal Institute of the Architects of Ireland.*—A Council meeting of this Institute was held at 37, Dawson-street, Dublin, on Monday, the 4th inst. Mr. Thomas T. Drew, R.E.A., was in the chair. Other Fellows present were:—Mr. W. M. Mitchell and Mr. Albert E. Murray, hon. sec. The hon. secretary read the minutes, which were signed. After the general business was completed, the question of the preliminary examination was taken up, when it was decided that this examination should be held at the same time as that of the R.I.B.A. Examination next week, and that the examining board should be as agreed on, viz., Messrs. Thos. Drew, J. R. Carroll, R. Millar, and Albert E. Murray, hon. sec. Candidates for membership were passed for ballot. A special Council meeting was directed to be summoned to nominate the officers for election for 1890, to consist of President, Hon. Sec., Treasurer, Members of Council, and Auditors.

*The Architectural Association.*—The second meeting of this Association for the present session was held on the 1st inst., in the meeting-room of the Royal Institute of British Architects, Mr. Leonard Stokes (President) in the chair. The following sixty-four new members were elected:—

Messrs. B. D. Cancellor, C. J. J. McCormick, F. A. C. Smith, J. A. Cooke, E. H. Ward, J. F.

\* We have not space for these, but may return to the subject.

of buttresses. But quoins also seem to be descended from them, and in this way: all the plaster strips were generally,—at any rate, generally in the commoner class of work,—built up of alternate flat stones on end, which had little or no hold on the walls, and long stones laid flat and tailed well into the walls. One may see it is so by examining almost any bit of, say, Saxon architecture. But this method, when it came to be used at the angle, seems to have puzzled the simple builders of the period to some extent. I cannot exactly say how they argued the matter out, but they seem to have come to the conclusion that the best solution was to make the bonding stone tail into both walls; and thus they arrived at the peculiar, primitive form of quoins we call long and short work. Whether this form was the parent of modern quoins, or whether, as is more probable, other workmen in other places met the same difficulty by tailing every stone into the walls, first one on one side and then one on the other, I cannot say; but in either case quoins would be the lineal descendants of the plaster-strips.

The angle strips, if they were not merely the last of a series of narrower strips forming the piers of a shallow arcade, as in the lower stages of the cathedrals at Pisa and Luca, were connected at the top, and generally at several other points, by corbel-tables which brought the wall out flush with them, and served excellently well to tie them into the general mass; examples will occur to every one. The style was spread over nearly the whole of Western Europe, and, of course, developed in different directions in different parts. But even when the styles had wandered so far apart that their common origin is unrecognisable, as in the towers of Durham Cathedral on the one hand, and the west front of Piacenza Cathedral on the other, we still find the angle piers marked and prominent. In the northern example, however, they seem already to foreshadow turrets, while in the other they have nearly developed into the broad pilaster form, which they have already still more nearly approached in the cathedral of Genoa.

Angle piers continued to be used throughout the Middle Ages. Even after buttresses had been developed from them we find them persisting also in their original form; still, as a rule, stopped by a corbel table or cornice at the top, and generally with a buttress planted against each of their faces. Later on they projected farther and stopped the cornices; themselves running up into pinnacles at the top. They, and the buttresses planted against them, gradually became more and more elaborate, and their grouping more and more complicated, until they developed into the graceful groups that mark the angles of the great church towers of the Late Gothic period. To analyse these groups would be an impossible task, and, probably, not a very profitable one; for the treatment is different in every case. All have a central pier, the pinnacle of which overtops the rest and dominates the composition, and against the two faces of it are planted buttresses. But how those buttresses are treated is a matter of taste. Except as regards the dominating pinnacle, the buttresses have become the chief thing in the group, and, as a matter of fact, the pier frequently exists only in imagination or for part of the height. Its pinnacle is left, and the buttresses are placed, not at the angle of the wall, but at what would be the middle of the face of the pier: but the pier has no projection, and is not to be distinguished from the wall face. One sometimes sees groups of angle buttresses and pinnacles without the central pinnacle, but I do not remember any such groups which appeared to be quite a success; the effect, too, is usually made worse in such cases by the buttresses being placed close up to the angle.\*

**The New Houses of Parliament in Stockholm.**—In all about 150 designs were received for the new Houses of Parliament and the National Bank to be built in Stockholm, of which fourteen have been retained for final examination. As soon as the jury has awarded the three prizes offered for the best designs all of them will be publicly exhibited.

**The School Board for London and the Building Trade.**—The report of the adjourned discussion on builders' grievances at the School Board is unavoidably crowded out this week.

\* The remainder of the paper, with some notes of the discussion, in our next.



Clark, S. B. Lee, G. H. M. Trew, A. N. Wilson, A. E. Gamble, C. H. Aveline, A. E. House, E. J. Kerr, T. J. Mackness, H. D. Austin, W. C. Hulbert, E. A. White, W. B. Hopkins, H. W. Johnson, C. B. Howell, G. M. Nicholson, H. C. Lander, J. Soutter, P. G. Newell, D. Dinwiddie, L. S. Rogers, J. Mew, K. Sakurai, B. W. Austin, A. R. Read, L. E. G. Collias, A. J. Meacher, G. R. Morris, W. G. Perstius, A. E. Pett, W. E. Pitt, W. E. Davis, H. J. Cox, F. H. Price, E. F. Selby, J. W. Paul, J. A. Page, C. R. B. Clark, V. H. King, C. P. Allen, F. K. Kendall, A. S. King, W. P. Crosby, H. Thinker, T. G. Charlton, J. W. Acock, A. B. Thomas, C. E. Salmon, R. H. Davies, A. G. Wright, W. C. Waymouth, W. Kerr, C. W. Dawson, W. Weir, F. P. Theobalds, A. Easton, F. E. Halford, H. B. Taberner, B.A., and C. C. Dornbusch.

Fifteen gentlemen were nominated for election as members. Mr. F. T. Baggallay then read a paper entitled "The Treatment of Angles and Enclosing Lines," the first portion of which we print on another page.

**Sheffield Society of Architects and Surveyors.**—The inaugural meeting of the new session of the Sheffield Society of Architects and Surveyors was held at the Montgomery Hall on the 28th ult. There was a good attendance of members, including Mr. F. Fowler (the President), Messrs. T. J. Flockton, C. Hadfield, E. M. Gibbs, C. J. Innocent (Vice-President), W. H. Lancashire, C. F. Wyke (Borough Surveyor), A. F. Watson, T. Winder, W. C. Fenton, and others. The President delivered his opening address. After a graceful allusion to the manner in which his predecessor, Mr. Flockton, had discharged his duties, he expressed an opinion that much good was being done by societies such as theirs, which were, he was glad to note, on the increase. The Royal Institute of British Architects and the Surveyors' Institution had fostered the movement, and both were doing their best to raise the professional status of their members, and to promote the higher education of young men entering into the professions of architect and surveyor. The Sheffield Society was doing a good work in alliance with the Royal Institute by carrying out the Examination scheme. In these days it was absolutely necessary that professional men should be well acquainted with their business, and much might be done in this direction by the preparation, reading, and discussion of papers by the members on subjects of professional interest. Speaking from the surveyor's standpoint, he would indicate a few, such as the valuation of town or agricultural property, rights of light, town improvements, valuation of manufacturing premises for rating and other purposes, drainage and sanitary work, &c. He instanced the valuation of property in Sheffield after the inundation in 1864, as showing that at any time the young surveyor should be ready for emergencies. Such often arose in actual work, and the best preparation for a successful career was the accumulation in early practice of knowledge and experience for the hour of need.—On the motion of Mr. C. J. Innocent, seconded by Mr. C. Hadfield, a hearty vote of thanks was awarded to Mr. Fowler for his address.—The Secretary then read a letter from the Royal Institute of British Architects, announcing that the following gentlemen (whose drawings and educational certificates had been considered by the Committee of the Sheffield Society, charged with the conduct of the Local Preliminary Examination) would be at once registered as probationers of the Royal Institute of British Architects, viz.:—Walter Patrick Belk, Charles Matthew Ellison Hadfield, Albert Ernest Hall, Charles Frederick Innocent, Harry Teather, John Charles Teather, James Vincent Woodinden. The President's brother (Sir John Fowler) kindly sent for inspection at the meeting a photographic album, containing views of the construction of the Forth Bridge, to the close of September last.

#### ENGINEERING SOCIETIES.

**The Institution of Civil Engineers.**—The opening meeting of this Institution for Session 1889-90 will be held on Tuesday evening next, the 12th inst., when the President, Sir John Coope, K.C.M.G., will deliver his inaugural address. On this occasion, also, the medals, premiums, and prizes awarded at the end of last session will be presented. The first Students' meeting for the new session will be held on Friday next, the 15th inst., when Mr.

S. C. Bailey will read a paper on "The New Harbour and Breakwater at Boulogne-sur-Mer." From the "List of Members" of the Institution issued on the 1st inst., we notice that the total membership is 5,732, made up of 19 Honorary Members, 1,659 Members, 2,643 Associate-Members, 444 Associates, and 987 Students.

**The Society of Engineers.**—At a meeting of the Society of Engineers, held at the Town-hall, Westminster, on Monday evening last, Mr. Jonathan R. Baillie, President, in the chair, a paper was read by Mr. S. Griffin on "Modern Gas Engine Practice." In dealing with the subject, the author confined himself principally to illustrations from actual practice, these being discussed as far as possible in the order in which the various improvements have been introduced. Having briefly alluded to a number of important points which could not be dealt with, by reason of the limited time at his command, the author concluded by indicating a few of the directions in which development of the gas-engine may be expected to extend, giving it as his opinion that future gas-engines will be constructed upon the lines of those of the present day, improvement being in the direction of detail rather than principle.

#### LOW SIDE WINDOWS.

SIR,—The argument of Colonel Parry [see his letter in the *Builder*, p. 316, ante] seems to me illogical and inconsequential. It amounts simply to this, that because there are apertures in the west walls of churches in Northern Italy, therefore the low side windows in English churches were not for the use of lepers. I do not see any connexion or relationship whatever between the Italian and English features referred to. It appears to me a plain matter of fact that the English openings are lepers' windows. They are almost exclusively of the Early English period, 1150 to 1250, and mark the return of the "Saunterers" (chintz-terre) from the Holy Land bearing the hideous diseases, which rapidly spread. The unfortunate sufferers—homeless wanderers—were not allowed to enter houses or places of general resort. The clergy, not willing to deprive them entirely of the offices of religion, devised a means—the low side chancel window—by which the Sacrament of the Lord's Supper could be administered to these objects, confession and absolution, no doubt, preceding at the same place. These apertures were small, as only one person at a time had to be dealt with. They were in the chancel, as only there was the Sacrament administered. They were at the side, as being, for many reasons, the most convenient place, and they were low because the persons outside were kneeling. This is the simple explanation of these windows—most natural and quite agreeable to common sense. The apertures—they are scarcely windows—were closed with shutters when not required for their special purpose. They did not look towards the high altar or any other.

PHILIP E. MASSEY.

#### "A QUESTION OF FEES."

"HAYWOOD V. SANDON."

SIR,—In reply to a letter in your issue of Oct. 26, p. 299, signed "F. H. C.," if he will kindly refer to 20 & 21 Vic., c. 43, sec. 2, he will be able to satisfy himself as to the right of appeal in this case. He may also refer to the case of "Wigmore v. Power," Law Reports 7, Common Pleas, p. 386.

W. SECKHAM WITHERINGTON.

#### STAINED GLASS.

**Aberavon (Port Talbot).**—A five-light painted glass window has just been placed in the east end of Aberavon Church. The window has been carried out by Mr. Dixon, of London, under the direction of Messrs. Kempe & Fowler, of Llandaff, the subject being "The Adoration of the Magi."

**Carmarthen.**—The very ancient parish church of Mydrim, the chancel of which has been restored at the cost of the Ecclesiastical Commissioners, has been further decorated by the filling of the east window with stained glass with a representation of the Last Supper. The window, which was lately unveiled by the Bishop of St. David's, is in memory of the Reverend Rhys Thomas Jenkins and John Jenkins, both of whom have been connected with the Church for over forty years. The artists were Messrs. Chas. Evans & Co. London.

**Ruislip.**—A five-light window, by Mayer & Co., has just been erected in the parish church, Ruislip, near Pinner, by Sir Hugh Hume Campbell, in memory of Lady Hume Campbell.

**Shedfield.**—The Church of St. John, at Shedfield, has just received a three-light window. The subject selected for treatment is the Home

at Bethany, and illustrates the text, "The Master is come, and calleth for thee." The work was entrusted to Messrs. Mayer & Co.

#### PROVINCIAL NEWS.

**Horne Bay (Kent).**—Two sheltered seats have lately been erected on East Cliff, Horne Bay, by Mr. A. S. Ingleton, builder, of Horne Bay, at a cost of 100l. each. Mr. John R. Withers was the architect, whose design was selected from amongst eighteen submitted in an open competition advertised in the *Builder* in May last. The Local Board are about to erect a bandstand from a design by the same architect.

**Whalley.**—The new vicarage at Whalley, Lancashire, has been carried out and completed under the direction of Mr. Henry Ross, of Accrington, on a plot of land which has been added to the old vicarage site. The fragments from the Abbey buildings discovered when pulling down the old vicarage, consisting mostly of portions of window tracery, have been carefully preserved. The only feature about the old house which was thought worth retaining, viz., the oak staircase, has been re-fixed in the new building. The stone in the old walls has been re-used to a great extent. This fact is recorded on the date stone inserted on the south side, and which reads thus: "Ex antiqua nova domus." The work has been carried out by local contractors.

#### The Student's Column.

WATER-SUPPLY.—XIX.  
LONDON WATER-SUPPLY (continued).  
Wells.

THE consideration of the public water-supply of the metropolis, however interesting and instructive it may be to the student, has not the same immediate practical value to the average architect or engineer, as the study of privately supplying small establishments, such as breweries, distilleries, mansions, hotels, &c., with the precious fluid. In the metropolitan area this is invariably accomplished by sinking wells, or bore-holes, to certain water-bearing levels, and it will be of interest to describe some of these "well-sections," to get some idea of the relative depths in different parts of the area of the water-bearing strata; to arrive at the nature of the materials which may be met with, and the difficulties usually encountered in constructing the wells and obtaining the supplies of water.

The best way, perhaps, of commencing the subject will be to briefly describe the geology of the London basin, with especial reference to that portion of it nearest to and in the metropolis itself. The term "London basin" is often a stumbling-block to the non-geological student of water-supply; he not unnaturally concludes that it is a very circumscribed area, with London in the centre of a sort of depression of the ground, and with this idea permeating his mind he is unable to appreciate the actual structure of the London district, or to derive much useful information respecting it from occasional professional papers on metropolitan hydrogeological matters which may come under his notice. The "London basin" properly so called is, roughly speaking, a triangular patch of clay, sands, and gravels, lying on the chalk, and the edges of which extend in a westerly direction from Pegwell Bay (near Ramsgate), through Rochester, Croydon, Basingstoke, to Hungerford; thence north-eastwards through Reading, Windsor, Watford, by Hertford and Woodbridge to the eastern part of Norfolk by Great Yarmouth. The estuary of the Thames occupies the site of a large portion of the beds which have been denuded by that river and by the sea on the eastern boundary of the basin in Essex, Suffolk and Norfolk. The chalk fringing the edges of these deposits usually (especially on the southern and western portions of the area) forms high ground and has a general tendency to dip under them towards the centre of the basin. Locally there are exceptions to this rule, but at all events one of the maximum effects is to create a sloping, slight trough-like flat depression (not very apparent when drawn to scale) under the district on which London stands. Rain falling on the chalk hills is absorbed and conducted underground, and collecting in this depression would completely saturate the chalk were the water not so extensively drawn upon in places. The



impervious mantle of clays forming the London basin naturally prevents the escape of water from the chalk, and it will be readily understood that, immediately this mantle is, anywhere in the Metropolitan district, pierced through, well into the chalk, the water in the latter being, as it were, tapped, escapes up through the boring, and forms an artesian well. We have previously alluded to the depth of the water-level under London. Thus, the most persistent fundamental rock under the district is chalk, which can be met with anywhere in it by boring to a sufficient depth.

Certain deposits, however, are found fringing the chalk at its outcrop, and which are also found beneath that rock in many well-borings under London, and these possess peculiar value in regard to the question of water-supply from deeply-seated rocks. In this connexion the following table of the thicknesses of strata met with in some of the deepest well-borings in the London basin may be useful:—

state the difference in level between the top of the well and the level of the street hard by, the chief reason why will be apparent in the sequel. These particulars are seldom published, with the result that much greater trouble is entailed in working out the thickness of made-ground, drift, &c., than would otherwise be the case.

It is noteworthy that the thickness of chalk passed through in the Streatham boring is less than in any of the deep borings in and near London. In all cases where the "Lower London Tertiaries" cover the chalk, the total thickness of the latter formation is present; but where this is not the case, as in the Ware boring above alluded to, the thickness of the chalk depends on the amount of the rock denuded, and the position of the top of the well with reference to the depth of the denudation. This, of course, only affects wells bored in the chalk at its outcrop; under London, as we have before stated, the chalk is everywhere covered by the clays and sands forming the normal deposits of

4. *Cricklewood*, near Hampstead. — 157 ft., T.H.W.M.
5. *Hackney-road*.—Wiltshire Brewery. 1871.
6. *Hampstead-road*.—Old reservoir near the Euston-road. 77 ft., T.H.W.M. 1838.
7. *Hyde Park-corner*.—St. George's Hospital. About 50 ft., O.D. 1870.
8. *Kensington*.—Horticultural Society. About 90 ft., O.D. 1862.
9. *Park-lane*.—Watney's Stag Brewery, Brewer-street. A little below T.H.W.M.
10. *Lambeth*.—Bethlehem Hospital.
11. *Woolwich*.—Western edge of Government Arsenal (? at the Laboratory). 20 ft., O.D.

In Table 2 it will be observed that the thickness of the London clay is very variable. This is not difficult to account for, when we reflect that the drift beds above it do not follow on in regular sequence in the geological scale. They lie on the London clay unconformably, and this proves (even if there were no other evidence) that that formation had undergone much denudation, its thickness having been therefore reduced before the deposition of the merely superficial beds above it. As we shall presently see, it is not very difficult to arrive at the comparative amount of this denudation for any given locality in the London area. When the London clay is covered by sands, known as the Bagshot beds, its total thickness is shown by the well-borings. It is often very difficult to define the limits (in well-borings) between the London clay and the Woolwich and Reading series; and, again, between these latter and the Thanet series. Some geologists include a series of pebble beds and sands between the two former formations (or made out of them?) as a separate formation, and call it the Oldhaven and Blackheath series. These are not always easy to recognise (even when present) underground. It is not so difficult to draw the lines between any of these formations where they crop out at the surface, but from the peculiar methods sometimes adopted in boring, carelessness on the part of workmen, the somewhat altered appearance of the individual beds at much depth, and from the known variability in their lithological character, the depths, relative thicknesses, and classification of beds in the well-sections are occasionally somewhat doubtful, but only to the extent of a few feet.

Table 1.—Deep well- and trial-borings.\*

Formations passed through.	Streatham Common.	Richmond Waterworks.	Kentish Town.	Tottenham Court-road.	Chesham.	Ware.	Crossness, near Erith.	Chatham Dockyard.	Harwich.
Made ground, Drift, &c.	10	10	...	22(?)	35(?)	14	39	17(?)	25
London clay	153	160	236	64	30	...	...	...	23(?)
Lower London Tertiaries	78½	83½	88½	72½	50	...	98	10(?)	30(?)
Chalk	623	671	645	655½	670(?)	544	696(?)	682	890
Upper greensand	28½	16	13	28	31(?)	77(?)	...	...	?
Gault	188½	201½	130½	160	164(?)	160	175	193	61
Lower greensand	...	10(?)	...	?	...	1½	...	41	...
Jurassic	38½	87½	...	64	...	...	...	22	...
? Trias	several feet	207	188½(?)	...	...	...	52	...	...
Carboniferous	...	...	...	...	...	...	...	...	69
Devonian	...	...	...	80	30	...	...	...	...
Wenlock beds	...	...	...	...	35	...	...	...	...
Total depths (in feet)	1,120 +	1,446½	1,302	1,146(?)	1,010	831½	1,060	965	1,098

\* The information contained in this and the following Table is largely derived from the many writings of Mr. W. Whitaker, F.R.S.

The boring at Streatham Common was made for the Southwark and Vauxhall Water Company, the top of the orifice being about 110 ft. above Ordnance datum; that at Richmond Waterworks is 17 ft. above O.D.; that at Kentish Town Waterworks is 174 ft. above Thames high-water mark; that at Tottenham Court-road, at Messrs. Meux & Company's Brewery, is about 85 ft. above O.D.; those at Chesham (Turnford) and Ware were constructed for the New River Company; that at Crossness, near Erith, for the late Metropolitan Board of Works, is about 6 ft. above O.D.; the Chatham Dockyard Extension well being about 10 ft. above O.D.; and that at Harwich (by the harbour, just west of the Great Eastern Hotel) is 6 ft. above high-

water. The London basin." These latter beds are represented in the above table as "Lower London Tertiaries" and "London Clay."

Before attempting to describe the nature of the deposits met with in these deep borings, it is necessary to point out that for brevity we have classed together many minor deposits, having distinctive names, under the term "Lower London Tertiaries," and bearing in mind the fact that the vast majority of London wells only reach the chalk, and that therefore this formation and the beds above it (which are exceedingly troublesome in many ways to bore through) claim the most general interest, we may now give further details of other and shallower borings:—

## RECENT SALES OF PROPERTY:

## ESTATE EXCHANGE REPORT.

- Oct. 23.—By GEORGE JACKSON.  
Herts, near Standon Station—"High Trees Farm," 30½ a. 1r. 1p., r. £240 p.a. £3,550  
By G. H. TAYLOR.  
West Chislehurst—A plot of 1 a. land 650  
By H. HOOPER.  
Fulham—73, Harwood-rd., ut. 87 yrs., g.r. £4, 10s. 375  
By FREDERICK & SONS.  
Crouch End—1 gr. of £10, ut. 25 yrs. 105  
68 to 75 (odd), Park-rd., ut. 25 yrs., g.r. £25. 935  
Oct. 29.—By W. B. HALLIST.  
City—190, Upper Thames-st., ut. 81 yrs., g.r. £80, a.r. £350 1,650  
By JONES, LANGE & CO.  
West Ham—E.g.r. of £9, with reversion in 61 yrs. to £80 p.a. 220  
Fulham—F.g.r. of £22, 10s., with reversion in 99 yrs. to £33, 4s. p.a. 510  
By T. N. TURNER.  
Marylebone—27, North-st., ut. 32 yrs., g.r. £15 ... 220  
Kilburn—6, 7, and 8, Alpha-pl. West, ut. 68 yrs., g.r. £9, r. £56, 10s. 360  
6 and 7, Park Mews, ut. 77 yrs., g.r. £10, r. £35 300  
104, Kilburn Park-rd., ut. 77 yrs., g.r. £8, r. £53 310  
1 gr. of £108, ut. 77 yrs., g.r. £35 p.a. 1,400  
115, Kilburn Park-rd., ut. 77 yrs., g.r. £8, r. £43 p.a. 420  
St. John's Wood—163 and 169, Belsize-rd., ut. 65 yrs., g.r. £16, 10s. 600  
By A. ROBERTSON.  
Kensington—9 and 11, Bedford-st., subject to lives aged 61 and 63 years, g.r. £3. 150  
Old Kent-rd.—Nos. 200 and 202, the lease of, ut. 14 yrs., r. £120 40  
By RUTLEY, SON, & VINN.  
Caledonian-rd.—30, Storey-st., ut. 55 yrs., g.r. £5 King's Cross—44, Sidney-st., ut. 53 yrs., g.r. £4, r. £24 235  
By WILKINSON, SON, & WELCH.  
(At Brighton.)  
Brighton—17, New Steine, and 79 and 81, St. James's-st., f. 1,800  
By INMAN & CO.  
Maida Vale—20, Greville-pl., f. r. £55 p.a. 810  
Oct. 31.—By R. TIDY & CO.  
Kingsland—63, Mortimer-rd., ut. 27 yrs., g.r. £4 205  
Islington—51, Popham-rd., ut. 21 yrs., g.r. £5, r. £30 p.a. 85  
By R. A. NOTLEY.  
King's Cross—108 and 109, Caledonian-rd., ut. 54 yrs., g.r. £4, 8s., r. £37. 1,040  
8, South-st., ut. 54 yrs., g.r. £1, 1s., r. £32. 380  
West Hampstead—16, Woodchurch-rd., f. 2,160

Table 2.—Wells in the London District.

Formations passed through.	1. Bank of Eng. land.	2. Bow.	3. Camden.	4. Cricklewood.	5. Hackney-rd.	6. Hampstead-road.	7. Hyde-park corner.	8. Kensington.	9. Finsbury.	10. Lambeth.	11. Woolwich.
Made ground, &c.	22	2	18	13	7	6	3	18	32	—	13½
Drift gravel, &c.	4	17	...	...	47	17	2½	22	...	28	6½
London clay	111	148	144	212	48½	59	229	196	140	80½	—
Woolwich & Reading series	59½	56	64	45	48	39½	64	54	67½	35½	—
Thanet series	89	51	8	21	42	24½	21	25	37½	47	46½
In chalk	100	150	166	19	259	37½	18	84	127	20(?)	311½
Total depths (in feet)	334½	324	400	310	411½	183	337½	401	398	211	366

\* There is some doubt as to whether the depth in the chalk in this boring should not be 92 ft.

water mark. These particulars are given to localise the position of the different wells, as near as may be,—a matter too often neglected. A well, for instance, constructed at the top of a hill, or on rising ground, may give a totally different thickness for its uppermost beds to one constructed at its foot, or in a bottom, and this even in the same street or road. And this reminds us that in many instances, as in a large city like London, it would be very useful to

The following gives particulars of the sites of the wells in Table 2, and (where known) the heights of the tops of the orifices above Ordnance datum, or Trinity high-water mark, with year of boring:—

1. *Bank of England*.—27 ft., T.H.W.M. 1851.
2. *Bow*.—Messrs. Berger & Company's Starch Works. 1864.
3. *Camden*.—London & North-Western Railway Station. About 100 ft., O.D.



By REYNOLDS & EASON.	
Bethnal Green—115 and 117, Green-st., f., r. £100 £1,900	3,030
119 and 121, Green-st., f., r. £100 £1,900	3,030
22 and 23, North-pl., f., r. £31 p.a.	330
Tottenham—1, Northampton-ter., f., r. £45 p.a.	768
Chingford—A moiety of the "The House Estate," about 6 acres, f., r. £40 p.a.	550
East India Dock-rd.—15 to 21, Sophia-st., f., r. £10 p.a.	885
By VOTTON, HART, & GILBERT.	
Edgware-rd.—30, Cambridge-ter., n.t. 40 yrs., g.r. £17, r. £13 p.a.	1,350
Kensington—26, Emperor's-gate, f., r. £40 p.a.	1,600
Dulwich—11, Alderley-st., n.t. 67 yrs., g.r. £2 p.a.	240
Fulham—5 and 6, Delaford-st., n.t. 90 yrs., g.r. £10, 10s., r. £88	270
Oct. 30 & 31.—By DUBERNET, TAYSON, & CO.	
Oxon, near Blelow—The Upper and Lower Farms, containing 629 acres, f., r. £810 p.a.	13,350
9, cottages in Chinnor	890
Numerous houses and cottages, f.	890
An allotment field, 37a. 2r. 10p., r. £134 p.a.	1,610
"Horton Farm," containing 88a. 3r. 32p., f., r. £180 p.a.	3,150
Stokenchurch—"Cooper's Court Farm," part of, 12a. 2r. 6p., f., r. £115	2,650
"Cooper's Court Farm," part of, 20a. 2r. 13p., f., r. £15	640
F. farm, 18a. 1r. 2p., r. £10	460
"Eastwood Farm," 80a. 0r. 18p., r. £100	1,850
"Hill Corner Farm," 30a. 2r. 37p., f., r. £55	700
"Dean's Farm," 35a. 0r. 11p., r. £80	1,400
"Saddler's Farm," 21a. 3r. 9p., c., r. £20	495
Eight f. and c. cottages	495
Dorchester—"The Manor Farm," 63a. 0r. 27p., f.	2,100
Aston Rowant—Three f. cottages	170
Oct. 31.—By R. W. SCORRELL.	
Gurbiton—"The Residence," "Forest," n.t. 59 yrs., r. £16, 10s., r. £100	1,145
By WATERBURY & SONS.	
Chertsey—Freehold land, 28a. 0r. 29p.	4,350
A plot of meadow land, 1a. 1r. 17p.	300
By HARMAN BROS.	
Sydenham—6 to 8, Denmark-ter., n.t. 90 yrs., g.r. £21, r. £72, 18s. p.a.	270
Finchley—3 to 13 (old), Wilton-st., n.t. 53 yrs., g.r. £14, 10s., r. £72, 10s.	345
By C. D. FIELD & SONS.	
Shermondsey—13 & 15, White's Ground, f., r. £230	5,000
81, Orange-ter., f., r. £45	640
Peckham—L-gr., £22, 10s. p.a., n.t. 74 yrs.	400
Nutt-st.—L-gr., £3 p.a., n.t. 74 yrs.	55
Scipio-st., L-gr. of 65, 10s., n.t. 74 yrs.	140
By BLAKE & DANFATT.	
Brookley—F-g.r. of £13, with reversion in 87 yrs.	300
F-g.r. of £23, with reversion in 88 yrs.	545
F-g.r. of £10, with reversion in 87 yrs.	245
F-g.r. of £40, with reversion in 90 yrs.	955
F-g.r. of £41, with reversion in 91 yrs.	980
East Dulwich—F-g.r. of £45, 10s., with reversion in 88 yrs.	855
By E. STIMSON.	
High Holborn—8, Fulwood's Rents, f.	1,050
Shadwell—Stabling in Sun Tavern Yard, n.t. 23 yrs., g.r. £2	300
Waterloo—2 and 4, Gray-st., and 13, Barron's pl., n.t. 144 yrs., g.r. £50, r. £134	130
28, Oakley-st., and 9, Coral-st., n.t. 31 yrs., g.r. £2	320
By BRODIE, TYMES, & BAKER.	
Old Windsor—Rent charges, £34, 18s. 11d. p.a.	600
Crouch-hill—31, Frander-ter., n.t. 85 yrs., g.r. £8, 10s., r. £26	385
By NEWSON & HARDING.	
West Smithfield—77 and 78, Long-lane, f., r. £150 p.a.	3,470
St. Luke's—6 and 8, Gosport, and 2 and 3, Willow-row, f., r. £40 p.a.	780
28 and 29, Gosport, and 13 and 14, Willow-row, f., r. £17, 18s. p.a.	885
Kentish-town—6, Clarence-ter., n.t. 48 yrs., g.r. £3, 5s., r. £37 p.a.	375
Holloway—112, Lady Margaret-ter., n.t. 79 yrs., g.r. £2, 18s., r. £23 p.a.	580
Highbury—16, Highbury-ter., n.t. £120 p.a.	2,125
Hoxton—28, New North-ter., n.t. 48 yrs., g.r. £7, 10s., r. £32 p.a.	680
Stoke Newington—81 and 85, Hawkley-ter., n.t. 84 yrs., g.r. £13, r. £71, 2s. p.a.	465
6, Grove-ter., n.t. 78 yrs., g.r. £2, r. £28 p.a.	255
149, Nevill-ter., n.t. 75 yrs., g.r. £4, 10s., r. £26 p.a.	200
Dalston—67, Eleanor-ter., n.t. 56 yrs., g.r. £3, 5s., r. £28 p.a.	245
Nov. 1.—By J. WILSON.	
Paddington—9, 17, and 21, St. Mary's-ter., f., r. £205	2,320

[Contractions used in this list.—F-g.r. for freehold ground-rent; L-gr. for leasehold ground-rent; g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; c. for freehold; a. for copyhold; l. for leasehold; e.r. for estimated rental; n.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

SATURDAY, NOVEMBER 9.	
Liverpool Architectural Society.—Visit to the new Inquiry (by permission of Mr. M. Waterhouse, R.A.), 2 p.m.	
MONDAY, NOVEMBER 11.	
Surveyors' Institution.—Address by the President, Mr. E. P. Squarey, 8 p.m.	
Bradford Historical and Antiquarian Society.—8 p.m.	
TUESDAY, NOVEMBER 12.	
Institution of Civil Engineers.—Lanquar address by the President (Sir John Cooke), and presentation of Medals, Premiums, and Prizes awarded at the end of last session, 8 p.m.	
University College, London.—Mr. Hugh Stannus on "The Distribution and Application of Ornament with Reference to Surface, Material, Construction, and Purpose." V. 5 p.m.	
WEDNESDAY, NOVEMBER 13.	
University College, London (Archæology).—Professor R. S. Poole on "The Mosque," 6 p.m.	

Liverpool Engineering Society.—Mr. G. Farren on "The Stability of Earthwork and Masonry Dams," 8 p.m.

THURSDAY, NOVEMBER 14.  
Institution of Electrical Engineers.—Mr. K. L. Murray on "The Lighting of the Melbourne Centennial International Exhibition," 8 p.m.

FRIDAY, NOVEMBER 15.  
Architectural Association.—Mr. Banister F. Fletcher on "The Paris Exhibition," 7.30 p.m.  
Institution of Civil Engineers (Students' Meeting).—Mr. S. C. Bailey on "The New Harbour and Breakwater at Boulogne-sur-Mer," 7.30 p.m.

## Miscellaneous.

**New Bridge over the Cam.**—The foundation stone of the new roadway bridge over the River Cam, with approaches at Chesterton, Cambridge, was laid on Monday last by the Mayor of Cambridge (F. C. Wace, Esq., M.A.) and Mr. John Bester (Chairman of the Local Board of Chesterton). The superstructure is constructed of iron and steel, and consists principally of six elliptical main ribs. The main ribs are 100 ft. clear span, with a clear rise above the water-line at the centre of 14 ft. 6 in.; this span allows the maximum width of the river at this point, with a halving way on the Cambridge side of 12 ft. in width. The main ribs are built up of wrought iron plates and angle iron, and firmly braced together with diagonal and horizontal cross bracing of channel-iron; the ribs are connected at the top with steel corrugated flooring plates, and upon these plates is laid the concrete and macadam road. The extreme width of the bridge above, between the parapets, is 40 ft.; this gives two footways of 7 ft. wide each, leaving a roadway of 26 ft. wide. The two outer ribs are covered with ornamental cast-iron spandrels, surmounted by ornamental cornice and parapet. It is claimed that the form of rib, as designed, offers the least resistance to the flood waters, and gives greater treadway for the halving-way than the segmental arch. The foundations of the bridge differ on each side. On the Chesterton side good solid clay is found at a depth of 15 ft. On the Cambridge side the bed of the old river was found, and as the clay was not reached until about 30 ft. below the top ground level, the engineers had to pile the substrate to obtain a good foundation for the abutments, in preference to excavating down to the solid. The abutments and retaining wall are built of Darley Dale stone facing, with Portland cement concrete backing. The new road (across the Midsummer Common) will be 40 ft. wide, with two footways of 7 ft. wide on either side, and properly drained. Cast-iron rail-fencing will be laid on each side of the road. The roadway of the bridges and approaches will be of granite macadam, and the footings of granolithic pavement. The engineers for the work are Mr. John J. Webster, M.Inst.C.E., of Lord-street, Liverpool, and Mr. Frank Waters, of Sidney-street, Cambridge. The sole contractor is Mr. John Mackay, of Bury St. Edmunds. The clerk of the works is Mr. G. McNeil. The cost of the whole of the works, which are to be completed next June, will be about 10,000.

**Paris a Seaport.**—It may be remembered that last session a proposal for making Paris a port was introduced in the French Chamber by M. Achard, and referred to a committee for examination, and this body has now issued its report, which is unanimously in favour of the scheme. The committee has consulted engineers, naval officers, members of the Academy, &c., and by all the proposal is approved. An objection has, however, been raised against the cost of the undertaking, said to be about 2,000 million francs, but the committee is of opinion that even this heavy outlay will be repaid. The canal is proposed to be twice as wide as the Suez Canal, the distance from the sea—at Rouen—to Paris being estimated at 180 kilometres. The depth is to be 6-20 metres. The most important work would be the making of a great harbour between St. Denis and Clichy. There are also second-class harbours proposed for Andelys, Mantes, Prissy, and Argenteuil. The committee points out the immense importance of such a canal to French trade, particularly in competition with that of Antwerp, which is every year becoming keener. The proposal will be laid before the next Chamber. The plans adopted for the canal are those of M. Bouquet de la Grye, of the French Institute, and Vice-Admiral Thomassin.

**Removal.**—Messrs. Mainzer & Kempthorne have removed to 18, Berners-street, Oxford-street, W.

**Examination and Registration of Plumbers.**—At the examinations of plumbers for registration held on Saturday at the Guilds' Institute, applicants were present from various parts of London, as well as from Somerset, Devon, Essex, and Kent. The examinations embraced tests of joint-making, lead-laying, &c., and a set of questions relating to the qualities of materials, the construction of various forms of house-fittings, and the principles of sanitation. The examiners were Messrs. Charles Hudson, W. Titmas, John Smeaton, J. W. Clarke, C. T. Millis, and R. A. Nurse—the last representing the United Operative Plumbers' Association of Great Britain and Ireland. Two-thirds of the applicants succeeded in passing the examinations. In connexion with this matter we may note that the first annual meeting of the registered plumbers of the counties of Aberdeen, Kincardine, and Banff, was held in Gordon's College, Aberdeen, on Saturday afternoon. There was a very good attendance, and Professor Matthew Hay, President of the Council, occupied the chair. There were also on the platform Lord Provost Henderson, Mr. Peter Esslemont, M.P., Dr. Ogilvie, Mr. John Miller, of Sandilands, Mr. William Pyper, of Hillhead, Mr. Boulton, Burgh Surveyor, and Mr. Kenneth Cameron, Sanitary Inspector. Professor Matthew Hay said that the report which had been placed in their hands showed that very substantial progress had been made—in fact, had exceeded their most sanguine expectations. The registration roll included the names of all the best known and most capable plumbers within the city and the three counties.

**The English Iron Trade.**—During the past week the English iron market has been somewhat less excited, but the rising tendency, both in pig and manufactured iron, has continued. If we except the Glasgow warrant market, where a very large business has been done daily, trade in pig-iron has rather slackened, owing partly to the fact that makers cannot, with the capacity of production at their command, accept the orders which are offering. Scotch warrants, notwithstanding many fluctuations, are maintained at about former rates, while with makers in Scotland prices are still going up. Middleborough iron, after a temporary drop of 2s. a ton, is 9d. dearer on the week. Bessemer pig is unchanged, notwithstanding a heavy demand. Both Lancashire and Staffordshire makers ask higher terms. A salient factor in the present conjuncture of the iron trade is the steady decrease of the stocks of pig-iron. There is a fairly good demand for finished iron, and prices are going up, although not to the same degree as crude metal. The inquiry for steel is as heavy as ever, and many works are unable to book fresh orders. Rails are 10s. higher, and proportionate rises are announced for other steel products. Shipbuilders are booking fresh work, and have a busy winter before them. Engineers are all very briskly engaged.—Iron.

**The Association of Public Sanitary Inspectors of Great Britain.**—The opening meeting of this Association for the present season was held at Westminster Town Hall, on Saturday last, when Mr. Hugh Alexander, the Chairman of the Council, delivered an address on "The Sanitary Institute: Its Examinations and Certificate." We regret that we have no space to devote to it this week.

**Complimentary Dinner to a Builder-Mayor.**—Last week, the Mayor of Bradford (Ald. Wm. Moulson) was entertained to a complimentary dinner by the Bradford Master Builders' Association, of which body his Worship is treasurer.

## PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	7	0	0	7	15	0
Teak, E.I.	do	12	0	0	14	0	0
Sequoia, U.S.	foot cube	3	10	0	5	0	0
Ash, Canada	do	10	0	0	10	0	0
Birch	do	3	10	0	6	0	0
Kim	do	4	0	0	6	0	0
Fir, Danish, &c.	do	3	10	0	8	10	0
Oak	do	2	10	0	4	10	0
Canada	do	5	10	0	7	10	0
Pine, Canada red	do	3	0	0	4	0	0
Lath, Danish	yellow	3	10	0	5	0	0
St. Petersburg	fathom	4	10	0	6	10	0
Wainscot, Riga, &c.	log	3	15	0	4	0	0
Deal, Finland, 2nd and 3rd, std. 100	do	2	0	0	11	0	0
Riga	4th and 3rd	7	0	0	8	15	0
St. Petersburg, 1st yellow	do	11	0	0	15	0	0
" 2nd	do	10	0	0	11	0	0



TIMBER (continued).		E. & S.	E. & S.
White, St. Petersburg, white.	7 0 0	10 0 0	
Swedish	8 0 0	18 0 0	
White Sea	9 0 0	17 0 0	
Canada, Pine, 1st	10 0 0	25 0 0	
" 2nd	11 0 0	17 0 0	
" 3rd, &c.	8 0 0	10 0 0	
" Spruce, 1st	9 0 0	11 0 0	
" 2nd and 3rd	7 0 0	9 0 0	
New Brunswick, &c.	6 10 0	8 10 0	
all kinds	6 0 0	18 0 0	
Boarding Boards, eq. 1 in., pre-	0 11 0	0 14 0	
pared, first	0 8 0	0 10 0	
Other qualities	0 8 0	0 7 0	
dar, Cuba	0 0 4 0	0 0 5 0	
Honduras, &c.	0 0 4 0	0 0 4 0	
Shogany, Cuba	0 0 4 0	0 0 4 0	
St. Domingo, cargo average	0 0 4 0	0 0 4 0	
Morison	0 0 4 0	0 0 4 0	
Robson	0 0 4 0	0 0 4 0	
Honduras	0 0 4 0	0 0 4 0	
ix, Turkey	4 0 0	13 0 0	
Le Rio	15 0 0	20 0 0	
Bahia	14 0 0	18 0 0	
tin, St. Domingo	0 0 0	0 1 0	
San Rio	0 0 0	0 1 0	
alut, Italian	0 0 4 0	0 0 4 0	

METALS.		E. & S.	E. & S.
Isor—Bar, Welsh, in London	4 10 0	7 0 0	
" at works in Wales	6 0 0	6 10 0	
Staffordshire, in London	7 10 0	8 0 0	
British, cake and ingot	48 0 0	49 0 0	
Best selected	49 0 0	50 0 0	
Sheets, strong	57 0 0	58 0 0	
Chili, Bars	44 0 0	0 0 0	
YELLOW METAL	0 0 0	0 0 0	
LEAD—Pig, Spanish	13 0 0	13 0 0	
TIN—Strait	98 0 0	0 0 0	
Australian	98 0 0	0 0 0	
English ingots	101 0 0	0 0 0	

OILS.		E. & S.	E. & S.
Linstead	21 0 0	21 5 0	
Coconut, Coochin	26 10 0	27 0 0	
Ceylon	23 10 0	23 15 0	
Palm, Lagos	28 10 0	0 0 0	
Rapeseed, English pale	31 5 0	0 0 0	
" brown	29 15 0	30 0 0	
Cottonseed, refined	23 10 0	0 0 0	
Tallow and Oleine	21 0 0	40 0 0	
Lubricating, U.S.	5 10 0	6 10 0	
" refined	7 0 0	12 0 0	
TAS—Stockholm	1 6 0	0 0 0	
Archangel	0 15 6	0 15 6	

## CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
ump Columns	Hendon Local Board	S. S. Grimley	Nov. 11th	i.
pad-making Works	Lewisham Bd. of Wks.	Official	Nov. 13th	ii.
ikes at Derby	M. R. Co.	do.	Nov. 14th	iii.
ay Wall, &c.	Wasbec Corporation	W. H. Thomas	Nov. 15th	x.
padmaking and Paving Works	Hammermith Vestry	H. Maier	Nov. 20th	x.
orks and Materials	L. G. Co.	Official	do.	x.
in Drainage Extension	West Ham Council	Lewis Angell	Nov. 26th	x.
teration and Extension of Schools	Burton-on Trent Schld.	R. Churchill	Nov. 30th	x.
ition Hall, Whitechapel	St. Alban's Sch. Bd.	A. B. Pite	Not stated.	x.
dition to Schools	St. Alban's Sch. Bd.	Clarkson	do.	x.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Premium.	Applications to be in.	Page.
erk of Works	Swindon Local Board	Not stated	Nov. 11th	xvi.
urveyor	LANCASTER CORPORATION	300l.	Nov. 21st	xvi.

## TENDERS.

[Communications for insertion under this heading must be sent us not later than 12 noon on Thursdays.]

<b>BELLAGIO</b> (East Grinstead).—For erecting hangar, for Mr. W. Syper. Mr. Walter Graves, architect, Buxton House, E.C. Quantities by Messrs. R. L. Curtis & Co. Mansbridge, Bellagio (accepted). £250 0 0	
<b>BIRMINGHAM</b> .—For erecting copper-house, hop-back, brewer's room, laboratory, and other works, at ton Brewery, Birmingham, for Messrs. Joseph Ansell & Co. Messrs. Inskip & Mackenzie, architects, 5, Bedford-square, W.C. Quantities by Messrs. R. L. Curtis & Co. Jones & Mason, Birmingham £23,980 0 0	
Robinson £3,377 0 0	
Simons £3,203 0 0	
Moorhouse £3,265 0 0	
Barnesley £3,170 0 0	
Lea & Sons £3,125 0 0	
Striman & Son £2,095 0 0	
Jeffery & Son £2,950 0 0	
Rowen £2,889 0 0	
Webb Bros. (accepted) £2,877 0 0	
<b>BRIGHTON</b> .—For erecting chapel and chaplain's use, Brighton. Messrs. Scott & Cawthorn, architects. Newham £23,170 0 0	
Chappell £2,097 0 0	
Freeman £2,060 0 0	
Fatching £1,994 0 0	
C. & F. Cheesman (accepted) £1,980 0 0	
<b>CHISWICK</b> .—For alterations and repairs to schools at parish place, for the Chiswick School-board. Mr. George Saunders, architect. Quantities by Mr. F. W. H. 73, Queen Victoria-street, E.C. £23,027 0 0	
C. Rogers £2,020 0 0	
W. Hunt £2,998 0 0	
H. Whitman £2,998 0 0	
W. Adams £2,948 0 0	
W. Blackburn £2,919 0 0	
J. J. Bryant (accepted) £2,904 0 0	
<b>BOWTHORNE</b> .—For building a house for Mr. G. T. wall. Mr. W. H. Ravenscroft, architect. Bottrell & Son (accepted) £275 0 0	
[No competition.]	
<b>FARHAM</b> (Hants).—For works in connection with Knowle Asylum Waterworks, for the Hampshire County Council. Mr. Edward P. Hildred, Engineer, Hithal. Contract No. 1.—Supplying and Laying 1,260 yards line—6 in. Cast Iron Water Main and Castings, Supplying and Laying Slates and Air Valves, Hydrants, &c. G. Lambert Gibson, Southall £208 0 0	
H. J. Saunders, Southampton £50 0 0	
A. J. Blide, Maidstone £69 0 0	
W. Adams £69 0 0	
W. A. Smith & Co., 5, Hanover-place £45 9 6	
N.W. £45 9 6	
A. J. Gould, Farham (accepted) £40 0 0	
[Engineer's estimate, £508, 7s. 6d.]	
<b>Contract No. 2.</b> —Erecting, Sinking, and Lining with Brickwork in Cement a Well 6 ft. diameter. P. C. Badham & Co., Holborn £491 0 0	
H. J. Sanders, Southampton £400 0 0	
Le Grand & Sutcliffe, 100, Bunhill-row, E.C. (accepted) £300 0 0	
R. P. Batchelor, Chatham £294 11 9	
[Engineer's estimate, £402, 18s. 6d.]	
<b>Contract No. 3.</b> —For Two Single-Cylinder, Direct-Acting, Vertical Pumping Engines, Two Steel Rollers, &c. James Simpson & Co., Ltd., Fimlico £1,879 10 0	
Bryan & Porter, Portsmouth £1,660 10 0	
Bryan, Donkin, & Co., Limited, Southwark £1,623 10 0	
G. Napier & Sons, Southampton £1,464 10 0	
G. H. H. Emmet, Dovesbury £1,300 0 0	
John Warner & Sons, Cripplegate £1,276 10 0	
S. Owens & Co., Whitefriars £1,233 10 0	
G. Waller & Co., Park-street, Southwark, S.E. (accepted) £1,151 10 0	
[Engineer's estimate, £1,200.]	
<b>HANLEY</b> .—For the conversion of the old Mechanics' Institute, the new Staffordshire Technical Museum. Messrs. W. Sugden & Son, architects, Leek. Quantities by the architects: Nicholas Bennett, Burslem (general repairs, &c.) (accepted) £573, 12 5	
G. & W. J. Carter, Congleton (roof repairs, &c.) (accepted) £119 0 0	
[No fixtures or fittings included in the above.]	
<b>HIGH BARNET</b> .—For extension of factory premises, for Messrs. Henry Gilling & Sons, Union-street, High Barnet. Mr. Hubert A. Gregg, architect: J. W. Wheeler £1,475 0 0	
W. James £1,370 0 0	
G. W. N. Miller £1,360 0 0	
Cheesum & Sons £1,200 0 0	
Worboys & Son (accepted) £1,247 0 0	
<b>IDEFORD</b> (Devon).—For works connected with the water-supply. Messrs. S. Soper, surveyor, Newton Abbot: Andrew S. Dainton, Newton Abbot £210 9 0	
Farker Bros., Newton Abbot £188 9 0	
C. Johns, Dawlish £183 10 0	
Robt. Hall, Ideford (accepted) £172 14 0	
[Surveyor's estimate, to include compensation, 300l.]	
<b>LONDON</b> .—For erecting three houses in Lewisham-road, New Cross. Mr. Horace T. Bosner, architect, 29 and 30, King-street, Cheapside, E.C. Quantities supplied by Mr. H. Der Wille, 15, New Broad-street, E.C. H. L. Holloway, Deptford £1,758 0 0	
* Accepted.	
<b>LONDON</b> .—For new shop fronts and repairs to Nos. 86, 88, 90, 192, 94, and 96, Cromer-street, Gray's-inn-road, Messrs. Brett A. Elphicks & A. Howell, architects, 50, Queen Anne's-gate, S.W. The Westminster Contract Company £513 0 0	
W. Rowlandson £405 0 0	
F. Brown (accepted) £380 0 0	
<b>LONDON</b> .—For new billiard room, approaches, alterations, and new staircase to concert-rooms, extension of saloon bar and general decorations, at "Tuffnel Park Hotel," for Mr. John Lees. Messrs. Carter & Son, architects and surveyors, 541, Holloway-road, N. Macintosh, Langham-street £1,524 0 0	
J. J. Young, & Co., High-street, Borough £1,440 0 0	
Blanford, Avenell-road £1,295 0 0	
Canle, Upper Holloway-rise £1,198 0 0	
Boreham, Liverpool-road £1,184 6 8	
Farquharson, Grafton-road £1,100 1 0	
Luke Norris, Upper Holloway £1,100 0 0	
William Evans, Upper Holloway £1,078 19 0	
Hughes, Stroud-green £1,082 0 0	
Crowe, Queen Victoria-street £960 0 0	
<b>LONDON</b> .—For new latrines and alterations in connection therewith at the Adelaide-street Schools, St. Martin's-in-the-Fields, for the Building Committee, Mr. William S. Cross, architect, 18, Outer Temple, Strand. Quantities by Mr. H. E. Pollard: Hall, Beadell, & Co. £740 0 0	
M. Patrick & Son £613 0 0	
J. & H. Barry £627 0 0	
J. D. Hobson (too late) £613 0 0	
Macey & Sons £698 0 0	
J. Clements £693 0 0	
C. Wall £653 0 0	
Dorrell & Co. £665 0 0	
<b>LONDON</b> .—For providing a new coal-cellar at the Byron and Bright-street School, Bromley; improving the lighting of the Infants' Department, and for providing a new exit for the Boys' Department, for the School Board for London. Mr. T. J. Bailey, architect: T. Linfield £378 0 0	
W. V. Goad £305 0 0	
J. Derry £243 0 0	
Atherton & Latta £10 0 0	
H. Bridel £170 0 0	
* Recommended by the Works Committee for acceptance.	
<b>LONDON</b> .—For various works in connection with the Farncombe-street School, Bermondsey, for the School Board for London. Mr. T. J. Bailey, architect: J. B. Gerrans £2535 0 0	
A. Martin £293 0 0	
W. V. Goad £439 0 0	
T. Linfield £434 0 0	
J. W. Roy £324 15 0	
J. Derry £314 0 0	
H. Bridel £278 0 0	
* Recommended by the Works Committee for acceptance.	
<b>LONDON</b> .—For erecting a temporary iron building for the accommodation of infants on the Ivydale-road site, Nunhead, for the School Board for London. Mr. T. J. Bailey, architect: W. Jones £2503 0 0	
W. Harbrow £439 10 0	
J. J. Richards £460 0 0	
London Iron Building Co. £459 0 0	
J. W. Ennis £445 0 0	
A. W. Poole £417 0 0	
* Accepted by the Works Committee.	
<b>LONDON</b> .—For removing the existing, and erecting new w.c.'s for the Girls' and Infants' Departments of the Dalmeida-road School, Forest Hill, and also for providing a new coal-cellar, for the School Board for London. Mr. T. J. Bailey, architect: J. H. Lyon £2740 0 0	
H. Bridel £556 0 0	
W. V. Goad £523 0 0	
T. W. Haylock £523 0 0	
J. Derry £440 0 0	
T. Linfield £419 0 0	
* Recommended by the Works Committee for acceptance.	
<b>LONDON</b> .—For providing a covered playground for the Girls' Department of the Albion-street School, Rotherhithe, for the School Board for London. Mr. T. J. Bailey, architect: W. V. Goad £2340 0 0	
J. B. Gerrans £279 0 0	
T. Linfield £247 0 0	
A. Martin £213 0 0	
J. Derry £188 0 0	
H. Bridel £183 0 0	
* Recommended by the Works Committee for acceptance.	
<b>LONDON</b> .—For building three houses in the Meyrick-road, and alterations to a shop in the Falcon-road, Battersea, S.W., for Mr. G. S. Tucker. Messrs. Williams & Son, architects: Thomson & Son £21,590 0 0	
Gregory £1,473 0 0	
Todd £1,440 0 0	
E. Barker £1,165 0 0	
<b>LONDON</b> .—For taking down and rebuilding No. 282, Strand, W.C., for Mr. W. Schofield. Mr. W. H. Duffield, architect, 2, King-street, Cheapside. Quantities supplied by Mr. J. Rookwood: Newton & Co. £21,550 0 0	
<b>LONDON</b> .—For finishing No. 44 and 46, Shaftesbury-square, W.C., for the International Hotel Employers Society. Mr. William Brett, 10, Charing-cross-road, architect: Langier & Pinkham, Kensal-green £1,539 0 0	
* Accepted.	
<b>LONDON</b> .—For alterations to bar fittings, and the provision of new lobby and partitions, &c., all in Spanish mahogany, at the "Olive Branch," Crawford-street, W., for Mr. Rosenberg. Mr. Alexander, architect: Mark £380 0 0	
Schlater £284 0 0	
Holt & Garlick £197 0 0	
<b>LONDON</b> .—For alterations to Cornwall House, S.E. Mr. E. J. Stevens, architect: Ham & Son £236 11 8	
Nackie £230 0 0	
Garrett & Son £359 0 0	
Whitehead & Co. (accepted) £340 0 0	
Balsam Bros. (accepted) £339 0 0	

LONDON.—For new bar-fittings to the "Fleese," Marcham-street, Westminster, for Mr. F. Ford. Messrs. Saville & Martin, architects, 88 and 87, Strand, W.C.:-

## General Fittings.

Spencer & Co.	£120 0 0
Turle & Appleton	118 0 0
J. Freshwater	98 0 0
Drew & Cadman	93 0 0
J. Vears & Co. (accepted)	83 0 0

## Pewterers' Work.

W. Helling.	148 0 0
Drew & Cadman	141 0 0
T. Heath.	117 10 0
J. Davidson	114 0 0
F. J. Rose	113 0 0
Watts & Co. (accepted)	104 0 0

## Gauflers' Work.

W. Winn (accepted)	29 15 0
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LONDON.—For rebuilding No. 85, Osnaston-street, N.W., for Miss L. A. Silcock. Messrs. Saville & Martin, architects, 88 and 87, Strand, W.C.:-

Gould & Brand.	£237 0 0
Puzey & Lumley.	825 0 0
R. Toms	778 0 0
S. Goodall	769 0 0
J. Auley	751 0 0
S. R. Lambie (accepted)	739 0 0

LONDON.—For new story and sundry alterations to the "Southampton Arms," High-street, Camden Town, N.W., for Mr. E. W. C. Thie. Mr. W. W. Gwyther, architect, 102, Temple Chambers, Temple-avenue, E.C. Quantities supplied by Messrs. Saville & Martin, 88 and 87, Strand, W.C.:-

J. T. Chappell	£1,698 0 0
Gould & Brand	1,687 0 0
W. Oldrey	1,615 0 0
E. Toms (accepted)	1,619 0 0

NORWOOD (Surrey).—For the erection of a detached residence at Falkland Park, South Norwood Hill, Surrey, for Mr. Thomas McMeekin. Mr. H. A. Rawlins, architect, 46, Queen Victoria-street, London, E.C.:-

Clarke & Bracey	£14,369 0 0
Brown, Son, & Bloomfield	14,136 0 0
Bywaters	13,875 0 0
Rider & Son	13,688 0 0
Dove Brothers	13,500 0 0
James Morter	13,473 0 0
Patman & Fotheringham (accepted)	12,929 0 0

READING.—For rebuilding "Lower Ship Hotel," for Messrs. Nicholson & Sons. Mr. F. W. Albury, architect:—

Bottrill & Son (accepted)	£5,360 0 0
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READING.—For rebuilding houses and shops at the corner of King-street and Duke-street, for Mr. Dowling (chemist), Messrs. Botley & Lewis (silversmiths), and Mrs. Adams (poulterer, &c.). Mr. F. W. Albury, architect, Reading:-

Winter & Fitt	£4,784 0 0
G. Wernham	4,343 16 0
Collier & Catley	4,243 0 0
Higgs & Sons	4,239 0 0
W. H. Simonds	4,158 0 0
Bottrill & Son (accepted)	4,160 0 0

RUTHIN.—For the erection of farm buildings at Pen-y-graig and Tanygraig, on the Ruthin Castle Estates, North Wales. Mr. W. Charles Evans, architect, Post's-corner, Westminster:-

John Morris, Ruthin	£241 19 11
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SPENCER'S WOOD (Berks).—For erecting new schools, for Mr. T. W. Allfrey. Messrs. Chas. Smith & Sons, architects:-

Higgs & Sons	£1,550 0 0
Collier & Catley	1,520 0 0
Bottrill & Son (accepted)	1,480 0 0

WOKING.—For the erection of stabling, Guildford-road, Woking, for Mr. T. Russell. Mr. Robert Clapp, architect, the Studio, Woking:-

Marriott & Co., High Barnet	£270 0 0
H. G. NeSmith, Chertsey	625 0 0
Stanley Ellis, Guildford	625 0 0
Oades, Bros., Egham	599 0 0
Andrew Glen, Worplesdon	590 0 0
Harris & Son, Woking	575 0 0
A. A. Gale, Woking	565 0 0
C. Field, Woking	569 12 0
J. Whitburn, Woking (accepted)	530 0 0
E. Seaber, Guildford (too late)	510 0 0

WEST HAM.—For works required for the West Ham main drainage extension. Mr. Lewis Angell, M.Inst.C.E., Borough Engineer:-

## No. 4 Contract.

Mowlem & Co.	£12,724 0 0
J. G. B. Marshall	11,671 0 0
Cooke & Co.	11,068 0 0
J. Adams	10,365 3 3
J. Jackson	10,150 0 0
J. W. & J. Neave	9,945 0 0
G. Bell	9,633 0 0
L. Bottoms	9,430 0 0
Perry & Co. (accepted)	9,160 0 0

## No. 5 Contract.

Mowlem & Co.	£15,413 0 0
L. Bottoms	13,806 0 0
J. G. B. Marshall	13,626 0 0
G. Bell	13,270 0 0
J. Jackson	12,590 0 0
J. W. & J. Neave	12,880 0 0
J. Adams	12,466 5 0
Perry & Co.	12,259 0 0
Cocoe & Co. (accepted)	12,097 0 0

WOKINGHAM.—For erecting house and stables, for Mr. S. B. Melville. Mr. Joseph Morris, architect:—

Bottrill & Son (accepted)	£2,490 0 0
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## [No competition.]

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## TO CORRESPONDENTS.

T. E. T.—Student (the answer given seems a sufficient one, and we cannot continue the correspondence).—M. V.—"Percentage," J. E. W. F. B. (next week).—W. J. F.—W. & Co. (too limited in amount for insertion).—W. E. (too late).—D. & Co. (shall have attention).—D. & B. (ditto).—L. E. F. (too space).—T. B. (ditto). All statements of facts, lists of tenders, &c. must be accompanied by the names and addresses of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications. Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and sent to the Editor.

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# The Builder.

VOL. LVII. No. 2411.

SATURDAY, NOVEMBER 15, 1890

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### Some Last Notes at the Paris Exhibition.



**L**HOSE who have seen much of the great Exhibition at Paris, the doors of which are now formally closed (though still informally open), will not regard without a certain

feeling of melancholy the demolition and dispersion of that extraordinary collection of the products of human intellect and labour in so many departments of work, which has rendered the "capital of pleasure" (as Matthew Arnold called Paris) during this year the centre of interest of the civilised world. Nowhere else could such an exhibition have been held, for nowhere else could there be found at present the combination of energy with artistic genius and ardour which has made of the Paris Exhibition (in spite of the Eiffel Tower) a kind of artistic creation on a grand scale. We hear that the Germans are fired with the ambition to produce a similar exhibition at their capital. The energy, the wealth, and the mechanical skill they possess undoubtedly in an equal degree with the French; but where will they find the artistic genius which gave such vivid interest, even allowing for some sins against good taste, to the Paris Exhibition? They will be wise at least not to attempt to challenge direct comparison with France by any immediate effort to rival her great national spectacle.

The following notes on some of the practical exhibits connected with building industries were made before the close of the Exhibition, though circumstances have compelled the postponement of their publication till the present week. It will not be out of place however to put them on record now, as a brief résumé of what was to be seen in the contributions of various countries in this class of exhibited work, the rather as we may be able to give credit to some things which appear to have escaped the official recognition which they merited. One reason for this may have been the uncanny kind of places to which exhibits of building materials were too much relegated. A fair variety of building materials were ranged along an arcade at the back of the British Section, but these were mostly Belgian, and a large proportion of the British exhibits of this kind were located very much out of the way in a

corner of the gallery of the Machinery Hall. The wares of the Imperial Stone Company included silicated stone pipes, petrosilicon paving, and some drain-pipes to illustrate Archer's patent joint, which we have before described and illustrated. This claims, and is supported by good testimony, to be a perfectly water-tight joint. Doubtless it is a good joint, but we apprehend that to complete it under water with the liquid cement, in which lies the essence of its perfection, requires very careful manipulation.

Mousset and Thibaut, of Bouffoulx, Belgium, exhibited some well-glazed pipes, and obtained a silver medal for them and for some very large earthenware crocks; and the Société des Terres Plastiques of Andenne, Belgium, made a good show with their very large stoneware flues, good tiles, slabs, and oven bricks. We may also mention the excellent paving squares in buff and black by T. Pire, of Marchienne au Pont, which were overlooked by the jury. A gold medal in these wares went to Monsere & Co., for excellent glazed stoneware pipes. They exhibited a broken 6-in. pipe which had resisted an internal pressure of 1,200 kilogrammes before bursting.

The Société Anonyme (or Joint Stock Company) of Seilles les Andenne, and of Bouffoulx, had a grand collection of refractory products of all kinds and sizes up to pipes 4 ft. 6 in. in diameter, and flues 13 ft. long and 2 ft. 6 in. across the face, and have received a gold medal, which has also been awarded to L. Escoyez, of Tertre (Hainault), for sharp, solidly-burned work of a similar character, and for encaustic floor tiles (5 in.) in stone colour and grey alternated, and in buff and light brown alternated. This firm also exhibited samples of the clays used in their manufactures.

In a pavilion opposite to this arcade was to be seen a great exhibition of terra-cotta goods from Belgium, amongst which gold and silver medals had been distributed without stint; tiles from the Mechanical Tileworks of Leforêt near Douai, in the Department of Pas de Calais, and glazed bricks and ridges of many patterns; but, so far as glazed bricks go, none of the foreign exhibits were equal to those shown by Brookes & Son, of Huddersfield, who exhibited quite perfect white and coloured glazed bricks in the gallery of the Machinery Hall, but they were not even noticed by the jury.

In the stand of Passavant Iselin, of Bâle, in the Haute-Saône, were exhibited thick glass

tiles cast to pattern to match moulded tiles, and corresponding exactly in size. It should be noticed that tiles of the kinds in common use in England are almost unknown on the Continent, a large, flat tile of uniform thickness, but with generally some ornamental pattern on it, being the system in favour in France. The weight of these tiles per square is greater than ours (average 8 cwt. per square), but the work of tiling is more quickly done; the individual weight of each tile is of advantage in a high wind, and there are fewer breakages and bills for "repairing tiling." We, in some respects, prefer their appearance on a roof to our own. The glazed terra-cotta and majolica squares of Parvillée Brothers, of Paris, are most excellent, especially in those of turquoise colour, and deservedly received a gold medal. Amongst others in this pavilion were Sazerac & Co., of Rochefoucauld (Charente), whose best exhibit were black tiles and stamped black bricks (silver medal), and Polakowski & Co., of Roumazieres, the colour of whose terra-cotta goods was very uniform; but the best terra-cotta work in the whole exhibition was that of Oustan & Co., of Tarbes, Hautes-Pyrénées.

In the Machinery Hall there were exhibitions of Scotch refractory goods by the Glenboig Union Fire-clay Company, of Glenboig, near Coatbridge, which have most deservedly received recognition, though the medal is but silver. The accurate and clean moulding of these peculiarly-speckled bricks places them quite beyond anything else of the kind exhibited. J. Hamblet, of West Bromwich, has also received a silver medal for majolica tiles and vitrified bricks, and mosaic and encaustic goods; and the Vulcan Firebrick Company, a bronze medal for firebricks of no particular merit.

We may take it, on the whole, that, irrespective of the cost of carriage, we, on this side of the Channel, have not much competition to contend with in the above-named classes of goods. There is no lack of good material in most parts of Great Britain, and no lack of skill to use it. Still, we write for all classes of persons, and, for those who wish to enquire about prices and compare them with those of their neighbours, the opportunity is now offered for them to do so. Contractors, in the keen competition for work, have to look on the whole world as a hunting-ground for materials and labour. There was a good show of machines for turning out bricks,—ordinary, perforated, tubular, &c.,—and tiles of all patterns.



Amongst the successful exhibitors were Gregg & Co., of Philadelphia, for moulded bricks; Joly & Foucart, of Blois, Loir-et-Cher; Boulet & Co., of Paris; and E. M. Delahaye, of Tours, the last three having each received gold medals. Judged by the tiles produced by Joly & Foucart, we should consider their machines to be probably the best exhibited. Without reproducing the drawings of these machines in our pages, which we do not consider to be necessary at present, or entering into elaborate descriptions, for which we have not space, it is not easy to convey to our readers any impression that would be of value, and we therefore confine ourselves to quoting the weights, prices, and capabilities of some of the various machines:—

*Joly & Foucart's Brick and Tile-making Machines.*

- No. 1.—Pressing-machine, with "chariot" cutter; 8 to 10 h.p.; 1,500 to 2,000 bricks per hour; weight, about 2½ tons. Price, 90l.
- No. 2.—Ditto, with a cutter, but on a brick base; 6 h.p.; 400 to 1,000 bricks per hour; weight, about 27 cwt. Price, 68l.
- No. 2A.—Ditto, ditto, on an iron stand; weight, 29 cwt. Price, 72l.
- No. 3.—Ditto, with its cutter; 800 to 900 bricks per hour; 4 h.p.; weight, 22 cwt. Price, 54l.
- No. 3A.—Ditto, ditto, in parts; weighing each not over about 35 lb. Price, 58l.
- No. 4.—Machine for pressing light and homogeneous earthenware by hand; 150 to 300 bricks per hour; weight, about 1 ton. Price, 48l.
- No. 5.—Cutter for bent tiles; 1,500 to 1,800 tiles per hour. Price, 20l.
- No. 6.—Pounding cylinders, with hopper and gear; weight, about 27 cwt. Price, 52l.
- No. 7.—Mixer; requires 5 or 6 h.p. to supply clay for about 2,000 bricks per hour; weight, about 2 tons. Price, 66l.
- No. 8.—Another mixer, to do a similar quantity of work; weight, 2½ tons. Price, 88l. To be fixed on a brick base.
- No. 9.—Mechanical press, No. 1; triple pressure of about 30 tons; capable of turning out 200 to 300 articles per hour with two men; weight, 35 cwt. Price, 88l.
- No. 10.—Mechanical Press, No. 2. Pressure and production the same as last; weight, 22 cwt. Price, 72l.
- No. 11.—Lever Press. Pressure about 7 tons, actuated by a sudden shock by one man, giving a result of 4 to 500 articles per hour; weight, half a ton. Price, 24l.
- No. 12.—Machine for Pressing Vertically. Weight, 3 tons. Price, 120l. Capacities not stated.
- Horse-gear for working Machine No. 3 with one or two horses; weight, 12 cwt. Price, 20l.
- Ditto, for No. 2 machine, with one or two horses; weight, 18 cwt. Price, 24l.
- Ditto, for four horses; weight, 21 cwt. Price, 25l.

It will be easy for any one who desires it to compare these data with those of our English machines.

The two English cement firms named Francis both exhibited; but whilst C. Francis, Son, & Co., of Newport, have received a silver medal, Francis & Co., of Vauxhall, have not been patronised by the jury. Their (C. Francis, Son, & Co.'s) plaques of Parian cement were better than those in Portland cement, and their slabs of Scagliola were good. Each of these firms exhibited barrels of Portland cement, both being, no doubt, excellent; but the proof of the pudding is in the eating, and to no other material does the old saw apply probably with greater appropriateness than to cement. We are not aware what means the jury took to test these cements other than by the eye.

Our old friend, M. Coignet, the father of concrete in France, had a little kiosk in the middle of the grounds, containing every possible variety, coloured and uncoloured, in mosaic, in imitation granite, and so on, the variety which the schoolboy would recognise as "hardbake" being pleasing when close to it, but disappointing, if not distinctly offensive, at a little distance.

Mr. Skelsey, of Hull, exhibited his "Adamant" Portland cement, but without result; and there were several imitation marbles in stucco, more or less displeasing, the best of which were by Corbinea, of Nantes, who styles himself a "stucateur."

Good stalls of hydraulic limes, Portland cements, and clays were exhibited by Deschamps and Faut, of Des Moulinaux, Issy-Seine (system Vicat); by Poliet, Baillet, and

Ville-vielle (silver medal), of Beffes (Cher); and also by Sollier and Co., of Boulogne.

A silver medal is awarded to A. Duboussé, of Beauvoir Allier, for samples of Kaolin, showing the gradations of disintegration from grey granite to pure, natural Kaolin, and showing white, grey, rose, yellow, and red varieties.

Messrs. Ponton, of Deptford, exhibited their petramite, which is stated by them to "be a mixture of sand and pulverised silica, which changes into a new crystallised state of silica, and, being entirely free from silicates, is unalterable by intense heat or boiling acids, and is superior to the finest statuary marble." Both white and grey varieties were exhibited. We regret that we cannot concur with the manufacturers in the comparison which they institute between petramite and statuary marble. The white is unquestionably a good white, but its resemblance to good marble is not sufficient to deceive anyone at all conversant with that substance. The price quoted is 3s. 6d. per cubic foot.

In the French Section two model kiosks were erected of a material called Blanc Minéral du Barry, and exhibited by Baumann & Co., of Bougival (Seine-et-Oise). This is a composition of chalk, pulverised, and subsequently mixed with some cementing material, tinted if desired, and moulded into any shape or for any purpose, such as for models. It is difficult to recognise any special value attaching to it, and the jury have apparently formed the same opinion.

Among examples of natural stones not well known here, may be mentioned the three different kinds that were exhibited by M. G. Biron, of Paris, two of which are good,—namely, a beautiful hard white limestone of the character of our Hopton Wood stone, but rather whiter, and taking a fair polish; the other being still harder, and taking a good polish, light drab in colour, with light-brown fossils. They come from quarries at L'Echailon par Voreppe (Isère).

M. Le Blanc, of Paris, had a magnificently-executed chimney-piece, of 13 ft. total width and 19 ft. in height, with three carved figures in Confians stone, enshrined in an arcade of three bays. The body of the work,—in fact, every part except the figures and the bases of the lower pilasters,—is in St. Maximin stone, from quarries on the Oise, a variety of limestone similar, but apparently inferior in character, to Caen. This firm also exhibits samples of the stone from the different beds of their quarries,—a plan which might often be followed with advantage to the public.

- 1.—St. Maximin (Oise) has six beds—Roche, Fine Roche, Roche (moysé), Demi Roche, Banc Royal, and Vergel.
- 2.—Confians (Seine-et-Oise) one bed only.
- 3.—Vivry (Seine) Roche, Banc d'Argent, and Demi Roche.
- 4.—La Jeunesse Bucey (Haute Saône).

The latter (4) are hard fossiliferous limestones of grey, buff, and pink shades, and, as usual, take a fine polish. A fine example of them is exhibited in a balustrade, each kind being utilised for the various parts.

The Belgians (Union des Maîtres de Carrières Belges) erected for their offices a building of ordinary white limestone, faced with the dark-grey limestones styled by them "Petit Granit," from Soignies, and exhibiting the differences in shade produced on the same stone by the various descriptions of work. In this stone the polished panels are black, the picked worked dark-grey, the fine-tooled light grey. The effect was not very happy, there being a coldness and slaty appearance about it somewhat repelling.

The steps of the machinery-hall had been executed in a compact white limestone, slightly tinged with pink, from M. Javelle, of Belvoe (Jura), and notwithstanding the extraordinary wear to which they have been subjected, seem now as good as new; but, so far as that goes, many of the concrete steps in the gardens which had been subjected to as much, if not more, wear than those in the machinery-hall, had also done their work most creditably.

The finest display of marble in the Exhi-

bition was that of M. Contini, of Marseilles, very choice examples of Jaune de Marseilles, Rose Tunisie, Porphyre d'Egypte, Rouge d'Afrique, Syenite d'Egypte, Onyx d'Algérie, Vert Antique, and Vert de Mer, Agate Pyrennien, Bleu Turken, Jasper Egypte, Breche Violette, Sicilien (of more than one variety), and the rare and expensive Cipolà Rose. These are grouped round one of those horrible statues which we occasionally encounter, in several kinds of coloured marbles, the hair of one colour, the drapery of another, the eyes of another, &c.; works which offend every sense of appropriateness and of the fitness of things, and are a desecration of the most beautiful material. Messrs. Farmer & Brindley, of Westminster, had a considerable show, comprising examples of both English and Oriental alabaster, Aventurine, Egyptian porphyry, Espagnol, Huelva, Breche Orange, Frosterley, Labradorite (green), and Thulite, a rose pink spotted with white, and not particularly pleasing, though of a rare shade. They had also twelve slabs of Devonshire marble, but no indication of the localities from which they were derived. None of them were particularly striking, except one fine dark grey, which seemed to be a variety of the Petworth, and one other similar to Huelva (a mixture of chocolate, slate, and white).

With the exception of the alabaster and the Frosterley (of Durham), the exhibition of these English marbles was a somewhat severe commentary on the remark said to have been made recently by one of the British workmen's delegates to Paris, to the effect that architects should specify that no marbles other than those of England and Connemara (which, by the by, is a serpentine) should be used in our houses. This sort of clap-trap patriotism (?) is utterly ridiculous, and it would be as sensible to say that we must put up with bad flour or English tobacco, or that we should cover our roads with dirt instead of hard stones, in order to make more work for local labourers.

The French marbles of the Vallée d'Ossau, in the Basse Pyrénées, in which Eaux Bonnes is situated, were well illustrated, together with a map shewing the positions of the twelve quarries belonging to the Company, as follows:—On the left bank of the river (as you ascend), Arudy, Izeste (Sondara), Izeste (Brousset), Bar, Cipolin, Pau, Miegébat (Carmine), Miegébat (Noir); on the right bank of the river, Louvie (Plon), Louvie (Soubiron), Fabreges, and Soques. The Bar quarry is one of granite,—singularly white, shaded with light grey. The marbles generally are of a beautiful grey, both veined and shelly, and veined with white and purple. There are no greens or yellows. The Company also exhibits fine slate from Laruns and Gerebeles, in the same valley.

Holtzer & Co., of Paris, exhibited Villefranche Violet, a pleasing mixture of violet and purple streaked with white; two varieties of Griotte, a deep red or chocolate either veined or flecked with white, for which we did not much care; and three varieties of Escalot, viz., Mouchet & Mouchet Campan, combinations of light and dark slate, chocolate, pink, and white, and Jaune, a curious yellow mottled with chocolate. One block of Griotte veinée was 17 ft. long and about 3 ft. square.

The Société Anonyme de Merbes-le-Château of Belgium displayed a series of fine slabs, each about 12 ft. long and 6 ft. wide, of the following:—

- Granit (Poulsaur), a black shelly limestone with white fossils.
- Blanc Puissant (Massa), pure white.
- Rouge Fleuri (Sautour), dark chocolate streaked with white, and blotched with black-edged white fossils.
- St. Anne (La Buissière), dark [slate, streaked, and speckled with white.
- Rouge Griotte (Vodelé), light chocolate, well streaked and blotched with white.
- Noir Fin (Golzine), pure black.
- Rouge Royal (Vodelé), similar to Rouge Griotte, but a paler chocolate.
- Florence (Profondeville), grey slate colour blotched with black.



Rouge Griotte (Bergmonny), rich chocolate, blotched with grey and streaked with white.

Blanc Clair (Carrara), white, streaked with grey.  
St. Anne Francais (Sobro St. Gery), dark slate, rather less streaked with white than the St. Anne de La Buisserie.

Several of these dark marbles, and especially the Florence, were strikingly handsome. A beautiful black slab and a square platform of variegated Belgian marbles were also exhibited by Duboy, Gros Jean & Son, of Isnes les Golzines, and a remarkably beautiful marble, the matrix a brown pink flecked with chocolate, embedding blocks of black and grey streaked with white, was exhibited both by E. Decolierie and Leon Boucneau, the quarries being at Montigny-le-Tilleul, Belgium.

Taking a general view of the above-mentioned classes of exhibits, we may fairly conclude that we cannot dispense with foreign marbles, and that we can get them both good and cheap from France and Belgium; but that we can get on well enough without foreign stones, except, perhaps, that from Caen, and possibly that from Confans. It is less easy to get the latter than the former, and of no especial advantage, for their character is similar; but for fine work there is nothing yet discovered in England at all equal to that from Caen, and for general building in this class of stone, it is a popular error to assume that the good qualities of Caen have not the durability of our Bath and other similar stones. That which will last in the country in France will last in the country in England, either for interiors or exteriors, but we must have the best, i.e. the stone from the Allemagne and not from the Maladerie quarries.

Machinery for working on stone or marble was extremely scarce, but two sawing-machines were exhibited of novel character. One of them, of which a model only was exhibited, is an American invention, the diamond having been requisitioned to help in the work. Small diamonds are set at intervals along the lower edge of a very deep blade set in a frame which oscillates from a central overhead pivot, one end of the frame being attached to an arm actuated in the usual manner. It is not known what are the capabilities or the registered performances of this machine, but it is stated to have had a great success in the United States, and that its success in France would be indubitable. It is described as the "System Jackson." It appears to us that the system is inferior in several respects to that commonly used in England for sawing stone and marble without diamonds.

The other machine is altogether of a different character, and is, we believe, essentially different, both in principle and in method, to any other stone machine yet introduced to notice. It is the invention, or, at all events, brought out and manufactured by M. Gérard, a mechanical engineer of Paris. The reader would have some difficulty in understanding the details of a structure of this kind unless he had the opportunity of studying an illustration, but we may say that the principle is that of the continuous band saw applied horizontally. The saw (in the machine exhibited) is of steel passing round a pair of drums, to which rotation is given by a sliding spindle passing through one of the drums and geared to a horizontal spindle in the upper part of the frame of the machine, worked as usual by a belt from the engine. The drums are each attached to a frame connected with a pair of collars, which work vertically on four strong hollow cylinders placed one at each angle of the bed-frame. On this frame are cross rails to carry a truck, with a revolving platform for carrying the stone to be sawn. The saw is guided on each side by friction rollers, and passes on each side through a box, which can be fed from above with sand and water. These collars, with the drums and saw attached to them, can be lowered automatically by means of sliding collars working on long screws in the hollow cylinders. The saw consequently makes two cuts with each revolution, either on two stones or on one as may be desired. The speed of lowering the frame is regulated by

the nature of the stone to be sawn; the speed of the saw was stated to be from 450 to 500 metres per minute, which would give about thirty revolutions.

The length of stone which could be placed under the saw in the machine exhibited was about 11 ft., or 22 ft. in all.

The advantages claimed by the inventor are 1. Great speed in sawing; and he gives the following as the depth of stone which can be sawn per hour:—

From 10 ft. to 16 ft. in soft stones.  
" 10 in. to 12 in. in hard stones.  
" 4 in. to 6 in. in different marbles and hard stones.  
" 4 in. to 5 in. in Belgian and similar granites.  
About 1 in. in Brittany, Normandy, Scotch, or Italian granites of extraordinary hardness, which have hitherto always had to be worked by hand.

2. A perfectly-sawn surface, well dressed and almost polished, contrary to that which is produced by means of other stone-sawing machines. In addition to this, the appearance is regular, and the stops sharp, without flaws. By this means all the operations usually attending ordinary sawing, which are often long and costly, can be dispensed with.

3. Great economy in motive force and hand-work.

It is stated that the machine exhibited could be worked with a 4-horse-power engine, and that one man was sufficient to look after two machines, and the inventor claims a saving of 40 per cent. advantage in effective work over any other stone-sawing machine.

The thickness or depth of stone which could be placed under the saw in this machine was about 9 ft. Its price was £560.

M. Gérard is constructing a still larger machine, of a similar kind, for the Town Council of Marseilles, which will take stones about 16 ft. long, the price of which will be £720. The weight of the machine exhibited is 17 tons.

We have described this machine at some length, because we have seen that what M. Gérard claims to do he can, at all events, in a great measure, perform. The work done by this steel saw on hard granite and marble is in every way superior to anything previously seen, and the extreme thinness of the slabs that can be sliced off by it is very extraordinary. No particular difficulty is experienced in producing sheets, or we should rather style them veneers, of granite and marble one-tenth of an inch in thickness,—a slab was exhibited in a wooden frame very much thinner than the above-mentioned,—and quite ready for the polisher. The machine is in its infancy, and consequently it is not possible to obtain reports concerning its capabilities under long trial, but M. Gérard is proposing to make it in several sizes, and to have one fitted up for inspection in motion at his manufactory in Paris (3, Place Daumesnil) in about a month's time. It is possible that this invention may economise the cost of marble for certain purposes to such an extent as to create a great impetus in the trade in inlaid marbles or marble mosaics, and in the decoration of walls internally, and possibly externally also, with very thin, inexpensive slabs of granite, marble, or other hard ornamental stone.

A variety of stone of a very useful nature, viz., lithographing stones, were exhibited by Joyeux, Hammond, & Cie., of Chateaufort-sur-Cher, and also by F. Dupuis, Givry (Saône et Loire), from the quarries at Clos Gateau, Burgundy. The prices seemed moderate, and the quality of the stones in each case very fine. In point of size, they were much eclipsed by a remarkable stone exhibited by G. Kammerer, of Paris, from the quarries of Vigan (Gard), 5 ft. wide, 7 ft. 10 in. in length, and  $4\frac{1}{2}$  in. thick, of uniform colour and texture throughout. The price was not stated.

Architects and builders are frequently interested in obtaining good and reasonably cheap lithographed work, and the French and American lithographers gave some excellent examples of page ornament, vignettes, etiquettes, passepartouts, corners, title pages, &c. A Grand Prix was given for this class of work to Debernay & Co., of Paris, and to Beaudouin

& Co., of Trouin, but their work did not appear to be better than, if as good as, that of Mackellar, Smith, Jordan, & Co., of Philadelphia, who received a gold medal, as also Ch. Derriez, of Paris. Beautiful work was also shown by Bonnet & Cie., and A. Turlet, both of Paris.

A considerable exhibit of slates from Nantes enabled us to institute comparisons between them and some of our own, very much to the disadvantage of Nantes. Those from Pen-yr-Orsedd, Nantlle, North Wales, in green and blue (alternated) roofing slates were much superior to Nantes, but received no mention, which is, perhaps, not surprising, as they formed a poor little show compared to the fine exhibit of all sizes of slates from the Oakley Slate Quarries Co., who received two gold medals.

Perhaps there is nothing in which the cost of building is more economised than by the use of the best machinery for converting timber for all manner of uses, and there was enough in the Exhibition to satisfy the curiosity of any one. The chief feature, perhaps, was the variety of endless band-saws which were being utilised to advantage towards the close in turning out thousands of puzzle toys, Eiffel towers, sofas, &c., which sold readily. Amongst others were those of Fay, of Cincinnati, U.S.A., who had a most extensive assortment of machines, and received a Grand Prize, but, in our opinion they were somewhat light generally for thoroughly satisfactory results over a period of time, and we preferred, on the whole, the exhibit of Messrs. Robinson (Railway Works, Rochdale), who received a Grand Prix for a planing and thicknessing machine, which could be also utilised (by rapid changing) for rebating and chamfering; to it was attached a very ingenious graduated scale with vernier, for regulating with extreme exactness the thickness of each piece of wood worked by the machine. Messrs. Robinson had also a graduated stroke morticing and boring machine, so arranged as to save much wear and tear in the shafts which hold the tools, and for this they also received a Gold Medal.

M. Gérard (previously mentioned), of Paris, exhibited an excellent endless band-saw, with differential pulleys, and arranged either for hand or foot working. It is made entirely of metal, and is solid and portable. The upper pulley (for the saw) was 16 in. in diameter, and the lower pulley 32 in. ditto. There was no jerking when worked with the pedal, and no doubt very accurate work could be turned out with it.

A remarkable shaping-machine was exhibited by Guillet et Fils, of Auxerre (Yonne). Two carved heads in high relief were shown by them as triumphs of machine-work, and a great deal of time must have been saved in the production of these heads in the state in which we saw them—that is to say, in the rough,—for the machine tools had produced nothing that could be termed finish; but such a machine could never be of any use even for roughing out sculptor's work, as it could not possibly take account of the innumerable variations in contour required.

Parquet flooring is a fitting successor to wood-working machines, and, amongst many others, those of P. Gil à Domene (Isère) and of Maison Camps & Co., of Annemasse (Haute Savoie), each of whom received silver medals, were most worthy of notice. The coloured illustrations of various patterns in the specimen book shown by the latter firm were most artistically prepared.

Parquetry was very abundant and most beautifully executed in several of the buildings in the grounds, and especially in the bold external panels of the Nicaragua pavilion.

M. A. Cauchot, of Paris, exhibited veneers of all kinds, and in strips up to 11 ft. in length, their specialty being walnut. This, however, has more to do with the furniture-maker than the ordinary joiner, so we may pass on to record a clever contrivance of M. O. André, of Paris (whose works are at Neuilly) for securing wood framing by short bolts and nuts passing diagonally through the angles of junction of the several pieces of



framing. An example was given of 3-in. stuff to form an external wall or hoarding connected with partitions. A bird's-mouth trimming was given to the end of each plank, the points thus meeting in the centre, and the bolts passing through from angle to angle and nutted inside. These were placed 9 in. apart vertically. It would seem that much rapidity of execution with a minimum of preparation could be secured by this method, and that for portability there was an additional advantage, the timber being uninjured in any way.

Much of the reliability of carpenters' work depends on the nails and screws that are used, and a very complete series of nails (over 200 varieties), exhibited by F. Hadley & Co., of the Mitre Nail Works, Birmingham, received a Bronze Medal. In screws we noticed a fine case belonging to the American Screw Company, of Providence, Rhode Island, U.S.A., and Thomas & Stirling, of Liverpool. One peculiarity of their latest manufacture in screws is the stopping of the groove for the driver from passing entirely across the face of the head, to which they apply the term of "swayed slot," and claim that a stronger head is thereby produced, which must, indeed, be the case. The depth of the thread is also greater than is customary with ordinary screws, and the thread is thinner, which gives it a greater hold on the wood with less distortion of the fibre. The material used for the screws is also stated to be of a different and quite superior character, a variety of Bessemer steel, — to that hitherto used in screw manufacture.

Les Fils de Peugeot Frères, Beaulieu, near Valentigney (Doubs), had a grand show of saws and received a gold medal. The firms of Cocker Brothers, B. Huntsman, and Burys & Co., worthily upheld the reputation of Sheffield with exhibits of various classes of tools, — saws, augurs, chisels, gouges, &c.; and were unapproachable in their several specialities. Leveque, junr., of Paris, had a good case of files and rasps; and H. Garette, also of Paris, received a silver medal for well-made carpenters' planes.

Amongst other tools we noticed those for masons (including stone saws), exhibited by Bocaze, of Rue de Roche, Paris, those for plasterers, exhibited by Bouvais, of Boulevard Voltaire, Paris, and for plaster of Paris or soft stone carvers and modellers, exhibited by Buffet Fils, of Rue Saussure, Paris, all exceedingly good, more especially those of the latter firm, who showed some beautiful examples of work done in fine stone with their tools. Nuts and bolts, from the Patent Nut and Bolt Co., of Sheffield, scored with two medals; and a gold medal was also obtained by the Hardy Patent Pick Co., of Sheffield, for an exhaustive series of the tools used by quarrymen, such as boosters, spalling hammers, &c.; and also stonecutters' tools generally. The Myers Beaver Falls Co., of Pennsylvania, had some excellent well-balanced shovels, notably the Patent Socket Strap-shovel. The steel from which so many of these machines and tools are manufactured was exhibited in various stages of its production by the Consett Iron Company, of Durham, who received the Grand Prix for their Martin's Siemens' Steel, and, in a manufactured state, by the Ebbw Vale Steel, Iron, and Coal Company, of Ebbw Vale, Monmouthshire, who had a very neatly-arranged case of samples of steel rails, sleepers, fish-plates, &c., exhibiting the sections of each.

If we were to attempt to do justice to the extraordinary exhibition of machinery for the production of other machines, we should not merely get into the province of the engineer and outside that of the builder, but Christmas would be near at hand, or more probably past, before the list of noteworthy exhibits had been exhausted. It will be sufficient, perhaps, to say that nothing in the Exhibition could be better than many of the Belgian machines and engines of the largest types, and also some from Le Blanc Georgi & Co., of Marquise (Pas de Calais). To descend from these important matters to others of a very much smaller but, in their way, not less

important character, — viz., hardware, — we found that the firm of Chubb had, as usual, received a gold medal for their extraordinarily fine locks; and also the Yale Tonne Manufacturing Company, of Stamford, Connecticut, a silver medal for their peculiar and now well-known locks, and for beautifully-worked black iron door-plates. But, in addition to these, some very good work was shown by several French firms, — Tessier, of La Croix aux Bailleys, for copper and brass locks; Derloche-Canteville, of Ault (Somme), for fine steel locks; and a number of exhibitors from Picardy; but for excellence of work none of them could equal that of Forestier Frères, of Valines (Somme), whose locks seemed to be as good as ours.

We were disappointed with the Belgian exhibition of glass for buildings. They had a good deal from Bivort and others, of Jumet, near Charleroi, and from Mondron, of Lodestart, and from Jemappes; the best, perhaps, was the sheet-glass, with a faint green shade, from Jumet; but two fine plates, each 20 ft. by 12 ft., of plate-glass were rewarded with medals, one from Ste. Marie d'Oignies, of Jumet, and the other from Moustier, of Jemappes. Some good glass tiles and bent-glass were exhibited by Legros, of Jumet.

But the French glass was far better; Murat, of Boulevard Malesherbes, exhibiting excellent greenhouse and skylight-glass, and stating that they had provided 70,000 metres (about 15 acres) for the galleries of the Exhibition; whilst the Société Anonyme, of St. Gobain, Chauny & Cirey, of 9, Rue Ste. Cicile, Paris, had a splendid show of roofing glass of all kinds and sizes, together with glass bricks and tiles and curved glass. This firm had roofed the machinery-hall at the Exhibition, having used 33,800 sheets of fluted glass  $\frac{1}{4}$  in. thick. Helliwell, of Brighow, exhibited their system of "imperishable" glazing without putty, but it did not meet with favour from the jury.

M. O. André (previously mentioned), of Rue Royale, Paris, had also a system of roof glazing of a somewhat complicated nature, the glass being putted on to a T-rafter having an elongated base which was held by a pair of peculiar clips forming a chair, which, in its turn, was clasped to H-purlins by collars; a zinc trough was also provided under the rafter. The space between the glass and the upper surface of the purlin was, in the example exhibited,  $\frac{3}{4}$  inches. The trough can be slid into its place in the folds of the chair after the glazing has been completed. On the whole, we think we prefer Helliwell's system; but this is worth trying, as the advantage of roof-glazing that will exclude the wet under all circumstances is of very considerable importance.

The manufacturers of the Vieille Montagne Society are too well-known in England to need more than a brief description. Their zinc, silicate of zinc paint, satin zinc, and other works in that metal were well exhibited in a separate hut, the windows and balustrades of which were executed in moulded zinc in the Renaissance style, and painted with dead white zinc paint to resemble stone. The deception was somewhat remarkable, and to those who are ill-judged enough to desire appearance without solidity, and wish to obtain it at an extraordinarily low price, this class of work would recommend itself.

Chennevière et Fils, of Belgium, also exhibited ornamental cornices, architraves, window-sills, &c., in moulded zinc on the same system as the Vieille Montagne, and zinc-roofing in the shape of ornamental tiling or slating. There were several thin black low-priced roofing felts, the best of which appeared to be that called "carton coir," exhibited by Derfeux, of Paris.

Good shutters and blinds are an everlasting comfort, in place of being what such things too often are, an everlasting nuisance, and a good many examples of shop and house shutters were exhibited, not only by our well-known firm, Messrs. Clark & Bennett, but by several French firms, and notably by Eperche, of Rue Bernoulli, Paris (wooden house-shutters);

Lacour (light iron house shutters); and Chedeville & Dufrene, of Rue de Tocqueville, who had fitted up a shop with a variety of excellent shop-shutters on the "instantaneous" counterpoise system in steel-plates, for fronts of 12 to 15 ft. in length, and the "silent" shutter in corrugated steel. Their folding shutters (in two or three leaves) were beautifully made, and they also exhibited simple dinner and luggage lifts for hand-work, very well finished. Baudet, Donon, & Cie., of Rue Saussure, Paris, exhibited some combination wood and iron folding shutters, the frames being of iron and the louvers of oak, whose effect was pleasing, and they would probably be very durable.

Fastenings for French windows were well illustrated by A. Bernard, of Rue des Souries d'Artois, and several others, and are a very seriously-important matter for the comfort of dwellers in houses. So is the regulation of a fanlight; and Messrs. G. Magnant, of Boulevard Bonnevoile, Paris, exhibited two modes of dealing with the difficulty: — 1. The Croizemarie, a rod, the top of which is level with the upper sash-bar of the fanlight, is connected with it by a small cog and worm; the rod, enclosed in a metal sheath, which is fixed to the frame, passes down to the level of the hand, and terminates with a handle attached to it by a cup-and-ball joint. By twisting the handle round and round, the fanlight opens gradually to the extent desired. This is much better than cords. 2. The Cremona-Vasistas. A somewhat similar system to the other, but the head of the rod is connected with a bar, the other end of which is slotted, and works on a thin button attached to the middle of the sash. This bar is only 3-16 in. thick, and closes the joint when the fanlight is closed, lying flush with its face; there is a corresponding bar at the other end of the fanlight hinged on a screw attached to the frame. In this instance the fanlight opens downwards from the top, whilst in the Croizemarie it opens upwards from the bottom. They had also another system for opening fanlights sideways. These methods appeared to answer very satisfactorily.

For flexible tubing for communication, an excellent kind was exhibited by P. Sorgne, of Paris — india-rubber cased with very fine, plated galvanised iron wire. These were also stated to be available for gas and pneumatic work.

A distinctive feature in the Machinery Hall was the considerable exhibition of cables and ropes, both in hemp and steel. Those of the Commission des Ardoises d'Angers; of Bessonnet Angers, of Fréty & Co., Boulevard Sebastopol, Paris; of A. Stein Dantout, Belfort; of the National Cordage Company of New York; and of Vertongen Goens, of Termonde, Belgium, were very remarkable, the latter firm having a specialty of woven flat ropes of great strength, in steel and hemp. The London Water Meter Company obtained a gold medal for their "Differential positive" water-meter, for which they claim twenty-one advantages. The French are said to be a thrifty nation, and this quality was illustrated to a remarkable extent by the quantity of excellent safes shown by many firms. If the number ordered from a firm is a fair criterion of their excellence, then the palm must go to H. Chaudun (Pettit Jean), of Paris; but the firm of Messrs. Chubb will still hold their place thoroughly so far as delicacy of workmanship is concerned.

The excellence of Doulton's and Jennings's sanitary fittings are too well known to justify any space being taken up in our columns to describe all the articles for our domestic comfort and convenience that they showed.

We have been profoundly impressed with the advance made, both in France and Belgium, in the manufacture of very many things that we believed previously that we English excelled in, and could make much better than any one else. What the reasons may be for the English exhibits not being up to the standard of previous Exhibitions, it is not our province to touch on, but the fact remains that we have been matched — we will not say overmatched — in many ways; and in



these practical departments, as in others, the Exhibition, as a whole, has been very far in advance of anything of the kind hitherto attempted.

## NOTES.

**I**N a letter to a recent number of the *Glasgow Herald*, which has been forwarded to us, Mr. John Honeyman, the well-known architect of that city, in reference to a remark that had been made in the *Herald* that "the building regulations of Glasgow are at present on their trial," says "they have been so for many years, and in the opinion of all best qualified to judge have long ago been found to be utterly wanting." Mr. Honeyman continues:—

"Several years ago the Glasgow Institute of Architects made a vigorous effort to bring the matter home to the conviction of the authorities. They gave the matter the most careful consideration, interviewed the Lord-Architect on the subject, and, at his suggestion, prepared and printed a draft of such regulations as they thought suitable. Indeed, they spared neither time nor expense in their disinterested attempt to get these building regulations amended for the better protection of the community, and I have no hesitation in saying that their efforts were unavailing entirely through the apathy of the Glasgow press, which practically ignored them,—as it too generally does things architectural. The obstacle, so far as the authorities were concerned, was simply unwillingness, begotten of sentimentality, to do away with that time-honoured institution, the Dean of Guild Court, for which not one word can be said by anyone who takes the trouble to consider how the work entrusted to it is done elsewhere,—at least in England, where the admirable results to which you refer are obtained. Surely the fact that the preventable fires in London are at the rate of 5 per annum, while in Glasgow they are at the rate of 81, is not a reason for giving additional power to that antiquated and unsatisfactory body, the Dean of Guild Court, as you imply, and as ex-Dean of Guild Walls some time ago insisted, but rather a convincing argument in favour of our assailing our practice here to the London practice, involving the radical change which the Glasgow Institute recommended. There is not a district in London where the buildings are not looked after by a thoroughly competent surveyor, who, as required by the Act, has passed an examination conducted by the Royal Institute of British Architects; and, in point of fact, some of the most able architects in London are district surveyors. Here, on the other hand, the authorities cling to the egregious mistake of believing in 'the practical man.'"

"If the apathy of the daily press on architectural subjects (except when some excuse occurs for getting up a sensation article in abuse of architects) we know something in London, and we are entirely at one with Mr. Honeyman in his distrust of the so-called 'practical man.' At the same time, as far as the question of building regulations goes, it appears to us, on the basis of the evidence as at present forthcoming, that the Templeton mill could have been built under the London Building Act, and that no District Surveyor could have legally interfered with it. The calamity cannot, therefore, as far as one can judge at present, be attributed to any special and peculiar defect in the Glasgow building legislation. The moral, as we have already said, is that it is not enough that a building should be so constructed as to be safe when completed; it must be safe while in course of construction; and, in view of possible contingencies, building regulations require to be carefully considered, and where necessary revised, to this end.

**I**N connexion with the Railway Rates Inquiry, now proceeding at Westminster Town Hall, a rather singular circumstance may be noted. At the resumption of the inquiry on Tuesday, Lord Balfour stated that, for the convenience of those interested, he would furnish the Press at the close of each day's proceedings with an outline of what would take place at the next sitting. This excellent arrangement was promptly put into force, as far as Lord Balfour was concerned,—his lordship stating at the close of Tuesday's proceedings that, after the cross-examination of Mr. Findlay, individual traders and others

would be heard, there being 18 or 20 gentlemen who had sent in their names as witnesses. If anything be needed to prove the interest with which this inquiry is being followed, it may be found in the fact that Lord Balfour made the arrangement alluded to in response to a large number of requests received by the Board of Trade for information as to the line of proceedings intended to be taken; but the *Times* of Wednesday, although devoting fourteen columns to the proceedings of another Commission, and seven more to political speeches, contains not even a paragraph relating to this important subject. It is satisfactory to find that the Board of Trade have determined to refuse their assent to unclassified articles being charged at the highest class rates. Mr. Findlay admitted that it would be impracticable always to do so, and remarked that there were many articles upon which they found it impossible to charge the maximum rate, as it would stop the traffic. It seems hardly worth while to invest the Railway Companies with still further powers which they would be unable to use,—especially as the proposal in question is so sweeping.

**THE** New South Wales Parliament has recently authorised the construction of some extensive sewerage works in that colony, and the Government are about to proceed with the sewerage of the western suburbs of Sydney, at an estimated cost of 1,817,896*l.*; the sewerage of St. Leonards and other boroughs at North Shore, at a cost of 106,000*l.*; and of the borough of Manly, at a cost of 34,000*l.* The engineer who has devised these extensive works is Mr. George H. Stayton, M. Inst. C.E., formerly of London. Mr. Stayton is on a short visit to this country, the Government having commissioned him to inspect and report upon the latest systems of sewage purification. It may be mentioned that the population of Sydney is now nearly 400,000, but the works are designed for a prospective population of 750,000 persons.

**SIR SYDNEY WATERLOW** has not only done a noble and generous thing by the gift of his Highgate estate to the London County Council for a public park, but he has shown a remarkably common-sense and practical spirit in the reasons he has given for choosing this way of benefitting his fellow-men. We reprint these in his own words:—

"Commencing the work of my life as a London apprentice to a mechanical trade, I was during the whole seven years of my apprenticeship constantly associated with men of the weekly wage class, working shoulder to shoulder by their side; later on, as a large employer of labour and in many various other ways, I have seen much of this class and of the poorer people of London, both individually and collectively. The experience thus gained has from year to year led me more clearly to the conviction that one of the best methods for improving and elevating the social and physical condition of the working classes of this great metropolis is to provide them with decent, well-ventilated homes on self-supporting principles, and to secure for them an increased number of public parks, recreation grounds, and open spaces. This latter object can, I think, be best accomplished by the kindness of individuals, acting through the agency of the London County Council, and with as little burden as possible on the public rates."

It is perhaps only fair to the County Council to add that gifts such as these, of property to be dealt with by them for the public good, furnish an important indication of the confidence which is felt in the County Council as an administrative body.

**THE** sudden death of Mr. Joseph Gordon, the Chief Engineer to the London County Council, ensuing so soon after his appointment to an office of so much importance, is to be deeply regretted, not only on personal but on public grounds. As has been but too evident of late years in the almost periodic floodings of certain districts of London—floodings which have been only partially obviated by the costly relief sewers which were constructed by the Metropolitan Board in the last few years of its existence,—

the main-drainage system of the metropolis calls for careful investigation with a view to its being supplemented by such works as may be necessary for the health of London. Mr. Gordon was engaged in this investigation at the time of his death, and had, Lord Rosebery stated on Tuesday, just completed an important report upon the Abbey Mills Pumping-station. That the position of things connected with this subject is very serious may be inferred from the grave statements publicly made at the meetings of the London County Council by some of its engineers—members, and referred to by us in a "Note" a fortnight ago (see *Builder*, p. 307, ante). We are therefore glad to see that there is to be the least possible delay in filling up the vacancy caused by Mr. Gordon's death, but we trust that no effort will be spared to secure the best possible man for the office. We say this because, while we think that on the last occasion the Council made a very good choice, the name of at least one highly-eligible candidate, as we pointed out at the time (see *Builder* for July 20 last, p. 42), was unaccountably omitted from the list of names submitted to the Council as that from which the choice had to be made.

**THE** School Board have just issued their yearly statement of the additional supply of accommodation which they find to be necessary for the London district, in the shape of new buildings or the extension of existing premises, together with an enlargement of their chief offices on the Victoria Embankment. The schedule comprises a list of thirty-seven school sites in all. But inasmuch as six out of twelve of these constitute alternative sites, the actual number of new and extended schools about to be provided amounts to thirty-one. These are distributed amongst the several Divisions in the following manner:—City: Gravel-lane school, Houndsditch,—1. Chelsea: Hugon-road, New King's-road (part of Messrs. Veitch's nursery ground), and Everington-street and Lillie-road, Fulham, with Waterloo-street, Hammer-smith,—4. Finsbury: Brecknock-road (part of the ci-devant Queen's College), or North-road, Islington Cattle Market, being two alternative sites; Trinity-street, and the Forster school in Hornsey-road, by the Holloway swimming-baths, all situated in St. Mary, Islington,—3. Hackney: Gayhurst-road, by London-fields, and Gainsborough-road,—2. Marylebone: Kingsgate-road, including portion of garden belonging to "The Grange," Hampstead, and Bell-street, Marylebone,—2. Tower Hamlets: Priory-street (including the National School by St. Leonard, Bromley, parish church), or St. Leonard-street, Bromley, being two alternative sites; with Morris-road, Bromley; Dalgleish-street, St. Anne, Limehouse; and Whitehorse-lane, adjoining the Trafalgar-square schools (cookery centre) in Mile End Old Town,—4. Westminster: Horseferry-road and Tufton-street,—1. East Lambeth: Sayer-street, by the Metropolitan Tabernacle Almshouses, or Station-road, hard by, being two alternative sites, and Bird-in-Bush-road or Commercial-road, Camberwell (abutting on the Licensed Victuallers' Asylum), also two alternative sites; with Choumert-road, Camberwell, and Hereford-street, Newington St. Mary,—4. West Lambeth: Sussex-road, Loughborough Park, and Latchmere School, Battersea; with Kennington-road and Stannary-street (including the tavern by sign of "The Sign is in the Cellar"), or Grove-place and Kennington-road, Lambeth St. Mary, being two alternative sites,—3. Southwark: Hatfield-street and the Board School,—1. Greenwich: Kensing-road and Halstow-road; Siemens-road and Bowyer-road, Woolwich; Greenwich Marshes, by St. Andrew's Church; Clifton-road and Edward-street, Deptford, and Stanley-street School and Mornington-road, Deptford; together with Wellington-street, by St. John's Church, or Mulgrave-place and Wellington-street, Woolwich, being two alternative sites,—6. After taking a mean between each pair of alternative sites, we find that the amount of ground which is scheduled



for school purposes may be taken as covering a total of 707,595 square feet, more or less; that is, say, very nearly 16½ acres. The Board have also scheduled, for the extension of their offices on the Victoria Embankment, a plot of ground about 8,836 ft. superficial, situated in St. Clement Danes parish, which abuts, westwards, on their present offices, and eastwards on Milford-lane and Messrs. Gwynne's workshops.

IT is rumoured that the projected purchase of the Opera House in the Haymarket, by a syndicate, will result in the erection of yet another vast hotel upon its site. The original house was built by Sir John Vanbrugh with a subscription of 3,000*l.* in 1704-5, the foundation-stone being inscribed "The Little Whig," in tribute to the Countess of Sunderland, a reigning toast of that day. The first season was opened on April 19, 1705, by Betterton, with the "Triumph of Love." Some twenty-five years later another subscription of 50,000*l.* was raised, and since George I. engaged to give 1,000*l.* yearly the theatre was styled "the King's." Its history is to be identified with that of the introduction and establishment of Italian opera in England, varied with oratorios, and with the masquerades of Delphini, Heidigger, and others. W. Capon's drawing, as printed by Smith, of Vanbrugh's building, shows us a common-place elevation of red brick and rustic work, about 35 ft. in length, having three round-headed doorways, two floors above, and a tiled roof. In 1782, Michael Novosielski made many alterations of its interior, and in 1790-1 he entirely rebuilt the house, which had been destroyed by a fire. Here was Ridaud's fencing academy; in a plan (1794) in the Crowle Pennant, the name of "R. B. Sheridan" is given as that of the tenant of a large house just north of the opera-house, Charles-street was not then made,—entered by a court between Nos. 75 and 76, Haymarket. Kelly's saloon, abutting against the opera house, stood at the angle of Pall Mall and Market-lane (St. James's Market), near to the present Opera-arcade, the resort, says Mr. G. A. Sala, of hypochondriacal boot makers. The saloon formed an "early door" into the house. Novosielski's new house, into which he had introduced the continental horse-shoe shaped auditorium, was modified, as to its exterior, by Repton and Nash in 1819-20; the arcade columns, as at Drury-lane, are of cast-iron; the artificial stone basso-relievo along the Haymarket front was designed by Bubb, Clarkson Stanfield, R.A., painted the drop-scene. In 1846 Mr. Lumley is stated to have realised a very great sum by selling boxes in perpetuity. This house was burnt out on December 6, 1867. The late Lord Dudley, as lessee under the Crown, rebuilt it at an expense of 50,000*l.* The contractors were Messrs. George Trollope & Sons, who completed the work in nine months, after the designs of Mr. Lee, architect. In 1874 the premises were offered for sale at auction; in the following year they were hired for the "revival" services held by Messrs. Moody and Sankey. In the old house Handel's "Rinaldo," his first opera, was brought out, in 1711; on April 4, 1739, his "Israel in Egypt" was first performed here; and "Belshazzar" on March 29, 1745.

THE spire of St. Mark's Church, Birmingham, appears to be in a dangerous condition. According to the local press, the stonework of the whole building is rapidly crumbling and decaying away,—so much so that, although it was only built in 1841, the masonry is so far gone that, except for the style of the edifice, it might easily be imagined that it was erected some 700 or 800 years ago. The City Surveyor has served a notice on the vicar, as "the owner of a ruinous and dangerous spire," to begin to take the same down within three days, and to do various repairs to the church as speedily as possible. It is said that the church was built from designs by the late Sir Gilbert Scott, that the stone was a gift from a local family who took an interest in the building, and that

a member of the same family was the first vicar. The inference to be drawn from certain comments on the subject as to who ought to be held responsible for the selection of the material is that, in the main, the architect is to blame. Judging from the statements made, there can be but little doubt that almost the sole cause of the decay of this imposing structure is due to the "unwise selection of building stone," but we think that anyone who understands the usual methods of selecting stone in cases like this, where the material is "generously" given by a patron for the erection of the edifice, will see that the architect has not, as a rule, so much to do with the choice of material as the donor. We could give several instances where landowners having stone on their property have practically prohibited the utilisation of other material in buildings erected for them, even although the architect has pointed out the superior quality and greater desirability of employing these latter. This may not be exactly the case in regard to the Birmingham church alluded to, but it looks very much like as though it were so.

WE have received from Mr. F. H. Berry, electrical engineer, a very compact form of electric bell patented by him. The working parts are placed entirely within the bell itself, so that it alone, together with the two binding screws, are visible on a wooden base. The electro-magnet consists of a soft iron bobbin, on to which insulated wire is wound, and two small side-projections from the rims of the bobbin serve as the pole-pieces of the bar magnet thus formed. The vibrating armature is placed parallel to the magnet; one end is almost in contact with a pole of the magnet, so that the other, which carries the striker, has a powerful pole induced in it opposite the pole-piece of the magnet to which it is attracted. By this ingenious method of shortening the magnetic circuit the armature and electro-magnet, similar in many respects to those of the Jensen bell, occupy about a third of the space taken up by the old horse-shoe pattern. A small lug projects inwards from the bell to receive the strokes from the vibrating armature. We have tried the device with a single quart-sized Leclanché cell, and find that it works well.

THE catalogue of the collection of "Studies for Pictures" now being exhibited at the Fine Art Society's Gallery is prefaced, to our surprise, by an intimation that the correspondence preliminary to the formation of the exhibition led to the discovery that a very small proportion of the artists appealed to were in the habit of making preliminary studies. We presume this means that they did not make such studies as would be presentable for exhibition. We can hardly imagine a picture worth anything being produced without some kind of preliminary trial of the grouping or composition. Among the elect who do make studies are included Mr. Richmond, Mr. Burne-Jones, Mr. F. Dadd (whose monochrome study for his large drawing "All's not Gold that Glitters," is almost like a finished picture, minus the colour), Mr. Walter Crane, Professor Legros, Mr. G. D. Leslie, Mr. Marks, Sir F. Leighton (the largest contributor), Mr. Watts, Mr. A. Moore, Mr. Tadema, Sir James Linton, Mr. W. E. F. Britten, Mr. C. C. Seton, Mr. F. Dicksee, Mr. Poynter (a very large contributor), and Mrs. De Morgan (Miss Pickering). The last-named artist contributes some curious-looking ideal compositions executed in gold on a very dark-tinted paper: they look more as if done for decorative effect than as studies in the ordinary sense. Professor Legros' sketchy figures, shaded vigorously and freely in line, are among the best portion of the collection regarded as examples of mere studies for figures to be finished in another medium; there is a very free broad vigorous style about them; his landscape studies seem rather too like echoes of the "Liber veritatis." The studies of Mr. Burne-Jones include a number of beau-

tiful and finely-finished little drawings of figures and drapery; a head (18) remarkably like a Leonardo da Vinci in expression, and an exquisite little "Floral Study" (13). Among Sir F. Leighton's contributions are a beautiful little drawing of architectural detail, "A Venetian Well" (83). Among his other studies will be recognised the foundation of many well-known works. Mr. Poynter's studies include two for his large and fine picture of "Atalanta's" race, and some interesting studies of armour. Among Mr. Tadema's few contributions is a beautiful little nude study (113) on toned paper with the high lights touched in white. Mr. Watts' drawings are only three in number, two slightly but very delicately executed profile heads, and a small most delicately drawn figure of a lady in modern dress, which is one of the most beautiful things in the collection, though we do not think it comes properly under the definition of a "study;" it looks more like a drawing made for its own sake.

WE hear that the Department of Science and Art have placed on the Art Prize list of the Department Mr. Ralph Neville's work on Old Cottage Architecture in Surrey originally published in the columns of this journal.

THE Exhibition of the Institute of Painters in Oil Colours is a somewhat melancholy place to visit. The standard of work seems to be getting lower and lower, and the walls of the three large rooms are covered with works of which few rise above mediocrity and too many are below it. The President, Sir Jas. Linton, has not thought it worth while, apparently, to contribute anything. When the Institute made their ambitious move into much larger rooms they do not seem to have sufficiently considered that a larger area of wall-space may be a curse rather than a blessing, unless there are means to fill it in a satisfactory manner. Among the few redeeming works of the exhibition one of the most noteworthy is the large picture by Mr. Fulleylove, "A Royal Palace" (94), being a representation of the garden-front of Hampton Court from the opposite side of a pond larger than the actual one, and with some fountains and sculpture apparently suggested by Versailles, as foreground objects: this is a very fine work, though we might like to have seen a little more decided appearance of texture in the palace front, which is a little too woolly-looking for architectural work even when removed a considerable way from the foreground. Mr. C. E. Johnson's "Waiting for the Milkmaid" (104) is a good example of his painting of quiet realistic scenes of English landscapes, and Mr. Adrian Stokes's "Souvenir of a Quiet Night" (87) is a fine study of moonlight effect. As a representation of a special effect of light on water Mr. A. Harrison's "Evening" (458) is worth note, though only a large sketch, as is also Mr. Alfred East's powerful sketch of a sunset effect (475). Mr. Hope M'Lachlan's "October Storm" (567), a dark rugged foreground and trees relieved against a wild sky with flying clouds, is a very fine thing. Mr. Barton Barber is in his best form with two dog pictures, "Amateur" (11) and "A Portrait" (513), and Mr. Yates Carrington with his picture of "The Vagrant's Dog" (304). Mr. F. D. Millet's "The Best Trump" (184) is one of the best painted and most finished works in the exhibition, noteworthy especially for the admirable combination of truth of local colour with a broad diffused light in the interior; the figures, very well painted, are not of much character or interest. This cannot be said of Miss Beatrice Meyer's clever and highly-finished little scene from "The Antiquary," Lovell reading the story of the Hartz Goblin (81), which has however been put down on the floor, while many far inferior works are on the line. Mr. Tom Lloyd's "Our Ducks" (145) is a beautiful evening scene steeped in warm light which does not however quite overpower the chilly green of the foreground field. Mr. Frank Dadd's contribution is an interior



with figures of an old man and a child, "The Scrap-book" (363), an excellent little work but not nearly so interesting as some of his in previous years. Mr. John Collier sends a very pleasing half-length portrait of "The Hon. Mrs. Collier." Among the few other works above the average are M. Fantin-Latour's "Bouquet Varié" (78) and his curious dream picture of ghostly nude figures in a ghostly landscape, entitled "Song" (612); Mr. Adrian Stokes's "A bank where the wild thyme grows" (219); Mr. W. H. Bartlett's "Intruders" (293), a study of two nude little girls on the seashore; Mr. T. Collier's "Millstream and Lock" (403; not equal to his best works); Mr. Dollman's "Content" (549), a carefully-studied group of donkeys revelling on thistles; and Mr. Eric Forbes Robertson's "Evening Sunlight" 290, a very truthfully-rendered effect of light. The whole exhibition, however leaves the impression that the Institute can hardly carry on much longer unless it can either raise the general standard of its work, or confine its exhibition to one room instead of filling three large rooms with such very ordinary products as form the mass of the collection.

THE front sheet of the *Times* of Wednesday last contains, we regret to see, an advertisement from an architect of some ability, and whose name is not unknown to us, touting in the most barefaced way for professional work. The following is the advertisement (omitting the names, as we are not going to assist this gentleman in his advertising propensities):—

"LIMITED OWNERS' RESIDENCES, Acts 1870, 1871—Board of Agriculture.—Noblemen and landed proprietors desirous of taking advantage of the facilities afforded by the above Acts for making improvements may consult Mr. ——— Architect, who rebuilds—hall and other country houses."

The full address follows. The advertiser is not a member of the Institute of Architects, or he would probably hear from that body. But it is a most discreditable thing to the profession that an architect should thus lower himself to the level of a quack medicine vendor, and we hope the architect who has thus disgraced the profession will get nothing but contempt by his tactics.

#### THE TREATMENT OF ANGLES AND TERMINAL FEATURES.\*

To go back for a moment—there is an early development of the angle pier that is exceedingly effective: namely, the development into the kind of shallow buttress which is sometimes found enveloping the entire angle in Early Gothic buildings. It makes an exceedingly strong and satisfactory feature. The feature which we generally mean when we speak of an angle buttress—that invention of the late and scientific Gothic period for saving a buttress—is rather an abomination. It looks so terribly mean and poor.

When angle piers were used alone in Gothic times,—that is without buttresses,—they were generally octagonal in form, and surmounted, or intended to be surmounted, by pinnacles. For good examples, I need only point to the towers of Magdalen College at Oxford, and to Giotto's campanile at Florence.

In Renaissance architecture, again, angles were more frequently finished,—at least in important works,—with piers, of one form or another, than with any other feature. Sometimes these piers are of considerable projection, and stop the majority of the architectural features, the main cornice alone breaking round them,—as in the "Mercato Nuovo" and the Church of the Annunciatina at Florence. But as a rule the pier is of slight projection, and all the horizontal features are carried round it, except the upper part of the main cornice, under the corona of which it stops. The piers are treated in a variety of ways; sometimes they are panelled; sometimes only broken by niches; more frequently they are rusticated or broken up into groups of pilasters. Strange to say, a rusticated pier does not seem to destroy the scale of a

design in the same way that rusticated quoins do; probably because it is evidently a separate feature. Such piers may be seen in many Italian palaces, as well as in France and England, where Perrault, Mansard, and Sir Charles Barry, in particular, used them with singularly satisfactory effect. One may point out, with respect to these piers, that they gain, like most other angle features, by being a little set in from the actual corner.

Piers treated as regular pilasters with caps and bases generally look out of place if there is nothing to suggest the pilaster-form in the rest of the design; but their use was quite common in such cases. On the other hand, at the end of a façade in which pilasters or columns are introduced, a pilaster or a group of pilasters forms the natural and most satisfactory angle. A pilaster placed absolutely upon the angle is to be avoided; not only because it is not strong enough alone, but also, and chiefly, because when both sides of the angle are seen, it looks clumsy and ill-proportioned. For the latter reason the common and obvious expedient of coupled pilasters is also unsatisfactory if they are set right upon the angle; but if they are set in, so that the angle shows, or even if the outer one of each couple only just meets the other, without their becoming two sides of the same; then the objection falls to the ground. It is an interesting, and not an easy exercise, to design a group of pilasters, or pilasters and columns to terminate a façade and get happily round the corner. The chief things to avoid, besides weakness, are columns or pilasters actually at the angles and any excessive projection of the cornice. If the latter is a great cornice supported on consoles, the trouble with it, unless you are very careful, is to be a constructive as much as an æsthetic one.

I cannot leave the subject of the smaller angle features without a passing reference to the twisted-cord moulding sometimes used in Egyptian and in Venetian buildings. It no doubt marks the angle well enough, but it has a quite intolerable resemblance to an upholsterer's cording on the cushions of a chair or couch, and is entirely beneath notice as an architectural feature in such a position. There is not the same objection to the roll-moulding that one often finds on the angles of early Gothic buildings, especially on the buttresses. The roll is cut into the solid angle, and not stuck on outside it, and it gives some fine, sharp lines of shadow. If only it were easier to run the roll right out at the top, or in some way get rid of the disagreeable effect produced by its being stopped short, I think we should all take to using it again now. A chamfer on the angle of any important feature is seldom or never an improvement; it weakens the line, and destroys its sharpness without giving any sort of compensation.

The larger angle features may all, for convenience, be grouped under the heads of turrets and pavilions. Angle pavilions are an invention of Renaissance architects; while turrets, though they continued to be used in the later period, are an essentially Gothic feature. It is noticeable that angle pavilions, as elements in a composition, are more often than not, made subordinate to a larger feature of the same kind which occupies the middle of the main face of the building; while angle turrets more generally terminate façades or faces which have no very large or prominent central feature. Neither rule is without very numerous exceptions, but the distinction holds good in the majority of cases. It is also noticeable that turrets are not such effective terminal features for long façades as for short ones, unless they have almost the proportions of pavilions. This is only natural; the longer building requires a wider terminal feature.

With respect to circular and polygonal turrets on the angles of buildings, it is a common fault, with inexperienced designers, to put the centre of the circle, or polygon, actually on the angle. It is natural enough, but a little observation and experience teaches us that it is fatal as regards effect. The centre should be well within the angle, and it does not much matter how far within as long as the angle does not come out beyond the turret. This is a matter to be particularly noted in the case of turrets carried on corbels, like many of those in the châteaux of the Loire district, as well as the little turrets on the angles of some of the Scotch castles. The same observation, of course, applies to circular and polygonal bays and oriel windows on angles, if people must have such things; and

there seems just now to be a taste for them. With respect, however, to such angle bays, I have ceased to believe it possible to design one that can be tolerated, unless it is carried up to the roof, and made more or less into a turret. It may be an oriel, carried on corbels, it need not start from the bottom, but it *must* go to the top. The reason is obvious. It is a fundamental principle that the angle must appear strong, and that is impossible if it seems to be carried on the roof of a bay-window, or upon a cunningly-contrived, but inadequate, pier in the middle of the outer face of the bay.

Before leaving the subject of turrets, there is a word or two to be said about towers. Large towers have, rather commonly in modern buildings, been used at angles. But there is this objection to them in that position. Anything that can be called a tower must be a very large and prominent feature; certainly it will overtop any building to which it is attached. It is, therefore, ridiculous to put it at the extreme corner of a composition where, from most points of view, it makes the group altogether one-sided, and from the most favourable point overwhelms the rest of the building. Of course, if there are other towers in the group it is a different matter; I am thinking of a single tower, which is the most that the majority of us are likely to have to deal with at present.

Something remains to be said about rounded corners and angles that have to be cut off for convenience at the corners of streets, and so on. They may be taken together; for the principles involved in dealing with them are practically identical. They present a peculiarly difficult and dangerous problem to the architect, who, if he has any proper ambition, is sure to see in them his opportunity for doing something original and effective. The problem, too, is generally complicated by the temptation—sometimes it is the necessity—to put an entrance in the angle. But all openings in or near angles must weaken them; and an important opening in a curved surface is a horrible thing to deal with—the head of it must overhang. These difficulties are, unhappily, seldom overcome with any sort of success. In nineteen cases out of twenty the attempt at an original feature results in some tall and consumptive, or grotesque, piece of confectioner's architecture, much too weak for its position, yet running up like the funnel of an old-fashioned steam-engine, and giving something of the effect of such a machine to the whole building.

As to the entrance, the natural and unavoidable weakness of the opening is too often aggravated by making it arched or by surrounding it with light ornament. The best way to deal with these rounded and canted angles is, I feel sure, to treat them, not as angles at all, but as short fronts with the angle features on each side of them. If the special feature is inevitable, it should be made to stand firmly, as a well proportioned feature of itself, having but little connexion with the rest of the building, which should be finished with its own terminal features on each side of it.

I had intended to deal with internal angles, but the paper is already so long that I will only stop to point out that where two long wings of a building meet and form an internal angle,—two sides of a courtyard as it were,—a marked feature in the angle is an imperative necessity, and is usually supplied by a turret, sometimes by a tower.

In the discussion which followed,

Mr. H. O. Cresswell proposed a vote of thanks to Mr. Baggallay for his admirable paper. Mr. Baggallay had drawn attention to a feature which was constantly forced upon the attention in walking about London, viz. the angle tower, which those who were the happy possessors of corner sites thought it their duty to erect. The angle tower, with its semicircular arches, or even with straight openings, had a tendency to be weak. With circular arches, in fact, it looked as if coming down to crush the spectator, were it not for the friendly girder which was generally behind. He did not know whether any of the worthy City practitioners who designed those angle-towers ever read the discussions at the Association meetings, but, if so, perhaps, in future they would be somewhat more sparing in their use.

Mr. W. Burrell seconded the vote of thanks, and said that when they were able to read the paper, and consider its points bit by bit, they might then take up the books descriptive of the old works, and study how things were done

\* By Mr. F. T. Baggallay, F.R.I.B.A., and being the concluding portion of a paper read before the Architectural Association on the 1st inst. (See p. 333.)



in the old days, as compared with the present. Such a paper as they had listened to that evening had more than an ephemeral interest, and it was of the utmost importance for the young architect to get these subjects well into his head.

Mr. F. R. Farrow remarked that Mr. Baggallay had taken up the subject pretty fully as far as the limits of the paper would allow, and there was little to be said in addition. There was one point, however, which had been referred to, and which was sometimes open to explanation, viz., the plan of circular turrets at the angles. Although the general rule with the best work was for the centre of the circle to be within the angle, it would be found occasionally in Scotch work, and with small turrets especially, that the centre of the circle was outside the angle. That had certainly a most unpleasant effect. There was a method of treatment which had not been mentioned, but which was to be found in the Venetian treatment of the *façade*, and perhaps might be taken as bearing upon the subject of angles. He referred to the treatment of the whole angle-bay of the *façade* in a more substantial and stronger manner than in the centre of the *façade*. It appeared to be peculiar to the Renaissance designers, and he had always immensely admired it. It seemed to be a very sensible way of treating the angle of the design, to make not only the bare angle, but the pavilion or block at the angle, more substantial than the centre part of the *façade*. He was gratified to hear what had been said as to the pleasing effect of an occasional rounded angle. He had seen a modern French building lately, and he noticed that the angle to the tower was simply rounded at the aris for the sake of rounding it. In doing so the designer had furthermore rusticated his angle, so that this rounded and rusticated pier at the angle had a most piquant effect.

The Chairman remarked that he quite agreed with what Mr. Farrow had said about rounding angles. It was unnecessary to go to Paris to see that, as it had been done in several places in London. In the case of Mr. McWhirter's house in Abbey-road, there were rounded angles executed in rough-cast, and the strings all round looked nice and soft. The angle should be designed according to the building, for a turret that would look all right on a three-story building looked quite ridiculous when drawn out to seven or eight stories. He would also like to emphasise another thing Mr. Baggallay had pointed out, viz., that when designing an angle, which of necessity was usually seen on the diagonal, care should be taken to design it on the diagonal as well as on the elevation. He might instance towers and spires as cases in which blunders were frequently made, because they were designed in elevation only. Both sides of a tower might be carefully designed and might look fairly well when seen in elevation, but when they were viewed on the diagonal the little turrets would be found to be a long way off on each side, with the spire coming up the middle. Those who used plasters in interiors must bear Mr. Baggallay's remarks very clearly in mind when they come to angles, for as to the pilasters in an internal angle, it was difficult to manage it. He did not know, in fact, which was the best way to use it, but he was aware that there were a great many bad ways of using it, which should be carefully avoided. Mr. Baggallay had divided up angles into three groups of treatment. The first practically came to this—"leave them alone," and he (the Chairman) could not help thinking that, unless they were driven to it, they could not go wrong in leaving the angle alone. In putting up buttresses, pinnacles, and turrets they would frequently come to grief, but a plain, solid angle, with the windows kept well away from it, would, in nine cases out of ten, look well. A frequent mistake occurred in putting windows near an angle. If they got two windows near an angle, they could see through the building, and the effect was unsatisfactory, but if the windows were kept well away from the angle the effect would be better. Mr. Farrow had pointed out that sometimes circular turrets had their centre outside the angle of the building. That was true, but even Mr. Farrow had admitted that the effect was, as a rule, unsatisfactory. If, therefore, they had a turret to deal with, they would, he believed, be pretty safe in keeping the centre inside the angle. There were many good examples of the treatment of angle turrets, and that of Mr. Norman Shaw at

the building at the corner of St. James's-street and Pall-mall, was excellent. Everything depended on the position of the angle. He also agreed with Mr. Baggallay that a single angle buttress put in the diagonal was not easy to treat well. It was, as a rule, unsatisfactory because made too thin. There was some chance of success if it was kept broad, but a 9-in. buttress put on the diagonal would most likely bring disgrace upon the designer.

The vote of thanks, on being put to the meeting, was most cordially received.

Mr. Baggallay, in replying, said he had omitted to mention angle-bays, and, as a matter of fact, he had not referred to the treatment of angle-pavilions. These latter should be designed with comparative solidity. Good examples of Renaissance work generally showed the angle-pavilion as set with a single light in the middle, with broad piers on each side, while if it was at the end of a composition in which an order was used, it would be found that the angles were treated with coupled columns, or with a column and pilaster, to make the whole pavilion more solid than the rest of the work; and in the same way, as Mr. Farrow remarked, the end bay of the building was treated in Venice. He supposed there were special reasons for the treatment of the bay like a pavilion in Venetian buildings. No doubt very stringent laws existed as to going beyond the building lines. Sites must have been exceedingly valuable, and so they were obliged to make the buildings square. They could not, therefore, allow anything to project in front to make an angle-pavilion, and consequently had to treat the end bay as one. With regard to the other point Mr. Farrow had raised, as to the little oriels, which occasionally had their centres outside the walls, he need only repeat that Mr. Farrow did not approve of them, and therefore they could not be deemed as going against his (the speaker's) theory, that the centre of the angle should be within. He had rather hoped that a greater number of the members would have spoken, for all he had said was, after all, very much matter of opinion, and he had put it forward with a certain amount of hesitation. Questions of taste were not on quite the same footing with scientific questions, and opinions upon them were always open to discussion.

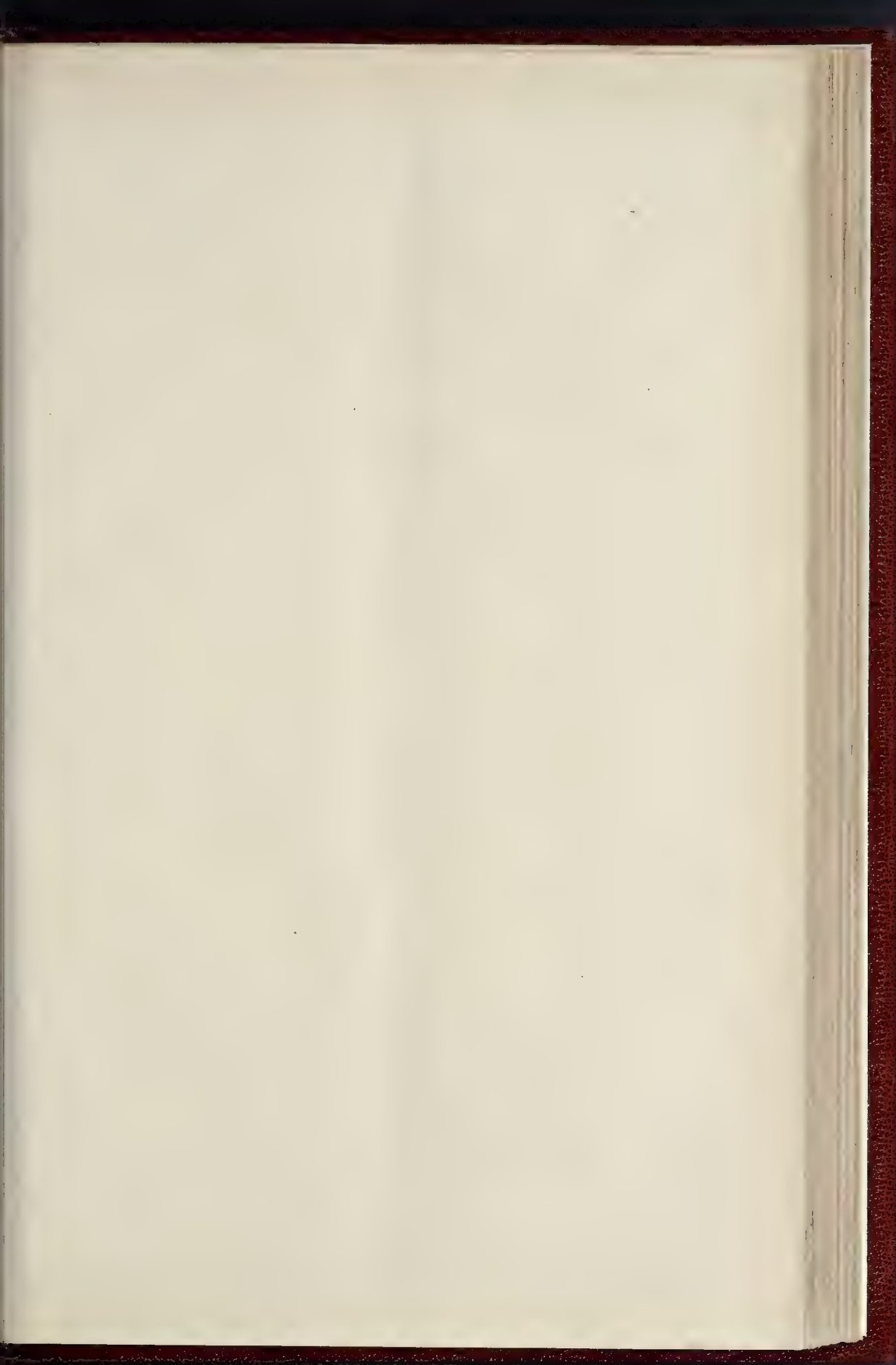
#### THE RECENT ART CONGRESS AT EDINBURGH:

THE PRESIDENTIAL ADDRESS IN THE SECTION OF PAINTING.

MR. BRITON RIVIERE, R.A., presided at the opening meeting of the Section of Painting, and delivered an address, in the course of which he said he was there as a painter to speak to those who did not paint, so that he might, if possible, bring them, at all events on a few points, into touch with those who did. More especially he wished to explain the relation which the language held to the message it contained; for that a painter had a message—his own peculiar message—to whatever class or order his work belonged, he took for granted, or how should they distinguish him from a living photographic camera? Among painters technical excellence was of paramount importance. They spent their lives in trying to acquire it; they broke their hearts over the failure to do so; and the result was that they naturally looked at works of art from a very different standpoint to that of the untrained. To them, as mere experts, a work would be strong or weak in the ratio of its excellence of manner. To the ordinary outsider, the matter would always be of primary importance. The former said, "How is it done?" the latter, "What does it mean?" Now, it was easy to see that this disagreement rested upon very solid grounds, and that each point of view was the result of a very definite cause. They were interested to know whether it was possible to bring those two points of view into agreement to enable the outsider to absorb something of the expert's knowledge, and yet preserve his own individuality as an outsider, and love a work of art intelligently, and, above all, honestly. Could an outsider, *i.e.*, one who had no practical training in painting, learn to thoroughly enjoy a picture both for its manner and its matter? If this was possible, how could it be brought about? In the attempt to create a truly receptive and sensitive art public, it was of the highest importance to begin in the right way.

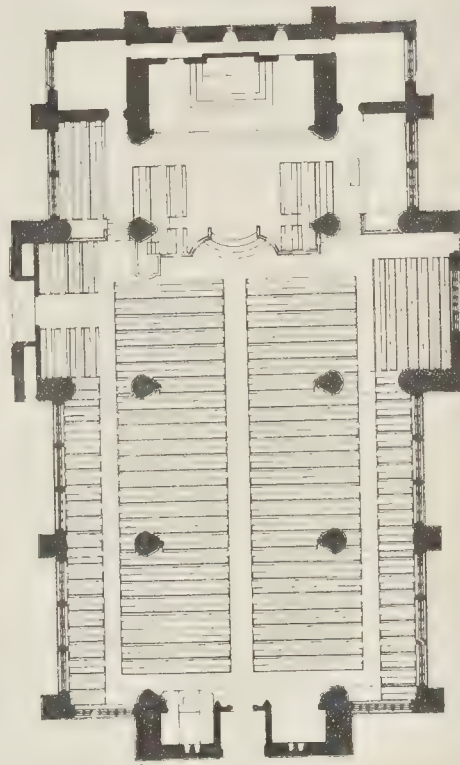
He believed the right way to begin was to start, not from the point of view of the painter, but from that of the outsider. In this manner, they should follow the only sound method of education, *viz.*, that from the known to the unknown. The shibboleth, "art for its own sake," used with such intense belief by some who had devoted their lives to art, must be quite unintelligible when uttered to the outside art public on such a campaign as the present. Now it must never be forgotten that painting is a language. Every work of art must be the expression of an idea, whether the idea be abstract or concrete; and this equally applied to purely decorative art, of which the main object was to express beauty—for beauty, in some one form or another, would be a constantly recurring idea, or the work could not be decorative. In the art of painting they must never lose sight of this principle, and the picture would be good as a work of art according to the manner in which the idea it expressed, and the value of the idea it expresses. One of the great difficulties of their art was that the language in which the idea was expressed was necessarily so important, and in the hands of a master of it was sometimes so powerful, that the idea was forgotten, and the mere expression of it stood out as the successful end and aim of painting. Nevertheless, it had been found in the past, and he did not believe the future of art would reverse it, that the idea, the motive, the mental force and intention of the artist and his idiosyncrasy must be interwoven with and over-ride the mere expression of language in any work which had art enough in it to make it live. And this, he believed, held true in all the walks of painting, whether the work be portraiture, historical, domestic, landscape, or decorative. Now, in painting there was, and ever would be, a never-ending struggle between two extremes, *—realism on the one hand, and idealism on the other.* A perfect union and balance of the expression, the language on the one side, and the idea on the other, might be called the mean. National temperament, as well as the idiosyncrasy of the painter, would go far to decide towards which extreme he would lean, and the bent and spirit of the age in which he lived would do the rest. For if painting was a language, and expressed the ideas of the painter, it must necessarily express those of the age which had produced him. Now, two questions presented themselves. First, What is the predominating force of this age? Secondly, Is it one calculated to help or retard the cause of art? It was easy to answer the first. Whatever might have been done in other lines of human energy during the Victorian age, there could be no question that its most remarkable achievements, both theoretical and practical, had been those of science. The art of the painter had not escaped its influence. On one side, and a very important one—that of realism—the side which furnished the language, *i.e.*, the signs and symbols to express the ideas of the artist, there was a wide front open to the influence of science; and on that side art had not been slow or unwilling to follow the advice of science, or ungrateful for the valuable help it had afforded. They would now try to answer the second question. Would this influence help or retard the cause of art? His answer was, that it might do either according to the manner in which it was received and used by the artist. If a painter resolutely held the belief that painting was a language and a work of art, the expression of an idea, and used science, and all that it had discovered and taught to enable him better to understand his signs and symbols, *viz.*, the material facts of nature, so that by means of them he might express himself correctly, then the cause of art would be much advanced by science, and works produced under its influence would be stronger and richer than they could possibly have been without it. On the other hand, if the painter allowed this scientific knowledge of the material or realistic part of his work to obscure the purely artistic and ideal part of it, to obscure instead of intensify the idea, and if, carried away by the material wonders of the "thing" which science had unfolded, he forgot the thought altogether, then, assuredly, however true he might have shown himself to be to the cause of science, that of art would suffer at his hands, *—indeed, might be lost altogether.* For he felt sure that most of his brother-artists would agree with him that it was possible for a picture to be scientifically true and have no art at all in it, and, on the other





THE BUILDER, NOVEMBER 16, 1889

PROPOSED CHURCH OF  
**S. PETER, FALING.**  
MR J D Sedding, F R I B A Architect

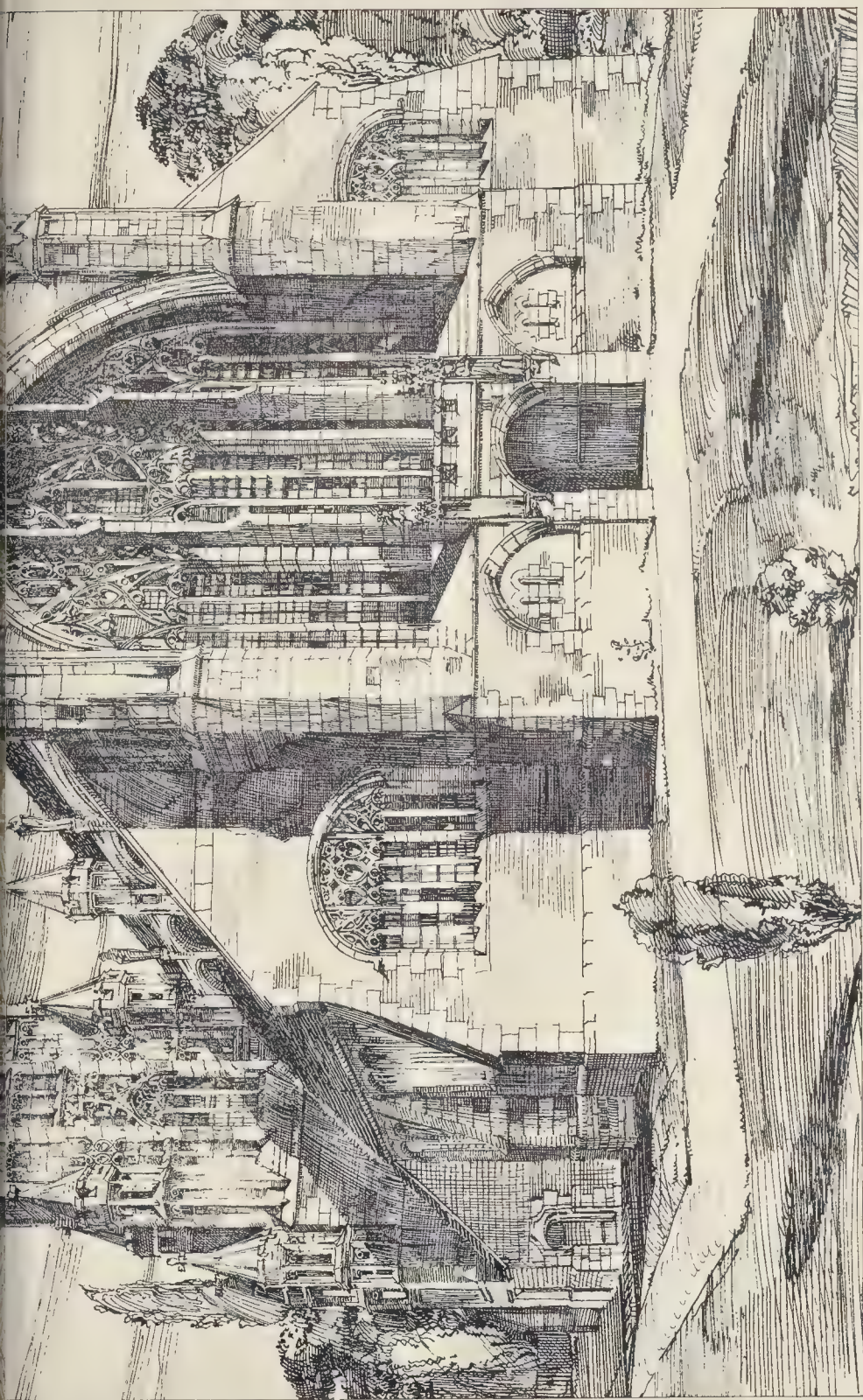


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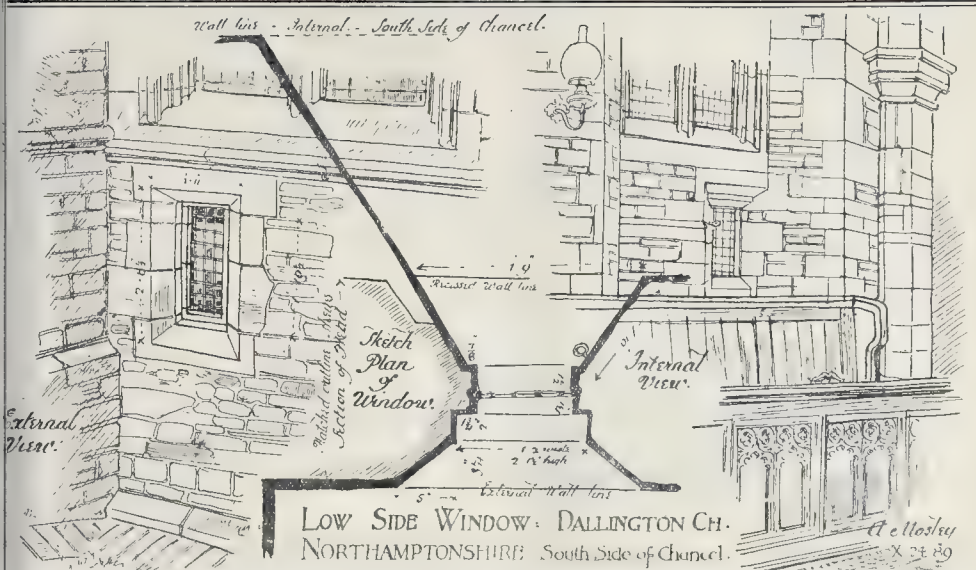












LOW SIDE WINDOW: DALLINGTON CH.  
NORTHAMPTONSHIRE: South Side of Chancel

to, to contain several scientific blunders and be a great work of art. The simple narrative of a work of art, to constitute a work of art and more than a photograph, could be considered a work of art, and for the same son,—viz., the material constituents of both are absolutely impersonal; and it was the personality of the artist, the impress on the work the artist's own mind and intention, adequately expressed, which gave the art. Mr. Ibbert went on to consider what were the influences in the world of art which isolated and checked this powerful scientific power, and to consider their chances of holding a balance against it. But before discussing them they might perhaps spend a few moments to consider the kind of work which would be produced without them, and what it would go to satisfy the art-craving man. Realism in one form or another must be the outcome of a purely scientific impulse, whatever its form, and however dissimilar the methods of its different schools might be, a single aim must be to register accurately the external aspects of things as they appeared on scientifically observed. There was a lesson so wonderful that it arrested their attention, and for the moment paralysed the imagination. It was to complete in itself that it seemed almost a failure, and the painter, at least, who had spent so many years in striving to attain some part of the manual dexterity necessary to produce such a result, this kind of materialism is indeed fascinating and astonishing; though on him its influence might not be permanent. But mere realism, however wonderful, could never give entirely adequate food to those who, without special technical knowledge of painting, were anxious to receive and enjoy whatever there was in art that their own powers were able to assimilate. To them mere realism could never prove sufficient, since it would only satisfy a part, and that the smallest part, of their craving. Those undisciplined lovers of art would, in nine cases out of ten, be the more imaginative of their fellow-countrymen, and they would be interested in art, since in it they hoped to find food for their imagination. Goethe says, "For what is the life in itself? We take delight in it when it is represented with truth,—nay, it may give us clearer knowledge of certain things, but the desire to our higher nature lies alone in the art which proceeds from the heart of the artist." Mere realism could never be this; to complete it was, the less it could be so, so as by no means the most realistically perfect work which excited the imagination. A line, a few colours, would often set the mind travelling when a piece of finished realism was confined to a point, and that perhaps a very low one. Was it not an inseparable part of the highest order of work that

should excite imagination in the beholder; that it should not give glory, but also promise glory; that it should be suggestive. Where, in the capacity to stir the imagination, the finished statue which could stand beside the fragment? or the complete building which could match the ruin? From this point of view mere realism could never give them all that they wanted. But what should they say on the score of beauty, without which art worthy of the name could hardly be said to exist? Would mere material realism give them this? Would the scientific method of observing nature and the scientific bias of the age give painters any help in their search for it? Could a faithful narrative of natural phenomena ever give them more than accidental and detached scraps of beauty? But of that beauty which was essential in its character, and could only be evolved by selection and the clearest artistic insight and experience,—that beauty which was the result of patient and persistent elimination of all that was unnecessary and crude,—of beauty of such a kind how much will mere material realism give them, when it is obliged to buy itself quite as much with what was crude and unnecessary? This brought them naturally to the forces which were required to counteract and regulate the purely scientific interest and an appreciation of mere realism. These forces, broadly speaking, were idealism and tradition. In connexion with the first he noted with regard to the heroic periods of art-history this remarkable fact, that they were as strong on the actual as they were on the imaginative side of art, and that not only was their ideal art excellent, but that their mere technical work was also excellent. The dignity and power of a thought would generally give clearness and symmetry to the expression of it, and the painter who felt strongly would seldom express himself weakly. Discouraging on tradition he showed how one art-period influenced that which succeeded it, and argued that a standard of historical excellence in art must not only be of abiding value to counteract any momentary influence or fashion of a particular period, but there it was, perhaps, the only means by which any kind of art-standard of a universal, and not merely national character, i.e. the outcome of certain accident of race or climate, could ever be evolved. In concluding, he said that the cultivated and intelligent section of the art-public was not only to be the judge of the artistic effect of its relics, its imagination, but also of its knowledge. If this section of the public relied only on its knowledge, in nine cases out of ten it would be brought face to face with the fact that it had had no special training in a technical art so difficult that many painters, after a lifetime spent in grappling with it, were compelled ruefully to acknowledge to themselves that painters, in the

true sense of the word, they should never be. On the other hand, there were qualities, some of them, and others the product of the kind of culture, that appealed to the people, which would not only help the possessor of them to appreciate a good work of art, but without which some, and those not the least important properties of every good work of art, could not be truly estimated or appreciated at all. Beauty, in its widest sense, grandeur, impressiveness, fitness, and, above all, sincerity,—these, embodied in a concrete form, were within the province of painting, and without many or all of these qualities a painting would never be really good. Catholicity of taste in its widest form was what they wanted to cultivate in those outside their painting class; the receptive, not the creative world of art. The wider the range of sympathy, the wider would be the range of pleasure and profit derived. If any of the work of this Victorian painter was destined to appeal to a permanent interest in the great chain of art-history, he dared venture to prophesy so far as to name the chief characteristics of that work, by whomsoever it was done, of whatever class or order of painting it might be, and to whatever school it might belong. He believed, in the first place, that it would be perfectly sincere work,—the outcome of what the artist really believed was what he wanted to do, and must do, whether his contemporaries believed in it or not. Secondly, he believed that it would be work in which the realism, however admirable it might be, was used not only for its own sake, but as a language in which to express the mind of the painter, in which the real should be so leavened with the ideal that the picture was never a mere transcript, but a translation of Nature,—in short, that the expression of an ideal. Finally, he believed that however apparently revolutionary its aims, and however original, and even eccentric, some of its methods might appear, it would, in the main, be in harmony with and founded upon the great traditions of the past.

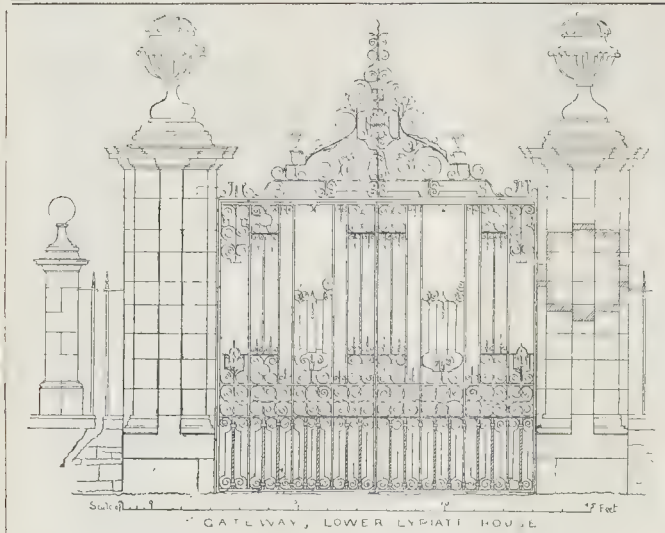
LOW SIDE WINDOW, DALLINGTON,  
NORTHAMPTONSHIRE.

THIS window is situate in the south side of chancel,—close by respond pier receiving the chancel arch. Over it is a modern window. An iron hook, which probably received the hinge of the original door, still remains, and is indicated on the sketch plan.

A. MOSLEY.

**St. Saviour's, Southwark.**—The Bishop of Rochester presided on Tuesday over a meeting convened to inaugurate the work of restoring this church. The scheme will cost 35,000*l*.





### Illustrations.

#### NEW CHURCH OF ST. PETER, EALING.

**W**E give a reproduction of the exterior and interior views of the design made for this church by Mr. J. D. Sedding, in an anonymous competition, into which, however, only three architects appear to have entered. Mr. Sedding's very picturesque and original design was formally accepted by the Committee a few days since, and is, we presume, to be carried out.

The plan and interior view, taken together, will show the reader the characteristic and original arrangement of the nave piers and arches. The effect of the heavy plain tie-beams across the springing of the roof we confess we do not admire, and we wish Mr. Sedding would reconsider the matter and dispense with them, which it is certainly possible to do; they spoil a fine interior.

In the plan it will be seen that all exits are from the ends of transepts and nave, with no side entrance to the nave. It is proposed that the school-children should occupy the south transept, and have the door into it for their special use, so as not to disturb the congregation.

A curious feature in the decorative design is the introduction of the four heart-shapes into the tracery of the circular end window, as will be seen in the interior view.

As to the estimated cost and proposed materials we have no details at present.

#### BRASS OF ROGER THORNTON (1429): ALL SAINTS, NEWCASTLE-ON-TYNE.

This brass was originally on an altar-tomb. It is now placed on the vestry wall.

It consists of the figures of Roger Thornton and wife under a super-canopy in two tiers, the lower of which shows the soul held by angels in a cloth, and in the upper there is seen the soul placed on the lap of the Divine Personage. On either side, and also between the principal figures, are canopied niches, containing the figures of various saints, with their emblems. On the side next to the inscription are small canopied niches containing figures in the habits of monks. An inscription runs round the outer edge, shields of arms being placed at the centre of either end and side of it. The Evangelistic symbols are at the corners.

The illustration is from a rubbing by Mr. Andrew Oliver, who has made a special study of brasses; the original formed one of the illustrations to a paper on the subject read by him on Tuesday last before the St. Albans Archaeological Society.

#### ARCHITECTURE ABOUT THE GOLDEN VALLEY, GLOUCESTERSHIRE.—III.

EAST of Stroud is a lofty range of hills descending abruptly to Todmoor on the further side. On this ridge are Lower, Middle,

and Upper Lypiatt. The latter adjoins the village of Bisley, where are many picturesque "bits." The mansion is new, but incorporates portions of an old house of some importance and historical interest. Middle Lypiatt is evidently,—from its likeness to other dated specimens,—of the latter half of the seventeenth century. The whole collection of farm-houses, out-houses, stables, cottages, &c., seem to be of the same date, and may be commended to any student wishing for a plan of a home-stead of that period.

Lower Lypiatt is a house of considerable interest, a paper on which was lately read by Mr. C. Wethered, of Stroud. It was built by Chas. Coxe, a Welsh Judge, about 1690. It is a curious square house, of prim form. The front and back windows have sash-frames, but at the sides the windows have transoms.

The house is only partly inhabited, and is falling to ruin, and would be an excellent home for a ghost. There are some interesting remains of embroidered hangings and other things; but visitors are not welcomed. The porch is a very beautiful piece of delicate Classic work, remarkable also for the absolute preservation of the stone, although exposed to the full blast of the western wind.

There is a courtyard in front, closed in with a handsome screen of stone piers and iron railings, and a splendid pair of wrought-iron gates,—alas! fast going to ruin. A sketch of these is subjoined. The story is, that the Judge reprieved from death a certain blacksmith, on condition that he made the gates; but it is evident that the house and its belongings were the work of no mean architect. In the wood adjoining this house is an obelisk, of the date of the house, to the memory of a horse who died at the age of forty. The view from the top of this house, or from the Limekilns, a little further, is as beautiful as anything in England.

The house in Stroud is dated 1686. The oval window in the gable retains, as is rare, its original lead-glazing. The king's arms is another variety of a form of which I have already given several examples.

Hazleton is a large farm settlement, standing in an isolated position on the site of an old Benedictine priory. The very fine old barn of the priory remains, with an inscription of the twelfth or thirteenth century. The doorway to the house is of good character, and I propose to give a measured drawing of it.

Frampton Mansell manor-house has an orderly stone front, with a bold cornice of stone curiously finished at the two ends.

RALPH NEVILL.

**Editorial Correspondence.** The Editor of this journal begs to intimate that he cannot undertake to attend to correspondence in connexion with the business of the paper which is sent to him at any other than the proper address—viz., the Office of the *Builder*. All communications should be addressed there, and not to any private address.

#### THE SURVEYORS' INSTITUTION: THE PRESIDENT'S ADDRESS.

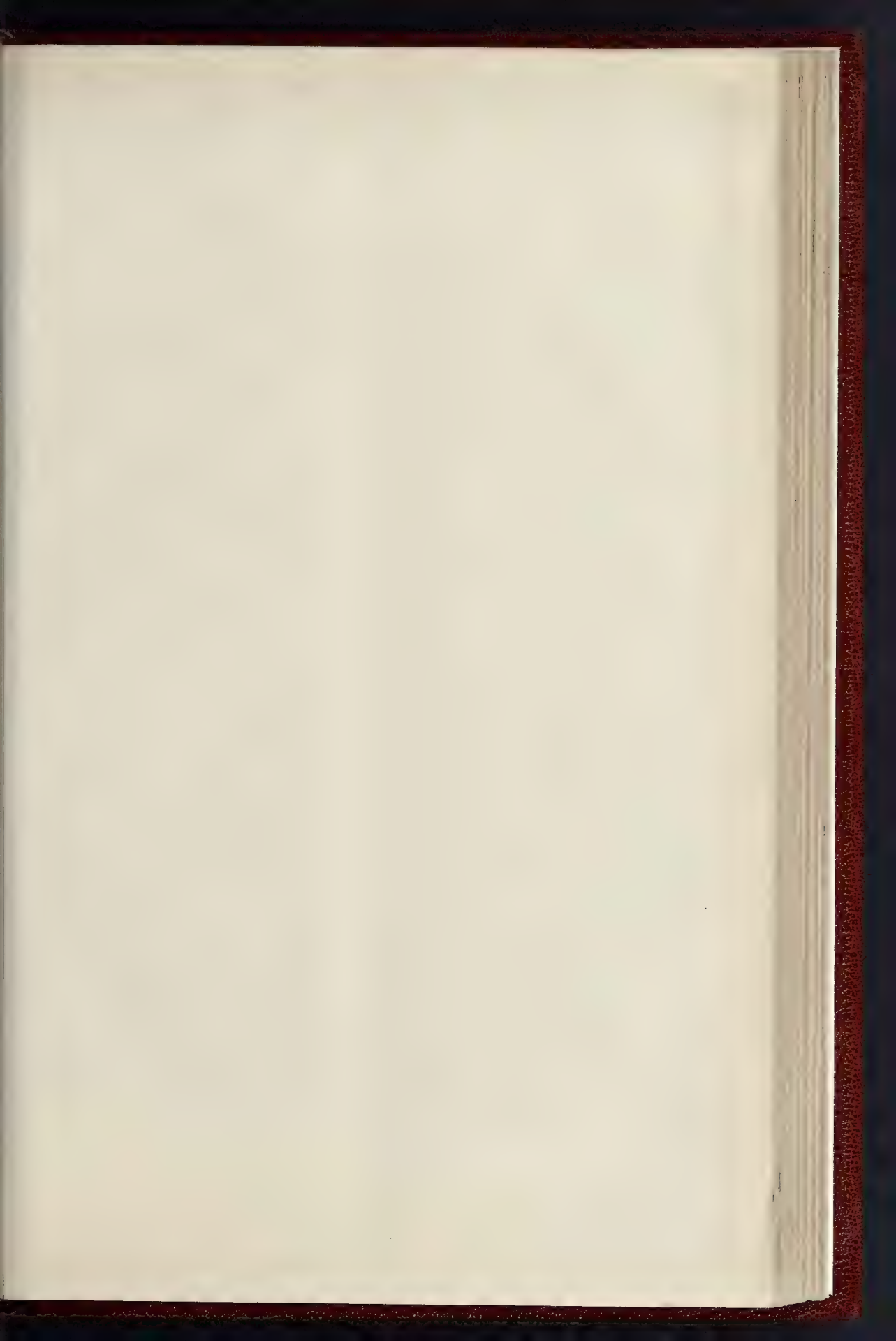
THE opening meeting of this Institution was held on Monday evening last, when an address was delivered by Mr. Elias Pitts Squarey, the President. We extract the following passages:—

Let me, in the first instance, congratulate you on the continued and advancing prosperity of our Institution. At the commencement of my Presidency we numbered fourteen Honorary Members, 784 Fellows, 333 Professional Associates, 90 Associates, and 102 Students, or 1,323 of all classes. The total number now stands at 1,448, besides a large number of new Members (nearly 100) in various stages of election. Nor is it unreasonable to look forward to a continuously-increasing accession, consequent upon the widely-extended and yet extending influence of our Provincial Committees. This new departure has, in many districts, more than fulfilled the expectation of the Council in bringing into relation with our Institution many who (resident in distant localities, with possibly infrequent opportunities of visiting London) are thus brought into immediate and sympathetic communication with us and with each other. The extension of these Committees will, doubtless, strengthen and consolidate our Institution, will widen its influence, will tend to disseminate its valuable literature, and will afford an increased area of selection for representatives on the Council. I may also mention, before proceeding to general topics, that the Council have authorised the holding of a few so-called Junior Meetings during each Session, to be attended only by Examiners and Students under thirty-two years of age. It is believed that meetings of the kind can hardly fail to be useful in training the younger Members in literary habits, and in cultivating the power of speaking in public.

The legislation of the past Session is of considerable interest. Among the Acts which received the Royal Assent, the Board of Agriculture Act is most acceptable, and likely to be most eminently useful in all matters relating to land. Clothed with the powers of the Privy Council under the "Contagious Diseases (Animals) Act," it undertakes the various and comprehensive duties of the Land Commission, so courteously and ably fulfilled by our Honorary Members, Sir James Caird and Col. Leach, together with the authority and responsibilities of the Commissioners of Her Majesty's Works and Public Buildings under the Survey Act of 1870; the collection and preparation of statistics relating to agriculture and forestry; the inspection of schools, in which technical instruction is given in agriculture or forestry, and overlooking the examinations incident thereto, and the making of such research and experiments as may be thought important for the advancement of agriculture and forestry. The new Board will happily constitute an office from which information and advice upon every matter connected with land, with agriculture, and the varied interests relating thereto will be afforded. . . . At last, too, a status is given to education in forestry. It is remarkable that the United Kingdom, producing, probably, as fine and valuable timber as any part of the world, should have afforded no means of education in the direction of home forestry. Arising out of this Act, the Council of the Institution have prepared a complete system of Special Examination in this subject, as well as in Sanitary Science and in Land Surveying and Levelling. These Special Examinations, which are confined to Members of the Institution, are likely to be of great service to young practitioners, to whom a new opening of usefulness and advancement is thus furnished. . . .

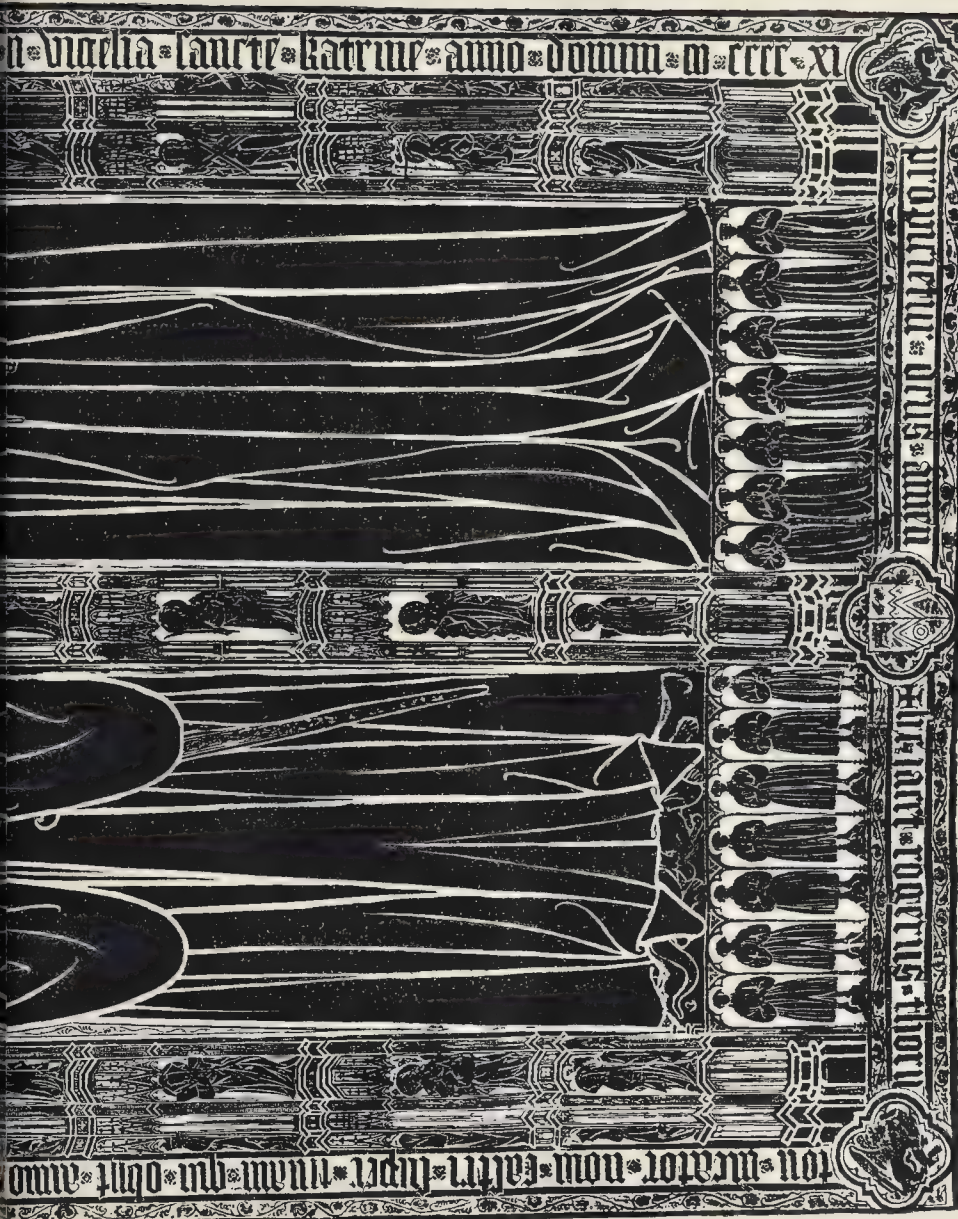
The Arbitration Act is of abundant interest to this Institution. Brought in by the Attorney-General whose wide yet technical experience in all matters connected with arbitrations enables him specially to deal most capably with these matters, this Act repeals portions of the Common Law Procedure Act, 1854, and other Acts relating to arbitration, makes the submission irrevocable, unless the contrary intention is expressed, or by an order of a judge, and gives to it the effect of an order of the court. Certain provisions set out in the schedule are to be implied in all submissions to arbitration, in the absence of any stipulation to the contrary. These provisions would seem to relate to the appointment of arbitrators, the time for making awards, the power to call and examine witnesses on oath in matters incident to the reference







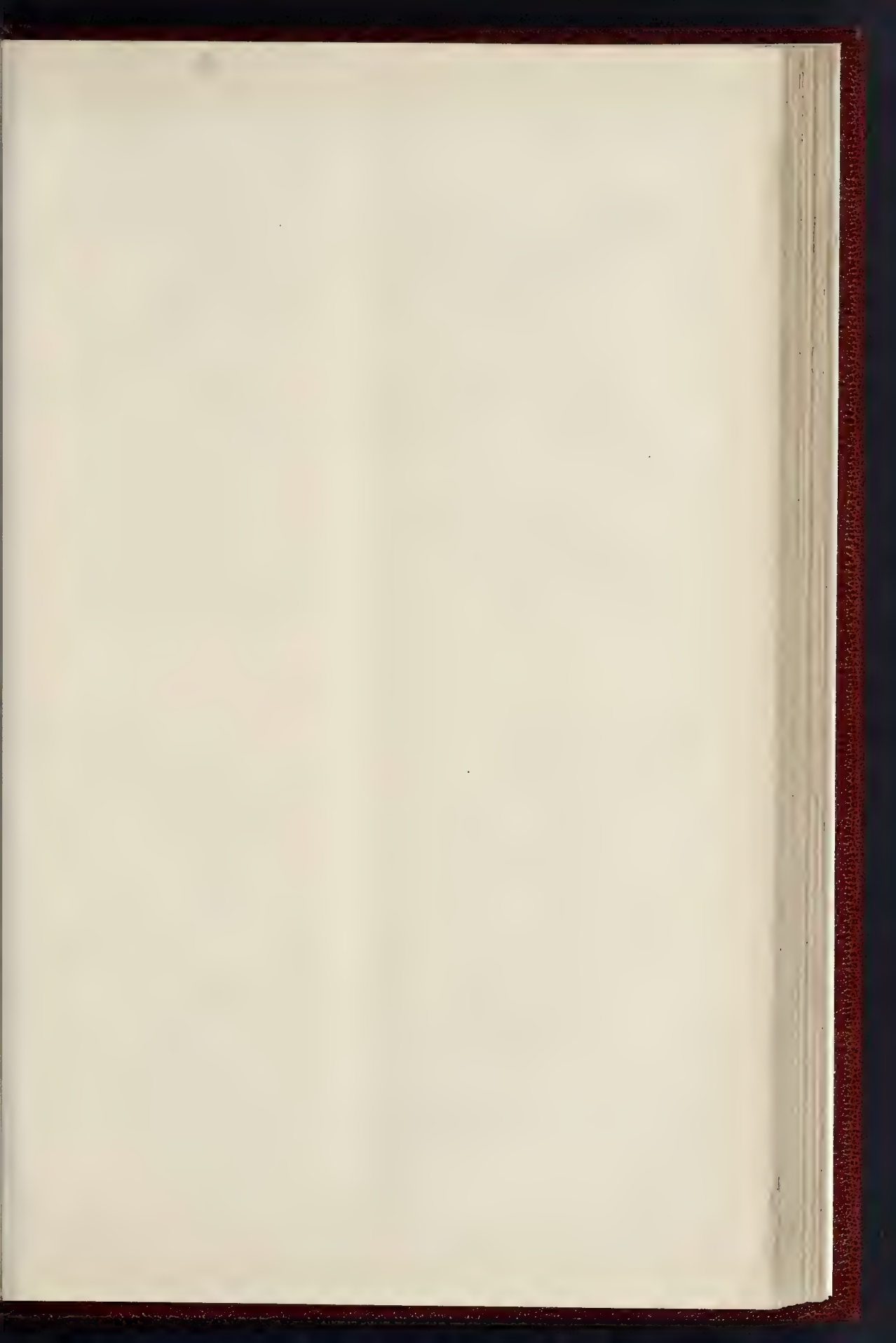




BRASS OF ROGER THORNTON: ALL SAINTS CHURCH, NEWCASTLE-ON-TYNE. (DATE 1429.)









HAZ ETON



WINDS ARMS S.T. D.



FRAMPTON VANSELE MANOR



IN STROUD





CHAMBERS FARM



LOWER LYPATT HOUSE



BOALTON FARM

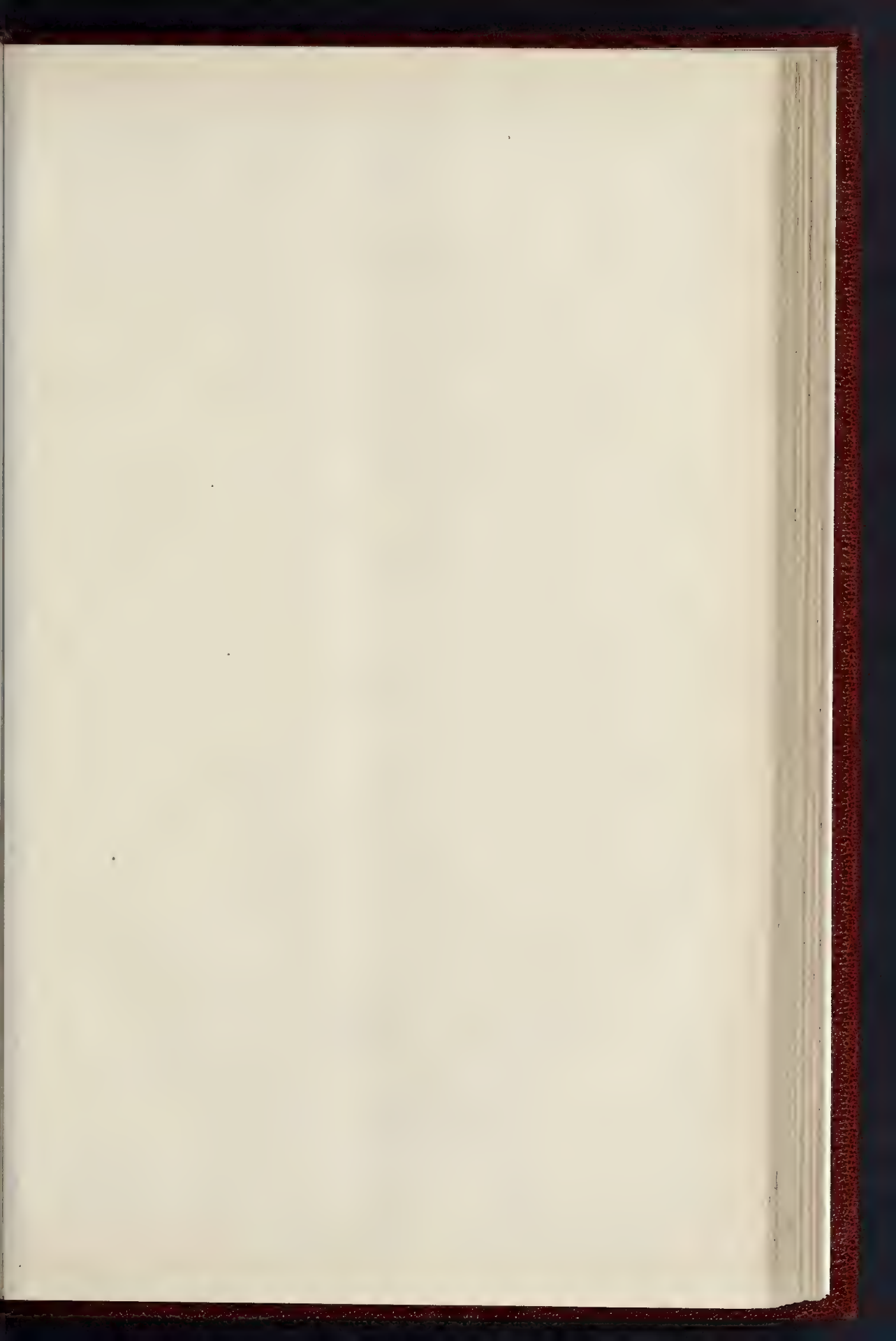


MOUNT FARM

SKETCHES ABOUT THE GOLDEN VALLEY, GLOSTERSHIRE. --By MR. RALPH NEVILL, F.S.A.







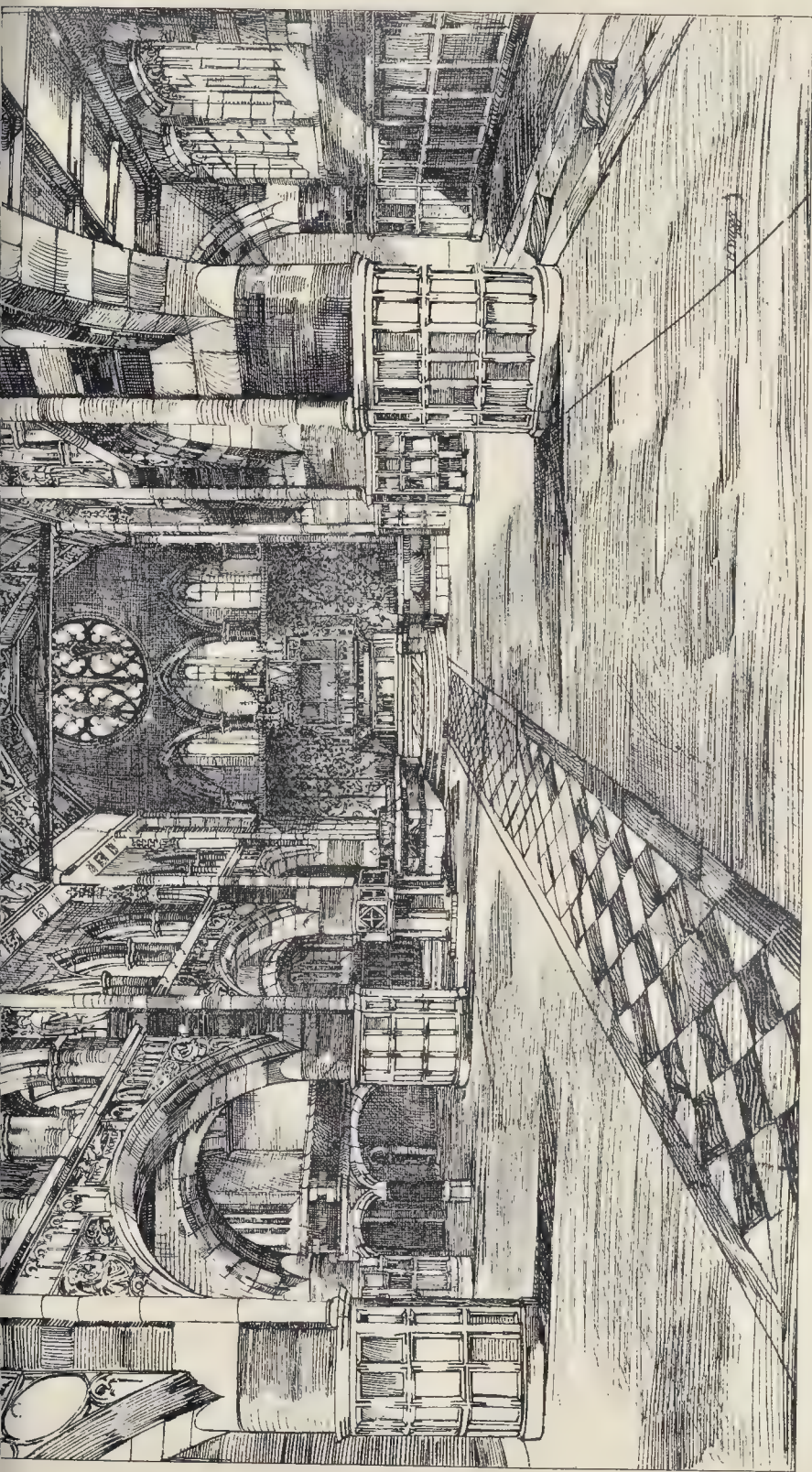
THE BUILDER, NOVEMBER 16, 1889

# PROPOSED CH of S. PETER FALING.

M<sup>r</sup>. J. D. Sedding, F.R.I.B.A., Architect.











within the discretion of the arbitrators or umpire; the production of books or documents having bearing on the matter at issue, and a power to compel the attendance of witnesses, on subpoena. The effect of this Act is to materially strengthen the hands of arbitrators or their umpire in every reasonable direction.

As most of those whom I address are aware, the question of rating advertising stations has been a subject of some difficulty. An Act, called the Advertising Stations Act, which received the Royal assent this year, provides for the rating of unoccupied or occupied premises in respect of increased rental value derived from their application to this purpose. The occupier is the person liable to be rated, not the advertising contractor. The power is reserved to the local authorities to enable them to prohibit or sanction the use of temporary hoardings for advertising purposes, subject to a payment or some other equivalent consideration. . . .

Before concluding, I cannot forget that this opening address marks the not distant termination of my occupancy of this chair. To be, for the time being, the official head of one's profession is a distinction of which any man may well be proud, and doubly so when he is called upon to preside over an institution so full of vitality and promise, and so intimately identified as this is with some of the most important interests in the arena of human affairs.

I am not of those whose faith fails them as regards the future of our profession. So long as separate ownership in property exists (which, I take it, will be so long as civilisation endures), the desire to acquire and the necessity for parting with property will continue to operate. Whoever the holders may be, they cannot afford to dispense with the skilled advice of those experienced in business transactions. The form of business may change; branches of practice may, in accordance with the modern tendency, become more specialised, but the business, I venture to predict, will remain and multiply after the present lull is over—the lull which, indeed, generally precedes all new developments.

We have taken upon ourselves, as an Institution, the duty of guiding the rising generation of surveyors in the path of exact knowledge which its predecessors would gladly have trodden had the opportunity existed. But no educational effort can endow the surveyor of the future with his best possession,—a candid and upright mind, and a desire to deal fairly as between all parties.

We have had brilliant examples to guide us in the past, and I doubt not that among those I see before me, possessing the ineffable glory of youth, there are many that will hand down the honourable traditions bequeathed to them by the generation that is passing away.

On the motion of Mr. W. Matthews, of Birmingham, seconded by Mr. Meadows White, Q.C., a vote of thanks was accorded to the President for his address.

#### THE LONDON COUNTY COUNCIL.

*Election of Presiding Officers.*—At the statutory meeting of this body, held on Thursday, the 7th inst., Lord Rosebery and Sir John Lubbock were unanimously re-elected Chairman and Vice-Chairman, respectively. With regard to the post of Deputy-Chairman, rendered vacant by the death of Mr. Firth, M.P., it was decided to reduce the salary from 2,000*l.* to 1,500*l.* per annum. Three nominations for this office were made, Mr. Fardell (who was a member of the late Metropolitan Board of Works), Mr. Alderman Gibb (Vestry Clerk of St. Pancras), and Mr. Councillor Haggis. When the names were first put, the numbers were:—Fardell, 51; Gibb, 19; Haggis, 59. Mr. Gibb's name having been dropped, the second voting resulted as follows:—Fardell, 51; Haggis, 61. Mr. Haggis was therefore declared to be elected, and he briefly returned thanks for the appointment.

*Death of the Chief Engineer.*—At the ordinary weekly meeting, held on Tuesday last, the Chairman (Lord Rosebery) said he had to make the formal announcement of the death of the valuable official whom they appointed so short a time ago as their Chief Engineer. He had only been with them two months, and it was not possible for them to have a long experience of Mr. Gordon's qualities, but he was quite sure that there was no member of the Council who came in contact with him who did not experience

the most ready courtesy from him, and who did not feel perfect confidence in his ability from the very first moment of coming in contact with him. He was afraid that not merely did Mr. Gordon's death fill them with regret at the loss they had sustained, but they could hardly have sustained a loss so severe at the present moment. They knew the enormous pressure there was on them to remedy the inadequacy of their main-drainage system. As their Chairman, he thought it his duty to call together the committee, composed of members of the Main-Drainage and Bridges Committees, who were appointed early in the year to consider the question of the appointment of a new Engineer. He thought the matter was so pressing, that though they were no longer a committee their advice—as being conversant with the question—would be most useful under the circumstances, and they came to the conclusion—which he confessed he also took—that there should be no delay in filling up the office. He did not think that it was necessary to renew the advertisement, and what he would propose was that the Council should reappoint these gentlemen as a committee to consider this question of the vacant office of Engineer. They were well versed in the claims of the different candidates they saw so lately: they would have power to summon any they might wish to see again, and they would even have power to see fresh candidates. They would be able in the light of common sense, free from the obstructions of red tape, to bring up a report as speedily as possible to the Council.

Mr. Rhodes, Chairman of the Main Drainage Committee, in expressing his regret at Mr. Gordon's death, said that in his opinion the stipend offered (1,500*l.* per annum) was not sufficient, and that they ought to take this opportunity of increasing it. This proposition, however, met with no favour, and

Sir John Lubbock moved that the suggestion of the Chairman should be adopted, and this was accordingly done.

The Chairman added that he was afraid that their late official had died under unfortunate circumstances, in some respects. He left his appointment at Leicester to come to them, and if he had died in that appointment he would, no doubt, have been entitled to consideration at the hands of the Council. It was a very difficult case to deal with. Of course, Mr. Gordon took the appointment as Engineer of the London County Council knowing exactly what the conditions were, and he had not been with them very long; but at the same time it was very melancholy to know that a gentleman whom they honoured so greatly should have died in circumstances which caused considerable concern to his family. He did not intend to make any proposal, but he would ask the Council to refer the matter to some committee so that they might bring up a report on the subject.

The matter was then referred to the Standing Committee, and on the motion of Mr. Marks, seconded by Mr. Harben, a vote of condolence was accorded to the family of the late Mr. Gordon.

*Gift of a New Park to London.*—The Chairman read a letter from Sir Sydney Waterlow, Bart., offering for the Council's acceptance, as a public park for London, some twenty-nine acres of land on the southern slope of Highgate-hill. The letter stated that "the grounds are undulating, well timbered with oaks, old cedars of Lebanon, and many other well-grown trees and shrubs. There are also  $\frac{1}{2}$  acres of ornamental water supplied from natural springs. The land is freehold, with the exception of  $\frac{2}{3}$  acres held on a long lease, of which 35 years are unexpired, and it is bounded almost entirely by public roads and a public footpath." For the purpose of acquiring the freehold interest in the  $\frac{2}{3}$  acres mentioned, or to defray the cost of laying out the estate as a public park, Sir Sydney further offered to pay the sum of 6,000*l.* The letter was received with great cheering; and on the motion of the Vice-Chairman, seconded by Mr. Gibb, and supported by the Deputy-Chairman (who said he hoped that the example set by Sir Sydney Waterlow would prove contagious), thanks were accorded to the munificent donor.

*The New Asylum Buildings.*—The Asylums Committee report as follows:—"Your Committee have to report that, in pursuance of the resolution of the Council of the 22nd ultimo," they have again considered the tenders received

for the execution of the works for the extension of the County of London Lunatic Asylum at Cane-hill, near Coudon, a list of which was submitted to the Council on the 15th ultimo. After making careful enquiry as to the capacity of several of the firms who sent in tenders to execute works of the character and magnitude of the proposed extension, your Committee have come to the conclusion that it is desirable that the contract should be entrusted to Messrs. Peto Brothers, of Pimlico, and they recommend—

"That the tender of Messrs. Peto Brothers for the execution of the works for the extension of the County Asylum for pauper lunatics at Cane-hill, Coudon, for the sum of 25,447*l.*, be accepted."

"Your Committee have also to report that they have taken the steps necessary for giving effect to the resolution of the Council of the 22nd ultimo,\* accepting the tender of Mr. E. Gabbutt, for the erection of the superstructure of a new County Lunatic Asylum at Claybury, near Woodford, Essex. It has been represented to your Committee by Mr. Gabbutt that, in consequence of the delay that has taken place since the tenders were sent in, the difficulty of completing the works under the contract by December 31, 1891, is much increased, and the Architect to the Asylum has informed your Committee that he is of opinion that the time for completion should be extended to March 25 following. With this opinion your Committee concur, and they ask the Council to extend the time accordingly. Your Committee submit the contract for the execution of the work, and recommend,—

"That the contract with Mr. E. Gabbutt, for the erection of the superstructure of the asylum at Claybury, be approved, that the time for the completion of the works under such contract be extended to March 25, 1892, and that the following documents be sealed."

The second of these recommendations was agreed to without discussion, but the first recommendation led to a good deal of debate, arising out of the fact that since the report and recommendation were drafted, Messrs. Peto Bros. had informed the Committee that mainly owing to the rise in the price of iron since the tender was sent in, the tender could not stand except by the addition to it of a sum of 1,400*l.* Under these circumstances the Committee withdrew the first recommendation; but eventually, on the motion of Alderman the Hon. R. C. Grosvenor, it was decided, by fifty votes to forty-five, to refer the report back to the Committee, with instructions to recommend the acceptance of Messrs. Peto's tender as amended by them.

After the transaction of some other business, the Council adjourned.

#### THE SCHOOL BOARD FOR LONDON AND ITS BUILDING CONTRACTS.

At its meeting on October 31, the Rev. J. R. Diggle, Chairman, presiding, the Board resumed the debate† on the following motion and amendment thereon:—

Moved by Mr. Barnes, seconded by Mr. Lynn,—

"That the resolution of the Board of February 21, 1889, shall be interpreted in the following sense:—Where a division contains more than six schools, the Works Committee shall give contracts for general repairs and painting to separate contractors for groups of schools not exceeding six in each group."

Moved by Professor Gladstone, seconded by Mr. Whiteley,—

"That the proposed resolution be referred to the Works Committee for consideration and report."

The Chairman said he had received a letter from the honorary secretary of the builders' deputation, stating that they had intended to have asked to be again introduced to the Board for the purpose of answering further questions that they believed some members of the Board wished to put to them; they had, however, resolved not to do this, but to ask the Chairman to tell the Board that they agreed to the grouping of the schools, as suggested in Mr. Barnes's motion, provided it was made clear that the work was to be done under the Board's schedule of prices.

The Hon. Lyulph Stanley, in resuming the debate, said he understood that Mr. Bourke, the originator of this debate, was willing to accept Dr. Gladstone's amendment. If that was so, the Board need not now further discuss the question. Mr. Bourke said Mr. Stanley had understood aright.

\* See Builder for Oct. 26 and Nov. 9.

† See Builder for Nov. 2, p. 315.

\* See Builder for Oct. 26, Nov. 2, and Nov. 9.







committee would pass away, and many more pensioners could be elected (applause).

Mr. R. L. Curtis (Mayor of West Ham) proposed "The Worshipful Company of Carpenters." It was an immense advantage, he said, to have the annual dinner of the Institution in that noble hall instead of in some City tavern, the Company having the utmost sympathy in every branch of the building trade.

Col. Banister Fletcher (Master of the Company) replied, and expressed the pleasure that it had given to the Court to be able to assist the Institution. The Company was also doing all in its power, by the establishment of technical schools and examinations to advance the craft, and he hoped the builders themselves would give the work their help and countenance.

Mr. Alexander Ritchie next gave "The Health of the Chairman and President," adding that Mr. Hobbs was a man of many parts and great qualifications, and that it would have been difficult to have selected a man better able to fill the presidential chair.

The toast was drunk with acclamation, and the Chairman suitably replied.

Sir George Chubb proposed "The Architects and Surveyors."

Mr. H. Chatefield Clarke responded, and expressed the interest which the architect felt in the builder; in fact, nothing could be more trying to the architect than to feel that the builder and contractor had come badly out of a job. The great buildings of the metropolis showed that the architects were doing their best for London of the present day. He also bore testimony to the work of the surveyors, and the esteem in which they were held.

Mr. W. H. Gibson gave "The Vice-Presidents, Committee, and Stewards," which was responded to by Messrs. W. Shepherd and C. Bussell. The concluding toast was that of "The Ladies."

In the course of the evening subscriptions to the amount of 912*l.* were first announced, of which sum 674*l.* appeared in the President's list. A further appeal from the chair realised another 50*l.*, when the Chairman intimated, amidst applause that he would make up the amount to 1,000*l.*

#### ARCHITECTURAL SOCIETIES.

**Manchester Architectural Association.**—The first ordinary meeting of this Association was held on the 5th inst., when the President (Mr. J. H. Woodhouse) delivered the opening address of the session. Referring to competitions, he said it was a mistake to compete unless there was a professional assessor or assessors, and he only wished they were so unanimous a body that they could compel all promoters of competitions to agree on this point. He advocated the taking-out of quantities by the architect, but insisted on the same being done with every care, and made as explanatory as possible, leaving no doubt in the mind of the builder as to his (the architect's) exact meaning and intention. He also referred to the proposed affiliation with the Royal Institute of British Architects, and to the communications received from the Manchester Society of Architects advocating the formation of one society instead of two as at present. A hearty vote of thanks to Mr. Woodhouse for his address was moved by Mr. A. H. Davies-Colley, seconded by Mr. Chadwick, supported by Messrs. Hodgson, Mee, and Potts, and carried unanimously. Thirteen new members were nominated, and a number of donations to the library were announced.

**Sheffield Society of Architects and Surveyors.**—A meeting of this Society was held last Tuesday night at the School of Art, Mr. C. J. Innocent, Vice-President, in the chair. Mr. J. Lancashire was elected a student of the Society, and Mr. W. Teather was also nominated by the Chairman. A letter was read from the President (Mr. F. Fowler), apologising for his non-attendance, owing to a long-standing engagement. Mr. W. H. Lancashire read a paper on "Engineering Surveying for Railways and Waterworks." He observed that the question of cost would not enter into his paper so much as his own experience of from twenty to twenty-five years of the work required from the surveyor and engineer in Parliamentary practice to comply with Standing Orders. In railway practice, nowadays, the surveying work was done by the staff of the company's own engineer, Ordnance Survey and town or district large scale maps being utilised in the preliminary work, and the Ordnance levels in laying out contours. Mr. Lancashire went on to describe

the details of the finished surveys and levelling, and insisted upon the importance of checking levels taken. One in a hundred was considered a dangerous gradient twenty-five years ago, whilst with modern types of engines and rolling stock it was thought little of. Passing on to describe waterworks construction, he pointed out that the first considerations which presented themselves were population, trade supply, source, and a careful estimation of the rainfall and gathering-ground of a district. He concluded by a technical description of the various processes gone through in the construction of a great reservoir.

#### OBITUARY.

**Mr. Joseph Gordon, M. Inst. C.E.**—We announce with great regret the sudden death of Mr. Joseph Gordon, M. Inst. C.E., who was elected in July last (see *Builder* for July 13, p. 31) to the important position of Chief-Engineer to the London County Council, in succession to Sir Joseph Bazalgette, resigned. He entered upon the duties of that office on September 1. Mr. Gordon, who was fifty-two years of age, died on Saturday morning, the 9th inst., in an omnibus, while on his way from his residence at Hampstead to his office in Spring-gardens. Mr. Gordon, who was born at Haltwhistle, Northumberland, in 1837, began his professional career as an articled pupil to the late Mr. James Hogg, City Surveyor of Carlisle, an office which he himself subsequently held from 1860 to 1866. He prepared many plans for the draining of large towns in the North of England and Scotland. In 1866 he was appointed to design and carry out a very important sewerage scheme at Frankfort-on-Main. He also prepared plans for the sewerage of Stuttgart, Heilbronn, Munich, Nuremberg, Hamburg, Aix-la-Chapelle, and other Continental towns. In 1880 he became Borough Surveyor at Leicester, where his extensive operations greatly reduced the death-rate. He carried out flood works costing over 380,000*l.*, and he also designed the sewerage works now in progress, which will cost over 300,000*l.* He was elected an Associate of the Institution of Civil Engineers in 1862, and a Member of the Institution in 1874. He was President of the Association of Municipal and Sanitary Engineers and Surveyors for the year 1887-88, and his able presidential address will be found reported in the *Builder* for July 23, 1887. In our pages for October 22 of the same year will be found a detailed description (with illustrations) of the flood prevention works carried out by him at Leicester.—Dr. G. Danford Thomas held an inquest on the body of the deceased on Monday, when medical evidence was given to the effect that death was due to syncope whilst the deceased was suffering from a weak heart.—The funeral took place on Wednesday, in the Leicester Cemetery, leaving St. Pancras Station by the 10.30 a.m. express, the following members of the Association of Municipal Engineers attending, viz., Mr. Boulnois (President), Mr. Angell and Mr. Jones (Past-Presidents), Mr. Robson, Mr. McKie, Mr. Meade, Mr. Lowe, and Mr. Thomas Cole (Secretary). The London County Council was represented at the funeral, as was also the Corporation of Leicester.

**Mr. William Millican, J.P., F.R.I.B.A.,** of Leicester, died on the 3rd inst., after a prolonged illness, in his fifty-ninth year. Mr. (or as he was better known locally) Colonel Millican was, according to the *Leicester Advertiser*, articulated to Mr. Wm. Flint, architect, Friar-lane, Leicester. He eventually succeeded in building up an extensive practice, and erected many important buildings in the town. He took a very active part in the Volunteer movement, as well as in municipal affairs, and was a magistrate of the borough. He was elected a Fellow of the Royal Institute of British Architects in 1878. His remains were interred in the Leicester Cemetery on the 7th inst.

**Mr. John George Gamble, C.E.,** died a few days ago, in Dublin, of typhoid fever, at the age of forty-seven. According to the *Times*, he was a pupil of Sir John Hawkshaw, and was engaged under him on several important works. In 1875 Mr. Gamble was appointed hydraulic engineer to the Cape Colony, a position he held for more than ten years, encouraging storage and irrigation, and constructing large and valuable works. He returned to England in 1886, and shortly afterwards was appointed chief hydraulic engineer to the Government in Ireland, in which capacity

he has been engaged for the last two years in preparing plans for the improvement of the three important rivers, the Shannon, the Barrow, and the Bann, to carry out the recommendations of the Royal Commission on Irish Public Works. The loss of his services will be greatly felt in respect of these important undertakings.

#### The Student's Column.

##### WATER-SUPPLY.—XX.

##### LONDON WATER-SUPPLY (continued).

##### Nature of the Geological Strata.

**I**N the preceding article we gave the thicknesses of the several geological strata, &c., met with in well-boring under the metropolis, and now we propose to describe their nature, in so far as it affects the methods of constructing and making the wells. The following is a summary in descending order (geologically) of the different strata met with in and around London:—

1. Drift Gravel, &c.
2. Bagshot series.
3. London Clay.
4. Oldhaven and Blackheath series.
5. Woolwich and Reading series.
6. Thanet series.
7. Chalk.
8. Upper Greensand.
9. Gault.
10. Lower Greensand.
11. Jurassic.
12. Trias. (?)
13. Devonian.
14. Wenlock beds, (Silurian).

Above all these we have, especially in the City and in those parts of the London area early settled upon, a certain thickness of made ground,—the *débris* and accumulations of successive buildings, rubbish-heaps, &c.

1. *Drift*.—A series of absorbent gravels and sands, which contains a considerable quantity of water, held up by the impervious London clay (where the Bagshot beds are absent) beneath. For centuries this was the chief source of supply to the inhabitants, and large numbers of wells were sunk to the top of the clay. In addition to the fact that it was not suitable for general supply, it became fearfully polluted by sewage, &c., and was eventually abandoned.

2. *Bagshot Series*.—A capping of the Lower Bagshot sands (or, as they are now sometimes termed, "London sands") is found on the heights of Highgate and Hampstead, and assist in the formation of the ponds at those places. At Bagshot Heath, in Surrey, there is a considerable thickness of these beds, which are important as water-bearing strata. It has even been suggested that the public London water-supply should be largely derived from this source. From the circumstance, however, that these beds are somewhat impure, containing seams of lignite in parts, &c., the water obtained is not always of the best quality. Many wells have been sunk into the Bagshot series in the district where they are typically represented.

3. *London Clay*.—This thick argillaceous deposit is very persistent, and plays a conspicuous part in regulating the underground water-supply of the London district. It is a stiff blue clay (brown at the surface when weathered), remarkably homogeneous in character, though here and there with thin seams of sand from which water rarely issues in well-borings. It does not present any serious difficulty to bore through, except that at certain levels, hard masses of concretionary matter, known as *septaria*, are met with. The *septaria* are rarely more than 2 ft. in thickness, and often only 1 ft. The base of the London clay is sandy, terminating usually in a pebble bed. The thickness of pebble beds can never be predicted, nor, indeed, in this particular case the bed persistent throughout the whole area; but, speaking generally, it is more persistent to the south than to the north and central areas (of the London basin), where, indeed, well-sinkings often show it to be entirely absent. In estimating the cost of sinking, it is well to assume that it is about 3 ft. in thickness where its presence may be suspected. Water is often met with in small quantities, as inexperienced borers soon find out.

4. *Oldhaven and Blackheath Series*.—A mass of pebbles, usually with sand, of variable thickness, but which in some localities near London—e.g., Blackheath, Bostal Heath and Plum-



stead, are more than 20 ft. in thickness. In well sinking, from 12 to 15 ft. may be estimated almost anywhere near the southern outcrop, as the thickness of this sandy pebble bed from Croydon eastwards—bearing in mind what we have just remarked concerning the thickness of pebble beds in general. The formation appears to be wedge-shaped, the thick end of the wedge being at the outcrop, the thin extending under London. In a well at the Caterham Water-works, the pebble-bed, presumably on this horizon, was found to be 90 ft. thick, and even then, although the chalk was met with, the gravel was not pierced through before 140 ft. from the surface was reached. This is almost unique, but we mention the fact to show a possible contingency in well-boring in outlying areas on patches of beds separated from the main mass and lying on the chalk. The great thickness in this case is probably due to what is known to geologists as a "swallow hole," as pointed out by Mr. Whitaker. A "swallow hole" is, briefly, a more or less cylindrical hole bored to some depth in limestone rocks, such as chalk, by the agency of running water. In the Caterham well "swallow hole" alluded to, the gravel has apparently subsequently fallen in. It is noteworthy that the pebbles of the Oldhaven and Blackheath series are nearly all (almost without exception) very round and made of flint. Where there is not much sand to bind them together they form very treacherous ground, possessing the property of "running" in a marked degree.

5. *Woolwich and Reading Series.*—These beds are extremely variable in character, and it is not possible to predict with any degree of accuracy the precise nature of the deposits which will be met with in well-boring, unless the underground geology of the proposed site is thoroughly well known. Speaking generally, they present thin beds of mottled clays, sands, pebbles, shell-beds, and iron-pans alternating with each other. In the western and central parts of the London basin, the mottled-clay predominates. Perhaps no part of the beds above the chalk presents so many difficulties to bore through as the Woolwich and Reading series. The beds frequently contain enormous quantities of water (not fit, in the central area, for human consumption), and this is a great hindrance to the progress of well-sinking; whilst the variable nature of the strata often makes it uncertain as to how long the nuisance will continue, within certain limits.

6. *Thanet Series.*—These beds, fortunately, are tolerably persistent in character. The mass of them is a medium-grained sand, the thickness of which may be gathered from the tables in our last article. Like most other local deposits, it is more or less stratified, some of the strata being more argillaceous than others, but pebble beds are seldom met with, and even then the pebbles are much scattered. At its base it is more argillaceous, and, in certain parts of the London basin, a regular bed of clay is here met with, which occasionally holds up large quantities of water, making the Thanet sand a good water-bearing deposit. In years gone by, many wells derived their supply from this level, especially those for breweries, but for various reasons, on account of contamination, &c., they have been bored deeper, and into the chalk.

7. *Chalk.*—This well-known water-bearing formation, to which we have had frequent occasion to refer, is separated from the overlying Tertiary beds by a mass of large green-coated flints, which, presumably, have been dissolved out of the chalk by the action of percolating water. The flint bed is rarely more than 1 to 2 ft. in thickness, but is remarkable for its persistency throughout the whole London basin. Indeed, we may say that almost wherever a junction is seen between the Chalk and Tertiary strata throughout North-western Europe, this thin flint bed is met with. This, therefore, is an obstacle found in nearly all borings to the chalk. It may readily be recognised, not only from the peculiar green colouring of the flint, but from the circumstance that no pebbles are present; the pieces are typical flints or else tabular in form. The chalk under London may be divided into two parts: the upper, containing seams of flint with many cracks and joints; the lower, having no flints, being more compact and slightly argillaceous. The late Prof. Ansted remarked that the upper chalk may be regarded as most usually the conducting, and the lower chalk as the containing part of the formation, so far as water is concerned. Although borings in the London basin have, in the vast majority of cases, been productive of an excellent

and copious supply of water for large establishments, instances are on record where disappointment has ensued. At the same time, it would be difficult to sink through the formation without finding abundant water in the central area. From the fact that the formation is so largely drawn upon, however, it is advisable to sink deeply into it. Any springs found in the uppermost 150 ft., will in time be liable to run dry. It is through the cracks and joints that the water so freely percolates chalk, and the supply is largely regulated by their size and disposition.

8. *Upper Greensand.*—This formation of medium-grained sand, about 50 ft. thick at its outcrop on the south, becomes much attenuated as it goes under the metropolis, being only 28 ft. in thickness in the Tottenham-court-road boring, and 14 ft. in the Kentish Town well-section. It thins out altogether as it goes north, between Shefford and Ware, not being recognisable between the outcrops of the chalk and gault near the former place. It is water-bearing, though not of much value in this respect.

9. *Gault.*—In our area, this formation is invariably found in deep well-borings. It is abnormally thick at Caterham,—340 ft.,—200 ft. at Richmond, and between 140 ft. and 160 ft. as it goes northwards. It is a stiff retentive clay, and does not present many difficulties in boring.

10. *Lower Greensand.*—The exact extent of this deposit under London is not yet definitely ascertained. It would appear that it is 400 to 500 feet thick at its outcrops round the gault, but dies out as it recedes from these points, being absent under London. It is a water-bearing stratum, formed of sand, and occasionally having iron pans and streaks running through it. Its gathering ground is comparatively small, and it so rapidly thins out that, hitherto, attempts have not been particularly successful in obtaining water from this bed in the vicinity of the metropolitan boundary. The most likely localities for water are at places not far from its outcrop, and we may mention that at Chatham, and the vicinity, wells seem to be successful, though the formation under that locality is very thin.

The other formations from 11 to 14, both inclusive, although influencing the distribution of water under London at very great depths, are not of sufficient practical importance in regard to water-supply for us to consider them in detail. As we have previously stated, it does not generally pay to bore for water beneath the chalk. The deeper-seated rocks, however, are very interesting from a purely geological standpoint; and when our knowledge concerning the occurrence of Nos. 12 and 13 is more extended, the question as to whether coal exists, or not, under the London basin will be definitely settled. From a commercial point of view, the solution of this question is not, we believe, of any great moment; for, if coal should eventually be found, we do not think it could be remuneratively worked.

#### SEWERAGE WORKS.

*Royton Local Board Main Sewerage Works.*—Mr. T. S. McCallum, C.E., of Manchester, has been appointed engineer (in succession to the late Mr. R. Vawser, M.Inst. C.E.), for carrying out the main sewerage works of the Local Board District of Royton, near Oldham.

*Shaw, near Oldham.*—Good progress is being made with the works designed by Mr. J. Mawson, the Surveyor to the Local Board, for the disposal of the sewage of Shaw. After mature deliberation and inspection of the systems in practical operation at other places, the Local Board decided to adopt the process of sewage treatment introduced by the International Water and Sewage Purification Company, of Westminster; and Shaw will be the first town in Lancashire where this process will be adopted.

*Swinton and Pendlebury Main Sewerage and Purification Works.*—Mr. T. S. McCallum, C.E., of Manchester, has been appointed engineer (in succession to the late Mr. R. Vawser, M.Inst. C.E.), to complete the Slackbrook Sewerage and Purification Works for the Local Board of Swinton and Pendlebury, near Manchester.

*City Surveyorship, York.*—Mr. Alfred Creer, A.M.Inst.C.E., Borough surveyor of Lancaster, has been appointed City Surveyor of York; there were eighty-six applications for the office.

#### Books.

*Timber and some of its Diseases.* By H. MARSHALL WARD, F.R.S., F.L.S. *Nature Series.* Macmillan, 1889.

*Dry Rot in Timber.* By W. H. BIDLAKE, A.R.I.B.A. London: Batsford, 1889.

THE title of Professor Ward's book is liable to be misunderstood. The book is chiefly devoted to a description of the diseases of living trees, and it is, therefore, a manual for the forester rather than the architect or the builder. A chapter is, however, devoted to the subject of "dry rot," a "domestic" disease of dead timber, and one of the most serious evils with which the builder has to contend. The volume, which consists of a series of articles reprinted and enlarged from *Nature*, reads like an elementary treatise on surgery. Almost all—probably all—the diseases of timber are due to fungous growths, some of which are large objects obvious to the most casual observer, such as the bracket-like fungus which projects from the stems of decaying trees, and the vari-coloured toadstools which grow among their roots, or to exceedingly minute fungi which need a powerful microscope to detect their presence, such as the moulds which infest the leaves as well as the woody structures, and which find their way through the breathing-pores on the under surface of the leaves, and into the woody tissues through wounds in the epidermis or rough outer bark. The ubiquitous nature of the spores of such organisms can be well understood, and the wonder is how any living trees or cut timber are able to resist their attacks. Professor Ward describes one of these pests as spending part of its life on the leaves of the common groundsel of our gardens, and the remainder on the pine-tree,—a diversity of tastes and adaptability to varying conditions of life which is by no means uncommon among these low forms of vegetation.

The "antiseptic treatment" of diseases both of living and dead timber is dealt with by Prof. Ward, and the nature of dry-rot and the precautions to be taken against it are also dealt with by Mr. Bidlake in his monograph. Mr. Bidlake treats the subject in more popular language, but he acknowledges his debt for his facts to Prof. Ward's original articles in *Nature*. Both books are well illustrated, but, nevertheless, we fear the general readers will find Prof. Ward's somewhat too technical in its language. A long article, occupying nearly a third of the volume, dealing with the various theories of scientific men on the ascent of water in trees is especially open to this objection, and it has little connexion with the principal subject of the work. It belongs to the more abstruse province of vegetable physiology, as does also the chapter on the classification of timbers.

Special chapters are devoted to "canker" in the larch, "pine-blight," leaf diseases, and the "damping off" of seedling trees. A chapter on the healing of wounds after the breaking off of branches by wind, &c., or their removal by the forester, is well illustrated, and very interesting reading. The subject of vegetable pathology is one of great importance, and Prof. Ward's manual is the only one, we believe, which brings up our knowledge to a level with Continental writers. It is fragmentary, but we trust it will be soon followed by a more complete treatise.

*How to Select Wood-Working Machinery.* By J. STAFFORD RANSOME, Ass.-M.Inst. C.E. London: William Rider & Son.

THIS is an excellent little book, full of information for those to whom it is addressed, the purchasers and users of wood-working machinery. Most of our readers will recognise in the author a gentleman connected with a leading firm of engineers who have made a speciality of wood-working machinery, and who, it may be added, have brought this branch of engineering to a very high degree of perfection. The fact augurs well for the book in one sense, and ill in another. No man can have so complete a knowledge of any kind of machine-tools as he who designs and makes them. On the other hand, the maker is likely to be biased in favour of his own productions, and when he writes a book too often seizes the opportunity to puff his own wares. Into this fault Mr. Ransome has not fallen. Throughout the book there is no suspicion of "an axe to grind." This is a good thing to chronicle in these days of cunning advertisement.



However, Mr. Ransome's virtues as an author are by no means confined to those of omission. His plan is good, the subject matter being treated in sections which follow in natural gradation. He begins with an introductory chapter on the question generally, in which the salient points of good and bad machinery are treated. His advice on the subject of good—if somewhat dearer—as against bad—though cheaper—machinery, will be appreciated by every one who has ever had to use the latter. His remarks apply almost with greater force to the case of wood-working machinery than to any other class of machine-tools. We always remember, in this connexion, a favourite saying of an old master we once served under, "It is only the richest firms that can afford to use common machine tools"; the inference being, of course, that they are so much dearer in the long run.

A short chapter on "Some Common Mistakes" contains a few shrewd hints. We are glad to see that the author does not throw dirt on catalogue information, after the manner of many writers,—indeed, he advises the purchaser to get as much as he can,—and to this we would add: "neither despise the selling agent, or commercial traveller, if you have sufficient strength of character to withstand his blandishments; otherwise, seclude yourself rigorously." There is a deal of information to be got from these gentlemen, not only on the perfection of their own goods, but on the blemishes of their neighbours'. On the latter point they are refreshingly candid. There is a chapter on second-hand machinery,—which is often far dearer than it seems, because it is generally "not quite the thing,"—and then a good chapter on motive power. The author does not seem to think the time has yet arrived for the gas-engine to take the place of steam in ordinary situations. He puts down 20 effective h.p. at about £1 per day for gas. For the same power, as, 2d. per day would have to be spent in coal, and 5s. per day stoker's wages; so that the economy of steam over gas would be 10s. 10d. per day. If waste wood and chips were used as fuel the saving would, of course, be far greater. There are, however, "some important patents in the course of a few years will lapse," and then, the author thinks, will be a time for the reconsideration of the subject. After a chapter on the functions of wood-working machinery, the author gets to the details of his subject. He begins with the tree in the forest, cuts it down by a steam-saw, handles the logs after felling, on the ground and in the yard, and breaks down the heavy timber by circular, rack, or band-saw; the remarks on the latter subject being especially worth attention. We then get on to the finer machinery, a chapter being given to fret-saws. Cross-cutting saws are next dealt with, and an instructive chapter on saw-blades follows.

The consideration of planing and moulding machines opens up another important section of the work. Boring and mortising machines, tenoning machines, lathes, dovetailing machines, sand-papery machines, and other descriptions of wood-working machine tools are dealt with at greater or less length. After this comes a section dealing with matters of cognate interest,—such as shafting, bearings, and couplings; the automatic collection of wood refuse; pulleys, belting, and lubricators, and a few other details connected with shop practice.

On the whole, we have no hesitation in recommending this unpretending little book as well fulfilling the purpose which the author claims for it. Indeed, it is seldom one sees so much good matter so modestly presented. The numerous illustrations, although not high specimens of the wood engraver's art, are sufficiently well designed to serve the purpose of helping the text.

**The Cost of City Improvements.**—The widening of Ludgate-hill has covered a period of nearly twenty years, and is now almost completed. The houses set back are all on the southern side. The first lot, including the houses from 51 to 71, Ludgate-hill, cost the Commission of Sewers, 85,405*l*. A few years later another block was taken—19 to 35—at a cost of 43,825*l*. The houses 11 to 17 necessitated an outlay of 63,268*l*, and the last operation, including 37 to 47, and 5, St. Martin's-court, cost 181,828*l*. This makes a total expenditure up to the present time of 324,326*l*, but there will be a considerable recoupment in connexion with the last item.—*City Press*.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

17,308, Sawing Stone. J. Pickover.

To facilitate the sawing of stone, a series of circular saws of different diameters are, according to this invention, used, so arranged that the saw of the smallest diameter works upon the stone first, and that of the largest diameter last, so that a kerf of gradually-increasing depth is formed as the stone moves past the saws. The larger saws are made in segments or plates secured by means of double dovetailed kerfs fitted in dovetailed notches in the tapered faces of the segments. Above the saws is mounted a sand-trough having tubes which lead in front of the saws, so mounted and set that the water will feed the same to the kerf at the proper point.

17,415, Blocks for Building. A. Katz.

These building blocks, which are designed for use in partitions, ceilings, &c., are made of a mixture of woody refuse, such as chaff, chopped straw, husks, woody fibre, &c., or other light or porous bodies, worked up with lime or cement, and poured into moulds so constructed as to form blocks having hollow passages or spaces, made in such a way as to decrease the weight without materially diminishing the strength in the direction of strain or pressure.

17,422, Ventilators, &c. J. Utley.

The ventilators are chiefly designed for use with ships' side-lights. A suitable chamber or compartment in the side of the vessel communicates on the outside of the vessel with the open air through the side-light or port, and upon the inside with one or more air tubes or passages, by means of which the air can be conveyed to the compartment or compartments in the interior of the vessel it is desired to ventilate. Suitable floats, or valves, are fitted so as to close the apertures in case the openings are submerged.

17,563, Fireproof Floors. W. Lindsay.

The floor brick, which is the subject of this patent is made of brick, the length of which is equal to half the distance between the walls or other supports which carry the floor. Every alternate course consists of two whole bricks, and the remaining courses of a whole brick in the middle and half a brick each side, so that the courses break bond. The faces of the bricks where they rest against each other are made in such a form that they interlock one with the other. The bricks are grouted or cemented together.

8,597, Enamel for Building Materials. J. Stiel.

According to this invention, an enamel produced by mixing glass, phosphates, and carbonates with metallic oxides, is put on to bricks, window-sills, or building materials, and the smooth surface thus formed will resist all action of the weather.

9,148, Iridescent Blown or Rolled Window-glass. E. Grosse.

After the sheet of window-glass is smoothed out in the ordinary process of manufacture, in the stretching or annealing furnace, the glass is sprinkled with powders which give it an iridescent appearance, which is novel in window-glass.

15,653, Fasteners for Sliding Windows. W. J. T. Goatley and G. Burton.

These fasteners for retaining sliding sashes of carriage or other windows may be applied to the sash or to the frame, either entirely concealed from view or placed upon the sash or the frame. There is in this invention a combination of a spring bolt working with or against a wavy or corrugated plate of metal, so that the bolt, assisted by the pressure of a spring, will hold the sash against the force of gravity, and yet allow of its being lifted or lowered at will.

17,495, Incombustible Roof. J. Dinsmore.

This invention consists of a simple and light arrangement of wrought-iron framing to carry tiles, slates, sheet metal, or glass, so as to form an incombustible roof, and entirely dispense with wood. A piece of inverted T-iron is bent to the required angle to form the ridge, and the two rafters are formed out of one piece this shape, the lower ends resting upon walls or columns. The flange forms the rebate, and the overlap is cemented with mastic or other suitable cement. The covering material is carried between the rafters.

17,970, Window-sashes. W. Lindsay.

According to this invention, the vertical iron sash-bars and the horizontal bars are made in one piece from end to end, and with slots out for the narrower bars to pass through. A shallow notch is also left or cast to allow for the cross-bars passing through.

17,991, Improvements in water-closets. J. & A. Duckett.

The object of these improvements is twofold,—(1) to combine the flushing-chamber with the closetpan, and (2) to construct and adapt the outlet of the pan to the socket of an ordinary drain, that the outlet of the latter may be turned in any direction to suit the main drain.

4,579, Kitchen Ranges. C. H. Perrot and others.

This invention relates to ranges with rising bottom-grates, the grates being provided with a rack which keeps them in position when raised up, and with a hinged lever for releasing the rack when it is desired to lower the grate.

11,281, Improvements in water-closets. J. Dean.

This invention relates to closets flushed by water controlled by the action of a hinged seat, in which an after-flush of disinfectant takes place. Elaborate mechanism is provided to allow of the effective flushing by fall of water and for the after-flow of the disinfectant, the action being controlled by the hinged seat.

## NEW APPLICATIONS FOR PATENTS.

Oct. 21.—16,579, W. Bradford, Flooring Material.—16,587, E. Howell and G. Thomas, Protector for the Roll-ends of Wall Paper, &c.

Oct. 22.—16,621, H. Jolly, Attachment for Augers.—16,651, L. Groth, Brazing Band-saws.—16,706, P. Bonner, White Lead.

Oct. 23.—16,715, J. Keighley, Ventilator.—16,720, W. Scott-Moncrieff, Syphon-flushing Cisterns.—16,726, T. Ashenurst, Knobs or Handles for Doors, &c. and attaching same.—16,752, J. Jofeh, Checking Workmen's Time.

Oct. 24.—16,774, H. Madden, jun., Carpenters' Planes and Fillisters.—16,781, C. Gabriel, Syphon Cisterns for Flushing Water Closets, &c.—16,784, W. Muirhead, Automatically Flushing Drains, &c.—16,804, J. Wilson, Nails.—16,819, J. Sherwin, Opening and Closing Gear for Greenhouses or other Ventilators.

Oct. 25.—16,831, W. Cowan, Flushing Cisterns, &c.—16,800, E. Urry and G. Farini, Mechanism for Closing Doors.—16,835, H. Lake, Bridges and similar structures.—16,888, T. Lixsmith, Plank Supporting Frames for Builders, Painters, &c.

Oct. 26.—16,911, S. and S. Hill, Draught, Rain, or Dust Excluders, for Doors, &c.—16,915, J. Margison, Combined Door-knocker and Bell.—16,941, H. Blake, Block Paving.

Oct. 28.—16,975, A. Bland, Gully-traps.—17,002, J. Stevens and C. Major, Spring Hinges for Doors.—17,032, H. Lake, Portable Scaffolds.

Oct. 29.—17,067, C. Rogers, Wood Seroes.—17,094, T. James, Windows and Casings.—17,121, L. Kennedy, Brick and Tile Machines.

Oct. 30.—17,146, J. Mattison, Window Sash-frame.—17,186, J. Edelbaum, Chimney Cowl.—17,192, H. Board, Construction of Roofs and Sides of Buildings, especially for horticultural purposes.

—17,199, D. Mersing, Veneer Saws.—17,211, W. Akerman, Kilns or Ovens for Burning Cement, Lime, Bricks, &c.

Oct. 31.—17,243, E. Hollanders, Door Locks.—17,280, L. Blumer and J. Tat, Lime Kilns.

Nov. 1.—17,299, R. Aitken, Method of Making Double-hung Sash-Windows open inwards like a door.—17,332, F. White and D. Banfield, Door Easer and Fastener.—17,335, F. Nickel, Support for Scaffolding.—17,357, S. Sharp, Drag-Preventer for Doors.—17,357, D. Bryce, Wall Frames.

Nov. 2.—17,382, W. and J. Rhoades, Prevention of Down-Draughts in Chimneys.—17,422, F. Podany, sen., Clearing Timber of Sap.—17,442, J. Hamblet and A. Plant, Flooring Tiles, &c.—17,443, W. Lindsay, Tiles, &c.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

13,280, J. Arnold, Disinfecting and Deodorising Sewer Gases, &c., in Soil Pipes, Drains, &c.—13,410, E. Thomas, Ventilators and Chimney Cows.

13,953, C. Crabtree, Drain Pipes.—14,433, G. Deacon, Glazing Roofs, &c.—14,766, W. Snelgrove and W. Avery, Door-checking Brackets and Fittings.—14,787, A. Mitchell, Joint for Drain Pipes, &c.—14,808, A. Black, Lead Water-pipes.—15,005, C. Rabbit, Wire-netting for use in the manufacture of Fire-proof Ceilings, Walls, &c.—15,538, E. Wren, Seroes.—15,603, J. Austin, Sash-fasteners.—15,638, P. Nicolas, Stop for Doors and Windows.—15,697, T. Kershaw, Door Knobs or Furniture.—15,720, H. Hadden, Sawing Machinery.—15,790, H. Hadden, Guides for Circular Saws.—15,791, H. Hadden, Band Saws.—15,807, T. Llewellyn, Holdfast, or Cramp for Joiners, &c.—15,831, F. Meyenberg, Brick and Pottery Kilns.—15,854, W. Thompson, Grinding Machines for Frame Saws.—13,960, R. Macdonald, Cisterns for Flushing Water-closets.—14,042, D. Law and others, Automatic Flushing Cisterns.—14,145, P. Hoy and J. Jones, Drainage.—14,512, J. Donkin, Saws.—14,706, J. Morris, Ventilator.—14,963, H. Stanton, Fire-resisting Floors for Buildings.—15,174, T. Mercer, Automatic Sash Fastener.—15,366, J. and F. Howorth, Ventilating.—15,430, J. Brooks, Sash Fasteners.—15,509, C. Martin, Electric Bells.—15,524, F. Berry, Electric Bells.—15,773, G. Notton, Paint Kettle, or Can.—15,950, J. Thame and L. Jacobs, Portable Buildings.—16,078, J. Nash, Construction of Walls of Buildings, Partitions, Floors, &c., so as to render them sound proof.—16,100, E. Stowell and G. Thomas, Preparation and Hanging of Wall-papers, &c.—16,192, C. Broad and C. McCann, Metallic Sills for Windows and Door-frames and Casings.

16,201, W. Sayer, Air Propellers or Ventilating Fans.—16,312, D. Waddell, Closing Ladder.—16,516, J. Shenton, Brick and Drain Pipe Making Machines.



## COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

16,448, T. Smith, Mireling Machines.—18,294, E. Strange and J. Auston, Smoke Extractors, Exhaust Ventilators, &c.—18,866, T. Twyford, Lavatory Wash Basins and Pittings.—6,543, H. Aigat, Locking or Fastening Sliding Sashes, &c.—12,648, G. Bailey, Bakers' Ovens.—15,795, P. Davies, Lead Tanks and Ventilating same.—16,285, J. Nicholls, Window Sash Holder and Bolt.—18,624, J. Connell and J. Gordon, Valve Apparatus for Water-closets, &c.—18,865, T. Twyford, Water-closets.—304, J. Sutcliffe, Window Sash-fastener.—11,929, G. Radfern, Composition for Covering Walls.—13,649, J. Weiss, Handles for Tools.—14,237, W. Thompson, Flushing Apparatus.—15,336, J. and F. Howorth, Ventilating Apparatus.

## RECENT SALES OF PROPERTY:

## ESTATE EXCHANGE REPORT.

Nov. 4.—By WAGSTAFF & WARWICK.	
Kennington—9 to 17 (odd), Methley-st., u.t. 42 yrs., g.r. £25, r. £192 p.a.	£1,680
Camden-rd.—13, Torrione-avenue, u.t. 55 yrs., g.r. £5	390
Islington—40, Morton-rd., u.t. 63 yrs., g.r. £45 p.a.	425
42, Alma-st., u.t. 45 yrs., g.r. £5, r. £42 p.a.	405
By GEO. HEND & CO.	
Dorset-st.—15, 20, and 22, Boston-pl., and 32, Balcombe-st., u.t. 20 yrs., g.r. £33 12s.	1,250
Nov. 5.—By BAAY, YOUNG, & CO.	
Caledonian-rd.—55, Gifford-st., u.t. 60 yrs., g.r. £8, r. £30 p.a.	250
By THURGOOD & MARTIN.	
Holloway—E.g.r. of £8 1s., with reversion in 75 yrs.	180
Westbourne-grove—27, Hereford-rd., u.t. 32 yrs., g.r. £8 10s.	625
Kilburn—34, Beechmore-st., u.t. 87 yrs., g.r. £7, r. £37	905
Ventnor—Alexandre-parade, f.g.r. of £47, with reversion in 99 yrs.	265
By P. MATTHEWS.	
Old Kent-rd.—34, Glengall-rd., f.e.r. £36 p.a.	500
49 and 49, Doves-st., f.e.r. £46 16s. p.a.	400
747, 747s, and 749, Old Kent-rd., u.t. 22 yrs., g.r. £10	660
751, 753, and 755, Old Kent-rd., u.t. 22 yrs., g.r. £27	675
By A. RICHARDS.	
City of London—1, 2, and 3, Fenton's-bldgs., f.....	1,420
Goswell-rd.—10, Geo-st., f.e.r. £30 p.a.	275
By WILKINSON, SON, & WELCH.	
Brighton—43, Marine-parade, f.r. of £100, reversion in 19 yrs.	3,600
124, Western-rd., f., r. £80 p.a.	1,600
Nov. 6.—By W. T. MARSH.	
Enfield—1 and 2, Riley-villas, f.....	305
Islington—35 and 36, Clayton-st., f., r. £52 p.a.	287
By ROSS, CHURCH, & CO.	
West Kensington—23, Charleville-rd., u.t. 57 yrs., g.r. £14 10s.	590
By A. WATSON.	
Houndsditch—117, Gravel-la., and 17, Gun-seg., f., r. £51 p.a.	1,005
By T. B. WESTACOTT.	
Kentish Town—81, Malden-rd., u.t. 60 yrs., g.r. £8	530
Nov. 7.—By W. W. JENKINSON.	
Jamaica—Ballard's Valley, Barry Hill Farm, and part of Killacholly Sugar Estates, containing 1,892 acres	4,350
By NEWBORN & HARDING.	
Hoxton—10 and part of 8, Pittfield-st., and 1 and 2, Boot-l., u.t. 60 yrs., g.r. £24 10s., r. £144 p.a.	1,000
Lower Clapton—15, Lincolnton-rd., u.t. 89 yrs., g.r. £7 10s., r. £45 10s.	270
Dalston—L.g.r. £3 7s., u.t. 62 yrs.	180
Haguerston—38, Angrove-st., f., r. £32 p.a.	405
Forest-gate—270, Romford-rd., f., r. £36 p.a.	580
By FULLER & FULLER.	
West Brompton—23, Edith-grove, u.t. 68 yrs., g.r. £7 10s.	650
Edgware-rd.—59, Melrose-st., f., g.r. £30	710
By J. A. JONES.	
Warwick-st.—35, Gloucester-st., u.t. 48 yrs., g.r. £12	700
Nov. 8.—By W. HOLCOMBE.	
Orford-st.—Nos. 493 and 495, u.t. 40 yrs., g.r. £15, r. £385 p.a.	4,000
By VAUGHAN & CO.	
Finchley-rd., Hendon-lane, u.t. 83 yrs., g.r. £10, r. £75	900
15, Cypress-rd., u.t. 83 yrs., g.r. £2 8s., r. £55	310
Hampstead-rd.—5 and 6, Little George-st., u.t. 21 yrs., g.r. £3 8s.	180
Paddington—18, Sovereign-mews, u.t. 32 yrs., g.r. £4 4s., r. £30	280
By A. & A. FRIED.	
Lambeth—71 to 74, and 100 to 104, East-st., u.t. 11 yrs., g.r. £32 10s.	700
By R. REID.	
Notting-hill—50, Clarendon-rd., u.t. 60 yrs., g.r. £15 13s.	450
Russell-sq.—No. 52, u.t. 10 yrs., g.r. £30 9s., r. £140 p.a.	360
41, Upper Bedford-pl. and Stabling, u.t. 28 yrs., g.r. £24	390
4, University-st., u.t. 13 yrs., g.r. £7 10s.	315
4 and 5, Mortimer-market, u.t. 13 yrs., g.r. £4 10s.	500
Edgware-rd.—E.g.r. of £450, subject to a.r. of £270 p.a. for 4 years	800

[Contractions used in this list.—E.g.r. for freehold ground-rent; L.g.r. for leasehold ground-rent; g.r. for

improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

SATURDAY, NOVEMBER 16.  
University College, London (Archæology).—Demonstration at the South Kensington Museum. 7 p.m.

MONDAY, NOVEMBER 18.  
Royal Institute of British Architects.—8 p.m.  
Liverpool Architectural Society.—The President (Mr. T. Mellard Read) will read a short paper on "The Structure of Sandstone as affecting Architectural and Engineering Works."

TUESDAY, NOVEMBER 19.  
Institution of Civil Engineers.—Mr. J. J. Thornycroft on "Water-Tube Steam-Boilers for Marine Engines." 8 p.m.

University College, London.—Mr. Hugh Stannus on "The Distribution and Application of Ornament with Reference to Surface Material, Construction and Purpose." 5 p.m.  
Statistical Society.—Opening Address by the President, Dr. T. G. Balfour, F.R.S. 7.45 p.m.  
Glasgow Architectural Association.—Mr. J. P. McGilivray on "Sculpture."

WEDNESDAY, NOVEMBER 20.  
Society of Arts.—Opening Address by the Duke of Abercorn, C.B., Chairman of the Council.  
University College, London (Archæology).—Professor R. S. Poole on "The Cairne House." 5 p.m.  
British Archaeological Association.—(1) Mr. C. H. Compton on "North Creak, Norfolk; its Abbey and Churches." (2) Mr. T. Morgan, on "The Rose of Provence and Lilies of France in a Vision of Lincoln." 8 p.m.  
Royal Meteorological Society.—Seven papers to be read. 7 p.m.

THURSDAY, NOVEMBER 21.  
Institution of Civil Engineers.—Students' Visit to the Thames Ironworks, Orchard-yard, Blackwall, E. 2 p.m.  
University College, London (Archæology).—Demonstration at the British Museum. 5 p.m.

SATURDAY, NOVEMBER 23.  
University College, London (Archæology).—Demonstration at South Kensington Museum. 7 p.m.

## Miscellaneous.

**Festive Gatherings.**—We are pleased to be able to record that a convenient mess-room for their men has been erected, at a cost of nearly 1,000l., by Messrs. Thos. & W. Farmiloe at their works, Nine Elms. The architects were Messrs. Karslake & Mortimer, and the builder is Mr. Thos. Potterton, of Balham. On Saturday evening last the men in the employ of the Nine Elms branch of the firm, numbering about 100, sat down to a dinner to celebrate the opening of this useful hall. The chair was taken by Mr. T. Panaris, supported by Messrs. F. Pitts and J. Chard, and the firm was represented by Mr. Arthur Farmiloe. There were also present Mr. Karslake and Mr. Potterton. After dinner the chairman, on behalf of the employes, thanked the firm for the liberal provision made for their comfort, to enable them to provide themselves at a small cost with a good meal, also with a place to meet for social enjoyment. The health and prosperity of the firm was then proposed. Mr. Arthur Farmiloe made a suitable reply for the firm, and said they were highly pleased to see the mess-room so well appreciated, and hoped that it would tend to the social improvement and happiness of the employes. The firm of Messrs. Killby & Gayford, builders, 87, Worship-street, erected a large stage at the works, 73, Great Tower-street, on Saturday last, for the benefit of their employes and friends to view the Lord Mayor's procession. After the show had passed by the workmen were invited to a substantial repast in the shape of a cold collation. Mr. Stamp, the manager of the firm, being in the chair. The toast of "The Firm" was received with loud cheers, and was responded to by Mr. Hadenham.

**Commercial Failures.**—According to *Kemp's Mercantile Gazette* the number of failures in England and Wales gazetted during the week ending Nov. 9 was seventy-seven. The number in the corresponding week of last year was 105, showing a decrease of twenty-eight, being a net decrease in 1889 to date of 259. In the building and timber trades the failures last week were twelve in number, as compared with twenty and six in the corresponding weeks of 1888 and 1887 respectively.

**Association of Manchester Students of the Institution of Civil Engineers.**—At the meeting of this Association, on the 6th inst., Mr. A. W. Lawson, Stud. I.C.E., read a paper on "The Sewerage, Paving, &c., of Private Streets, under the Public Health Act, 1875, Section 150."

**The English Iron Trade.**—The English iron market is once more in a state of morbid excitement, speculative influences having for the moment succeeded in, to some extent, disorganising legitimate business, at least in Scotland and the north of England. That trade has not been completely paralysed is due to a genuine demand, the requirements of consumers being still as large as they have been for some time past, although they are alarmed by the vagaries of the market. Notwithstanding the prevailing excitement, the trade in pig-iron rests upon a sound basis, an evidence of which is the steady and heavy decrease in stocks. The principal rise has been in Cleveland pig-iron, No. 3, G.M.B., having gone up above 7s. during the week, it being impossible to gauge the exact advance. Cleveland warrants are over 4s. per ton higher than Glasgow warrants, which, however, have gained about 3s. 6d. on the week. Scotch makers' iron has also been put up again, the advance ranging from 1s. to 3s. per ton. Bessemer pig in the north-west is 4s. 6d. dearer, and on the east coast about 5s. The advance in Cleveland and Scotland has been reflected in the midland districts, while the Lancashire pig-iron trade has been unsettled. There has been almost a uniform rise of 10s. a ton in finished iron, following upon the rapid advance in pig metal, although in some districts prices have been raised only about 2s. 6d. to 5s. Business, on the whole, is less active. Steel, on the contrary, continues in very full demand, regardless of the further increase in rates of from 5s. to 10s. per ton. There is some sluggishness in ordering new vessels, the high prices which shipbuilders are obliged to ask acting as a check to business. There is no slackening in the activity of the engineering trades.—*Iron.*

**Insanitary Houses in Shoreditch.**—At the Worship-street, Police-court, on Wednesday, the National Temperance Land and Building Company, represented by their Secretary, of 21, Charterhouse-street, Holborn-circus, owners of the premises, 9, 10, and 11, Ann's-place, Boundary-street, Shoreditch, appeared to a summons for allowing a nuisance to exist on the premises, rendering them injurious to health and unfit for habitation. Mr. Temple Cooke, barrister, represented the Company. Mr. Smith (Rollit & Sons), for the prosecution, said that the state of the premises was such that the walls were damp with rain coming from the roof, rats were running all over the place, the water-closets were without a water-supply. The rooms were so small that often a man with his hat on could not stand upright. Evidence having been given by the tenants in support of the complaint, Mr. Alexander, Sanitary Inspector, said the premises were insanitary, and, in his opinion, unfit for habitation, and nothing that could be done to them would make them so. He admitted in cross-examination that he had taken no proceedings. Asked why not, he said that the premises had already cost 537l. of public rates, and he thought it useless to spend more money on them. The magistrate, having viewed the premises, made an order to close them, prohibiting the use of them until they were certified as fit for human habitation by the Medical Officer of the parish.

**The New Asylum and Hospital, Gartloch.**—At a recent meeting of the City of Glasgow Board of Lunacy, the plans of Messrs. John Thomson and R. D. Sandilands, 121, West Regent-street, were accepted for the construction of a new asylum at Gartloch. The Board invited eight firms of architects in the city to submit designs for an asylum to accommodate 500 patients, and six of these complied with the request. After examination of the plans sent, the Board adjudged those by Messrs. Thomson & Sandilands the most suitable, and they were appointed architects of the buildings, which it is expected will cost about 70,000l. Messrs. H. & D. Barclay were awarded a premium of 100l., and Mr. H. E. Clifford, 50l., while the other three competing architects had a premium of 25l. each.

**Johnson's Fire-Resisting Wire Lathing.**—In regard to a recent severe fire at Messrs. Crabtree & Sons' dyeworks, Ardwick, Manchester, it is stated that Johnson's patent fire-proof plaster ceiling stood the fire remarkably well. Captain Tozer, the Superintendent of the Manchester Fire Brigade, says that the ceiling was subjected to intense heat and streams of cold water for about an hour. We believe that this is the first serious fire in which these ceilings have been put to the test.



PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Heart, B.G.	ton	7	0	0	7	0	0
White Pine	load	12	0	0	12	0	0
White Pine	foot cube	0	3	0	0	3	0
White Pine	load	3	0	0	3	0	0
White Pine	load	3	0	0	3	0	0
White Pine	load	3	0	0	3	0	0
White Pine	load	3	0	0	3	0	0
White Pine	load	3	0	0	3	0	0
White Pine	load	3	0	0	3	0	0
White Pine	load	3	0	0	3	0	0

TIMBER (continued).

Mexican, cargo average	0	0	4	0	0	4
Tobacco	0	0	4	0	0	4
Honduras	0	0	4	0	0	4
Box, Turkey	4	0	0	4	0	0
Rose, Rio	15	0	0	15	0	0
Bahia	14	0	0	14	0	0
Satin, St. Domingo	0	0	9	0	0	9
Porto Rico	0	0	9	0	0	9
Walnut, Italian	0	0	4	0	0	4
METALS.						
Iron—Bar, Welsh, in London	0	0	0	0	0	0
“ at works in Wales	0	0	0	0	0	0
“ Staffordshire, in London	0	0	0	0	0	0
Copper—						
British, cake and ingot	48	0	0	48	0	0
Best selected	51	0	0	51	0	0
Sheets, strong	59	0	0	59	0	0
Chili, bars	47	0	0	47	0	0
YELLOW METAL.						
Lead—Pig, Spanish	13	5	0	13	5	0
English, com. brands	15	10	0	15	10	0
Tin—Strait	97	10	0	97	10	0
Australian	98	0	0	98	0	0
English Ingots	101	0	0	101	0	0
OILS.						
Lined	21	0	0	21	0	0
Cocunut, Coochin	28	10	0	28	10	0
Ceylon	23	0	0	23	0	0
Palm, Lagos	28	10	0	28	10	0
Rapeseed, English pale	31	10	0	31	10	0
“ brown	32	10	0	32	10	0
Cottonseed, refined	32	15	0	32	15	0
Tallow and Oleine	21	0	0	21	0	0
Lubricating, U.S.	6	10	0	6	10	0
“ refined	7	0	0	7	0	0
TAR—Stockholm	1	6	0	1	6	0
Archangel	0	15	6	0	15	6

DORKING.—For the erection of a new chapel at the Dorking Union Workhouse, for the Dorking Board of Guardians. Messrs. Bagnall & Benison, architects, 16, Essex-street, Strand, W.C.—

C. Parsons, Reigate	2,865	3	0
E. Walker, Leatherhead	574	15	0
W. Goldard & Son, Dorking	572	0	0
C. Dudley, Dorking	561	0	0
W. Edear, Dorking	547	10	0
J. Hanson, Kingston-on-Thames	542	0	0
J. Pledge, Dorking (accepted)	533	5	0
GRIMSBY.—For building the ‘Olea Park Hotel, for Messrs. Hewitt Bros., Limited. Mr. E. W. Farebrother, architect, Grimsby.—			
Smith & Lunn, Newark	24,880	0	0
C. Baines, Newark	4,500	0	0
J. Crawshaw, Skegness	4,300	0	0
Walker & Cook, Grimsby	4,193	0	7
T. Wilkinson, Cleethorpes	4,010	9	8
F. Grant, Cleethorpes	3,676	19	4
J. Guy, Grimsby	3,803	0	0
J. Chapman, Grimsby	3,798	0	0
H. Marrows, Grimsby	3,767	0	0
T. Siminson, Grimsby	3,696	9	10
Thompson & Sons, Louth (accepted)	3,676	0	0
Kewins & Goodhand, Grimsby	3,400	0	0
* Withdrawn.			
GRIMSBY.—For building ‘sheds’ home, for the North Sea Steam Trawling Company, Limited. Mr. E. W. Farebrother, architect, Grimsby.—			
Thompson & Sons, Louth	21,020	0	0
H. Marrows, Grimsby	1,007	13	0
Walker & Cook, Grimsby	1,023	8	0
T. Siminson, Grimsby	999	5	0
J. Guy, Grimsby	989	0	0
J. Chapman, Grimsby	987	10	0
F. Grant, Cleethorpes	970	0	0
T. Wilkinson, Cleethorpes	861	8	0
* Accepted.			

COMPETITION, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Extending and Enlarging Asylum	Dorset County Lunatic Asylum	40l. and 20l.	Jan. 21st	i.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Ad Materials	Acton Local Board	Official	Nov. 19th	ii.
Drainage and Sewer Works	Plumstead Burial Bd.	H. H. Church	do.	ii.
Church, Landludno	West Ham Council	T. G. Williams	Nov. 20th	xii.
Drainage Extension	London County Council	Lewis Angell	Nov. 25th	xii.
Church and Tool Shed, Highbury Fields	Com. of Sewers	Official	do.	ii.
Slaking	Burton-on-Trent Sch. Bd.	R. Churchill	Nov. 29th	ii.
Operation and Extension of Schools	Amersham Union	Official	Nov. 30th	ii.
Church Ward	East Grinstead Gas and Water Company	Official	do.	ii.
Well	Water Company	E. Easton & Co.	Dec. 3rd	ii.
Edge and Store Buildings, Clissold Park	London County Council	Official	Dec. 8th	xii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Premium.	Applications to be in.	Page.
Surveyor	Lancaster Corporation	300l.	Nov. 21st	xvi.
Assistant Surveyor	Birkdale Local Board	2l. weekly	Not stated.	xvi.

TENDERS.

Communications for insertion under this heading must be in not later than 12 noon on Thursday.

ERLEY (Middlesex).—For building two cottages in Erley-lane, Arkley, near Barnet. Mr. Hubert A. Gregg, architect.—	
James	278 0 0
Miller	730 10 0
Worboys & Son	694 0 0
ROCKENHAM.—For the erection of a billiard-room, Messrs. Farnacott, 156, Westminster-bridge-road.	
Kydd	2140 10 6
Atell	118 0 0
Kick (accepted)	101 0 0
Read	89 0 0
BISTOL.—For the restoration of meter shop, premises, Castle-green, Bristol. Mr. R. K. Leakey, architect. Estimates supplied by Messrs. Young & Brown.—	
Cowlin	64,231 0 0
Humphreys	4,105 10 0
Fonse (accepted)	3,820 10 0
Stephens, Bastow & Co. (accepted)	3,863 0 0
[All of Bristol.]	
BISTOL.—For a branch factory and manager's house Kingswood, for Messrs. R. W. Ashley & Sons, wholesale and shoe manufacturers. Mr. Herbert J. Jones, architect, Bristol.—	
Bastbrook & Sons	21,840 0 0
W. Godfrey, Kingswood	1,690 0 0
T. Hatherly	1,663 0 0
E. Walters	1,647 10 0
Wm. Church	1,630 0 0
G. Humphreys	1,475 0 0
J. Perrott	1,407 0 0
Thos. R. Lewis	1,376 0 0
* Rest of Bristol.	

BISTOL.—For pulling down old and building new warehouse and offices, Broadmead, for Messrs. H. Ashman & Co. Mr. Herbert J. Jones, architect, Bristol.—	
A.	
W. Church	22,540 0 0
J. Wilkins & Son	2,378 0 0
J. Bastow	2,200 0 0
Cowlin & Son	2,189 0 0
Bastbrook & Sons	2,148 0 0
A. Kraus	2,077 0 0
G. Humphreys	2,075 0 0
E. Walters	2,074 11 10
J. Perkins	1,985 0 0
T. R. Lewis	2,000 0 0
E. & G. Howell	1,980 0 0
J. Perrott (accepted)	1,974 0 0
[All of Bristol.]	
A. Cross amount of tenders	
B. Net ditto after allowance for old materials.	
CROMER.—For the erection of the Town-hall, for the Cromer Town-hall Company, Limited. Mr. George J. Skipper, architect, Norwich. Quantities by Mr. F. M. Skipper, surveyor.—	
J. Downing	22,050 0 0
W. Chapman	1,893 0 0
Berdell Bros.	1,800 0 0
G. E. Hawes	1,900 0 0
Jas. Gray	1,868 0 0
H. Leacy	1,852 0 0
R. Mavor	1,807 15 0
J. H. Blyth	1,881 0 0
Corle & Beech	1,858 0 0
R. Eastoe	1,836 0 0
Solden Hipwell	1,738 0 0
J. Newman	1,733 15 0
J. Orfeur	1,695 0 0
C. Youngs	1,699 0 0
Chapman & Son, Norwich (accepted)	1,439 0 0

LONDON.—For the erection and completion of the Royal South London Ophthalmic Hospital, St. George's-parish, Waterloo-road, for the Committee. Mr. Keith D. Young, architect.—

Hall, Biddall & Co.	219,168	0	0
Patriot	18,979	0	0
Wall Bros.	18,883	0	0
Nightingale	18,831	0	0
Bywaters	18,816	0	0
Higgs & Hill	18,700	0	0
Downs	18,558	0	0

LONDON.—For erecting house, Fitzjohn's-avenue, Hampstead. Mr. George Truett, architect.—

Stuart	26,080	0	0
Han & Son	5,540	0	0
Lown & Son	5,470	0	0
Gould & Brand	5,377	0	0
Stanley Bird	5,263	0	0
Hunt	5,198	0	0
Bryans (accepted)	4,997	0	0

LONDON.—For building new warehouses, James-street, Haymarket, for Mr. W. F. Williams. Mr. D. Cubitt Nichols, architect.—

Patman & Fotheringham	28,763	0	0
Perry	6,687	0	0
Morker	6,587	0	0
Brivonnet	6,460	0	0
Stimpson	6,420	0	0
Gentry	6,390	0	0
Grover	6,363	0	0
Nightingale	6,337	0	0
Lawrence & Sons	6,280	0	0
Toms	5,983	0	0

LONDON.—For foundations and basement in Davies-street and South Molton-lane, for Messrs. Bolding & Sons. Messrs. Wimporis & Arber, architects.—

Oldrey	23,377	0	0
Fulmer	3,975	0	0
Nightingale	3,958	0	0
Bywaters	3,284	0	0
Higgs & Hill	3,240	0	0
Hall, Biddall & Co.	3,240	0	0
Chapple	3,239	0	0
Perry	3,197	0	0
Buck & Sons	3,173	0	0
Kirk & Randall	3,119	0	0
Lawrence & Sons	3,015	0	0
Johnson	2,990	0	0
Adams	2,988	0	0
Wall Bros.	2,748	0	0

LONDON.—For the proposed rebuilding of the ‘Blue Anchor’ tavern, Bell-court, Fenchurch-street, E.C., for Mr. Godwin. Messrs. Treacher & Fisher, architects.—

Kirk & Randall	24,125	0	0
Nightingale	3,639	0	0
Lancelotti	3,607	0	0
Greawood	3,520	0	0
Gentry	3,494	0	0
Kilby & Gayford	3,370	0	0

LONDON.—For proposed alterations and additions to the German Orphan Asylum, Norfolk-road, Dalston, for the Committee. Mr. E. A. Gruning, architect.—

Holland & Hannen	23,869	0	0
Colls & Son	3,777	0	0
Nightingale	3,630	0	0
Clark & Bracey	3,668	0	0
Perry & Co.	3,662	0	0
Lectier & Sons	3,633	0	0
Simpson & Sons	3,600	0	0

LONDON.—For partial rebuilding and alterations at the ‘Black Lion’ Tavern, Baywater-road. Mr. R. A. Lewcock, 88, Bishopgate-street Within, architect.—

A. Davies	23,663	0	0
Kynoch & Co.	3,274	0	0
Lancelotti	3,036	0	0
Boars & Co.	3,097	0	0
J. E. Todd	2,989	0	0
J. Walker	2,890	0	0
Balsam Bros.	2,824	0	0
John Allen & Sons (accepted)	2,850	0	0





# The Builder.

Vol. LVII. No. 242.

SATURDAY, NOVEMBER 23, 1890.

## ILLUSTRATIONS.

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Claybury Asylum, Woodford, Essex: General View.—Mr. George T. Hine, Architect .....	Double-Page Photo-Litho.
Ground Plan of the Claybury Asylum .....	Double-Page Photo-Litho.

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### Over the Scottish Border.



WE have all heard stirring tales of Border warfare; Border minstrelsy has charmed our boyish ears; the veil of romance which Sir Walter Scott has cast over the scenes of

village and rapine enacted for centuries in the Border counties has invested them with a fascination which has outlived many modern tree volumes. To us, indeed, these tales may have seemed little more than visions, though suggested by real events perhaps; but the real events were too far away in the past to excite any desire of grasping their actual significance, and the whole series shone bright out ill-defined through the glowing atmosphere conjured up by the romancer. But a visit to the country where they occurred, an examination of the castles in which the actors lived, brings home to the imagination the reality of the deeds and the characteristics of the doers.

The castles, or Peel-towers, as they are called, of the Border, are distinct from anything south of that indefinite tract, unless it may be a Norman keep. Now a Norman keep is a thing of antiquarian interest, but the daily life that went on within its walls appeals to but few. The records are scanty, and known to hardly any besides Dr. Dryasust, whose manner of imparting information is not popular. If we go to the Bayeux tapestry the curious figures there delineated seem to have but little in common with us of the nineteenth century. But imagine a Norman keep built in the seventeenth century, after John Thorpe was dead, and inhabited by the contemporaries of Inigo Jones, and you find the task of peopling it with inmates a little less difficult. It is true that the simplest type of a Peel-tower was not very much in use in the seventeenth century, but in all essential features the convenience and accommodation that suited William the Conqueror's followers were sufficient for the borderers till after James I. came to the throne.

In case we should be too much inclined to old the wild deeds related of this part of the world to be little besides the raw material of the novelist, let us hear what a grave writer had to say some four years after the

crowns of England and Scotland were united under James I.

Camden, in his "Britannia" (1607), says of his design of dealing with Scotland:—"For this, I assure myself of pardon, both from the good nature of the people themselves, and in regard of the extraordinary happiness of our times, when, by Divine providence, that is fallen into our hands, which we durst hardly hope for, and which our ancestors so often and so earnestly wished to see, namely, that Britain, which for so many ages had been divided in itself, and been a kind of unsociable island, should (like one uniform city) be joined in one entire body, under one most august monarch, the founder of an everlasting peace. Who, being through the propitious goodness of Almighty God, appointed, and born, and preserved, for the common good of both nations, and a prince of singular wisdom, and fatherly affection to his subjects; doth so cut off all occasions of fear, hope, revenge, and complaint, that the fatal discord, which hath so long engaged these nations, otherwise invincible, in mutual wars, is now stifled, and suppressed for ever, and concord exceedingly rejoices, and even triumphs, because, as the poet sings:—

Jam cuncti gens una sumus,  
Now all one nation, we're united fast.  
To which we answer by way of chorus.  
— Et simus in ævum.  
And may that union for ever last."

Further on, in enumerating the main divisions of the country, he divides them into Highlanders and Lowlanders, and adds, "out of this division I exclude the Borderers, because they, by the blessed and happy union, enjoying the sunshine of peace on every side, are to be look'd on as living in the very midst of the British Empire; and (being sufficiently tired with war) begin to grow acquainted with and to have an inclination to peace."

The worthy Camden, therefore, had a vivid sense of the feuds that abounded in the Border country; and in a casual manner he constantly recurs to this subject, his remarks being all the more striking because not intended to enforce this point. In dealing with "Tei-fdale," or Teviotdale, he says, "It is inhabited by a warlike people, who by reason of the frequent encounters between the Scots and English in former ages, are always very ready for service and sudden invasion." In Liddesdale, again, he says, "Hard by is Brakensey, [better known to modern ears as Branksome, the scene of the 'Lay of the Last

Minstrel'] the seat of the warlike family of Bucleugh, sir-named Scot; with many little forts of military men, up and down the country."

It is these "little forts of military men" which we are now about to visit. And first let us go to Smailholm, lying midway between Kelso and Melrose. Here we have the wants of man supplied in about as bare a manner as is possible. The Tower stands on an abrupt mass of rock precipitous on all sides but one, where it is strengthened by a thick wall, through which the enclosure was



entered (see sketch). The enclosure was about as large as an ordinary stable-yard, and occupied most of the flat top of the rock, the remainder being taken up by the tower itself. That was the whole of the homestead,—the tower and the yard. If there were any out-buildings in the yard, they were insignificant, and only meant for cattle. The tower was the home of the chief, and when we consider that it was his home till comparatively modern times, an inspection of its bare interior will give a good idea of the difference that existed between the civilisation of Scotland and England at the time of the union of the Crowns.

The tower contains four apartments, one above another, about 25 ft. long by 17 ft. wide, access from one to the other being obtained by a circular stone staircase in one corner. The lowest room was a store-place, with a loft in the upper part, whither the servants probably climbed to seek such



repose as they might. This cellar was vaulted, with a plain barrel vault, forming the floor of the room over, which was the hall. Over this hall were two other floors of wood, the uppermost of which communicated with the battlements. Only the three upper rooms had fireplaces. The cellar had a narrow window, the other rooms had windows somewhat larger, but still small, and provided with stone seats on each side of the recess formed in the thick walls. The hall and the room over had each a latrine leading out of one corner, and formed in the thickness of the wall. A few recesses by way of cupboards—and that is the whole of the provision made for the comfort of the lord of Smailholm, his lady, and the household. Anything more bare could hardly be imagined, and, when we remember that such an eyrie was the Scotch representative of our Elizabethan manor-houses, we can easily appreciate the benefits that sprang from the union, and the cessation of hostilities which it ultimately brought about. Smailholm was the scene of Scott's ballad, "The Eve of St. John," but the "chamber to the east," the abode of the priest, is a poetic licence, and so, too, is the "chamber fair," where the lady slept, unless it were plentifully hung with arras to hide its present desolate appearance.

The exact date of Smailholm is difficult to determine, but Messrs. McGibbon and Ross class it among examples subsequent to 1542 in their excellent book on "The Castellated and Domestic Architecture of Scotland." At Amisfield, however, in Nithsdale, there is the date 1600, together with the arms of the owners and the initials of one of them. This, if not the actual date of the erection of the tower, shows at least that at that time it was the home of the family, and embellished as such.

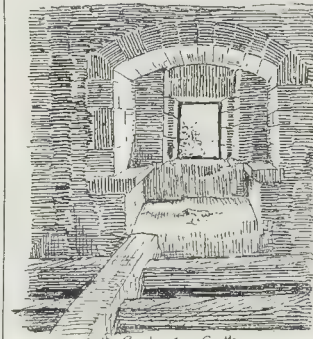
This home of a Scotch laird in 1600, though more ornate than Smailholm, is no larger, and contains but little better accommodation. It has the vaulted cellar, the hall over it, and two more rooms again over that. There are signs of a recess in the hall having been partitioned off into a separate apartment; and, on the top floor, three of the angle turrets form three very small rooms; but with these doubtful exceptions there is no more attempt at privacy than there had been in England five centuries earlier. At Amisfield there is no battlement-walk as at Smailholm, but there is a picturesque watch-tower carried up three storeys higher than the top main floor.

It is evident that the people who lived in such strongholds were compelled by a necessity which they could not withstand to sacrifice comfort to security. Or perhaps it would be more correct to say that the need for a safe home compelled them to adhere to the old and tried arrangements, instead of adopting the ideas of comfort which some of their countrymen had accepted, and which no squire in the southern kingdom would have consented to forego. It is impossible to suppose that any one in the seventeenth century would have neglected the refinements of the age, had they been in a position to have availed themselves of them.

Smailholm and Amisfield are examples of the small and simple Peel; but there were others of the same general type, but with more conveniences introduced. Such are Comlongon in Dumfriesshire, and Elphinstone in Midlothian.

They are both considerably earlier than the other two, which shows that the latter were not built in so plain a manner for want of existing examples to follow. Comlongon has the usual number of floors: the vaulted cellar, with a loft in it; and the hall, and two rooms over it, all about 30 ft. by 20 ft. But here in the walls, which are from 10 ft. to 13 ft. in thickness, are contrived numerous little chambers, without any fireplaces it is true, but still separated from the main rooms. The latrines open from some of these instead of from the hall; there is a separate kitchen, though it is very small; and the battlements have covered guard-rooms, one of which has a fireplace. There is,

throughout the place, a certain striving after ornament; the fireplace and almonry in the hall have an unusual amount of work lavished upon them, and many of the floor corbels are carved with coats-of-arms. In addition to the main staircase reaching from top to bottom, there is a second leading from the hall to the cellar. The windows and window-seats are somewhat larger (see sketch), and



Window Seats, Comlongon Castle

altogether we have here quite a superior tenement. Not the least interesting feature is the dungeon. It is contrived in the thickness of the wall, and is some 18 ft. long by 6 ft. wide and 9 ft. high. The only access is through a manhole in the barrel vault; there is no window, and the only means of ventilation seems to have been an opening at one end, which found a devious way into the open air. The fate of any one consigned to this place was hardly to be envied.

Elphinstone Castle is even more elaborate. Each floor is about 30 ft. by 20 ft., surrounded by thick stone walls. Over the vaulted cellar and loft is the main hall, a high vaulted room, and over this is a floor divided into two in its length; while over this again was another floor, giving access to the battlements. The thick walls are riddled with little chambers, some leading direct from the main rooms, others contrived as mezzanines off the stairs. There are more stairs, too. Some, of small diameter, lead from floor to floor, and to the wall chambers already mentioned; while one, as much as 8 ft. in diameter, commences at the great hall, and leads direct to the battlements. By this means the men-at-arms were able to pass between their two places of chief resort without going near to any of the private apartments. Here, too, there is a separate kitchen, but there is no such dismal dungeon as at Comlongon, though, no doubt, one of the numerous wall-chambers would often serve the same purpose.

Distrust of both friend and foe governed the arrangements of these "little forts of military men." The contrivances against the foe are sufficiently obvious. The thick walls, the unflammable vaulting, the small windows, the well-guarded external doors, some of which were on the second floor and reached only by ladders (in which case the doorway on the ground floor and the staircase to it would be blocked during an attack by anything that could be spared)—all these are patent enough. But against friends curious precautions were sometimes taken. Here at Elphinstone is a kind of spy-hole contrived through the flue of the great hall, to overlook that apartment and to communicate with a little chamber approached only by a private stair. In another castle an opening has been contrived leading from a recessed window, where the unsuspecting members of the household would retire for private converse, to a chamber in the wall accessible only to the owner, and where, quite unsuspected, he could hear everything that was said.

These examples are only four out of many hundreds that abound in all parts of Scotland. With all the rudeness of manners which their

arrangements imply, they were the homes of chieftains from whom some of the best of the Scotch families are descended, and, which is the most striking reflection, they were deliberately adopted as the only safe residences at a time when every English village had its new or modernised manor-house, in which all thoughts of defensive arrangements had been abandoned, and in which the increasing comfort of the times had multiplied apartment-had given them wide and handsome fireplaces, and, above all, had let in floods of daylight upon their carefully-designed and elaborately-wrought ornament.

#### NOTES.

**E** are glad to observe, in connexion with the munificent gift of a quarter of a million by Sir E. Guinness for the purpose of building dwellings for the poor in London and Dublin, that there appears to be a decisive intention to administer the fund on the only principle on which it is of any real use to administer such a gift, viz.: for the provision of buildings on an economic basis. The Peabody Fund, owing to the ignoring of this wholesome principle, has been, in our opinion, a conspicuous failure in regard to the real object originally professed. It has not provided houses suitable to the very poor, and it has not established any, as far as we have heard, on a really remunerative basis. At the same time, we cannot ignore the fact that the difficulties in the way of doing this are very great. We can only trust that the trustees of the new fund will not find them insuperable. A daily paper exhorts them to consider architectural beauty in the buildings erected. We quite sympathise with the spirit of the recommendation, but we fear that is almost out of the question. The problem is to produce a wholesome dwelling of sound construction, so cheaply as to let at the rents which the lowest class who pay any rent at all are now paying, and to yield a fair profit to the administration. This has never really been accomplished yet. A difficulty of another kind exists in the habits of the class themselves who are intended to be benefited. They must be kept under rules and regulations, or they will ruin the property; and such is the dislike of the lower classes to regulation, that many of them would prefer to live in a hovel as they please, to living in a clean house under supervision. "Go out into the high-ways and hedges and compel them to come in," will perhaps be the practical upshot of the scheme. They will be at least be nearer the kingdom of heaven in clean and decent houses than they can well be in dirty and unsanitary houses; and perhaps the next generation, at all events, may have learned the lesson which will have to be forced upon the poor of the present generation.

**A** LARGE party of engineers and architects met at the South Kensington Museum on Monday afternoon, to inspect Mr. Vinning's high-pressure fire-hydrant system which is installed there, and to which we have before referred. This is a system, applicable to any large building in which the extent and importance of the "fire-risk" justify the necessary expenditure,\* for keeping always ready at a moment's notice the power of throwing a jet of water the whole height of the building, by air-pressure derived from storage of compressed air. On the accompanying plan and section, B represent fourteen wrought-iron cylinders each 14 ft. long and 12 in. diameter, connected by tubing so as to be practically one vessel, and filled with air at a pressure of 350 lb. to the square inch. From the bottom tier of cylinders a pipe (D) is carried upwards to a pressure-lever and

\* In regard to cost, Mr. Vinning writes:—"The cost of an installation identically the same as that at South Kensington Museum would be from, say, 450l. to 550l., according to structural conditions. This would be often modified and considerably reduced—(1) where buildings were of much less elevation; (2) where the apparatus could be put on the roof."



pressure-gauge board fixed against the wall in the roadway above. Here the pressure is retained by a check-valve within the valve box, above which a pressure-gauge shows the maintenance of the pressure at the required 350 lbs. From this the pipe is continued to a regulating and reducing valve, and from thence is carried downward to the top of the water-tank, at its junction to which is fitted a weighted safety-valve and a small float-ball valve (I), which permits the air to pass upwards through it when the tank is being filled with water, but closes by floatation when full. At the base of the water-tank, a similar float-ball valve (K) falls when all the water is discharged, and prevents the compressed air from entering the fire mains. On the pressure lever being pulled downwards, the valve is opened and the compressed air passes through the regulating and reducing valve, and downwards on to the surface of the water, which is then—on the opening of any of the fire-cocks all over the building—delivered from the high pressure

engines can be got to the spot, and affording the means of contending instantly with the first outbreak of a fire, without having to trust to the necessarily varying and often quite inadequate head of pressure in the company's water-mains. The exhibition of the action of the hose under the air pressure was perfectly satisfactory, and showed that here was a power placed in the hands of the custodian of the building equivalent to a powerful fire engine on the spot and always in gear. We expressed some doubt on a former occasion as to whether the stored compressed-air power could be trusted for an indefinite period; but with care in the manufacture of the containers it seems quite possible to secure practical freedom from leakage, and the pressure-gauge, at all events, shows at any time if the pressure is declining. It would be of course advisable to test the working once in six months or so, to see that all is right; but there is nothing about the apparatus that is at all liable to get out of order.

**THE** scheme for a ship-canal between the Forth and the Clyde has during the past two months continued to be somewhat diligently canvassed on a local footing, with Edinburgh as the headquarters of the movement, but the progress looked for, and some time ago prospectively announced as within view, has not been realised. No application will be made during next session of Parliament. Glasgow, upon whose advancement the cutting of such a canal would exert an influence of the greatest importance, has been, or seemed to be, singularly apathetic during the discussion of the question; but there may be cause for this, so far as the Town Council and the Clyde Trust are concerned. If the canal were cut at the narrowest crossing, about fifteen miles of the already canalised Clyde would be used by the through navigation, and sailing powers to that end taken in the Act of Parliament. A full rate of tonnage dues charged for this accommodation might be, and very likely would be, fatal to the financial success of the new enterprise, and an agreement on liberal terms previously concluded with the Clyde Conservators is therefore a necessity. In a matter calculated to confer benefit on them from almost every conceivable quarter, the latter might well be not only generous, but eager; but perhaps they calculate that by affecting indifference now they may drive the harder a bargain when the time for bargaining arrives. Probably to hold this tendency in check the promoters have meanwhile been talking of the old suggestion of a roundabout route *via* Loch Lomond, of more than double the length, and involving a deepening of the Forth at one point, and passing it by syphon under the canal at another; also dealing with the River Endrick in a similar way, and tunnelling mast-high for some miles under two lofty ridges of hills, but making no use of the deepened Clyde, and keeping Glasgow at a distance. It is not likely that Glasgow will be seriously frightened at this; but it may bring about what is desirable, if the canal, on a reasonable route and scale, is ever to be made, and that is the assumption by the western city of the leading place in the movement, and the abandonment of its present position of mere watcher.

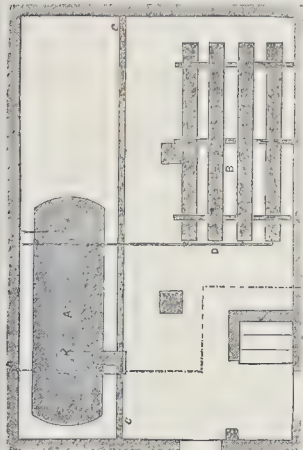
**A** LETTER has just been addressed to the Railway Companies' Association by the Board of Trade, pointing out the desirability of giving earlier notice of intended alterations in the passenger train service. This action may perhaps be looked upon as a sequel to the chorus of complaints which recently appeared in the *Times* on this subject, led by the Bishop of Wakefield. It is probable that the remonstrance from the Board of Trade will have far more weight than the newspaper appeals, and that some improvement may at last be looked for. Time-table alterations involve far more work than the uninitiated would imagine, but this is not a sufficient excuse for the delay in announcing them which has given rise to this remonstrance.

The Department unearthed a letter dated April, 1878, in which it was promised that "the several companies will endeavour to publish any alterations they may make in their train arrangements at each station one week before the expiration of each month, and also advertise them as early as possible." This (as most persons who travel frequently will know to their cost) has, apparently, been found impracticable hitherto. It is often impossible to know of train alterations until after they are an accomplished fact, and very seldom, indeed, "one week before." The Board of Trade only ask the companies to give the desired publicity to these changes "a reasonable time before they come into force." The least the latter can do is to carry out the arrangement of 1878, and we hope we may soon find "Bradshaw" on the bookstalls several days before the first of the month.

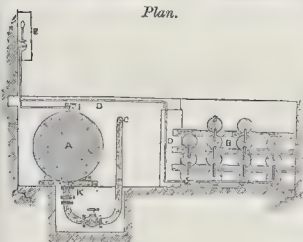
**WE** hear that the Caledonian Railway propose to apply for power to construct an underground railway from the station at Lothian-road, Edinburgh, through the centre of the city. The proposed new railway would leave the present terminus on the north side of the station at a level of 12 ft. below the existing platform. Crossing Lothian-road, it would run under Princes-street near to the Gardens, with a station at the east end of the street, proceeding under Waterloo-place, Regent-road, and Royal-terrace to Greenside, from whence it would run in the open to the foot of Leith-walk. At this point the line would fork, one branch running to the new docks at Leith, and the other to the existing Caledonian railway near Granton-road, thus completing the circle. The scheme involves the erection of a new station at Lothian-road, that at present in use being a temporary wooden structure in a dilapidated condition.

**THE** Military Exhibition in Edinburgh has given rise to a desire for the formation of a National Armoury for Scotland. It is thought that the newly-restored Parliament House in the Castle would form a suitable habitation for the collection. Besides the arms in the Exhibition at the Scottish National Gallery, there are said to be specimens of good armour scattered throughout Scotland which the owners might be induced to add to a national collection, and the armoury at the Tower, which is overcrowded, could easily spare others which are stored there.

**I**N our article on "Concrete Floors" (October 26), referring to the correspondence on the subject set on foot by Mr. F. Caws, we referred to a concrete floor given by Mr. Caws as the largest he had yet attempted to construct, being 30 ft. by 19 by 7 in. thick, but which was then still in process of construction. We referred to it as having a dangerously small factor of safety. Mr. Caws now sends us further particulars as to this floor, of which the centres have been struck after having stood for three months. The size of the slab of which the centres have just been struck is, it appears, 26½ ft. by 19½ ft., but by the process of corbelling round the edges (*i.e.*, casting the concrete round the edge in a corbel section), the bearing of the thin portion of the slab is practically reduced to 25 ft. by 18 ft. The admixture was one of best old cement to four of hard broken brick aggregate. The centering was 2½ in. plank supported in a perfectly firm manner on joists and posts. Over the centering a film of plaster was spread, so as to make a fair surface for finishing the ceiling. Over the plaster a grout of pure cement was spread as a guarantee against air holes appearing in the finished ceiling surface. Upon the wet grout the concrete was cast about 5½ in. thick, with the aggregate broken not larger than a hen's egg. Finally, the finishing layer, 1½ in. thick, was laid, formed of cement with very fine broken brick or granite chips. "Immediately after the removal of the centering," Mr. Caws writes, "we fitted a rod vertically tight between ceiling and floor. The rod is 14 ft.



Plan.



Section.

tank (A) at 100 lbs. pressure. The result of this is that the Museum has, at instant command, at its highest point—an elevation of 110 ft. from the ground level—about 120 ft. head or 51 lbs. pressure instead of the present head of 20 ft. or 8 lbs. pressure, and this entirely free from the risk of any temporary failure of the external public supply. The air-cylinders are charged to the necessary pressure of 350 lbs. to the square inch, by means of a number of steel bottles or tubes, of portable shape and weight, containing compressed air at a pressure of from 1,500 to 2,000 lbs. These bottles are delivered by the patentee, and removed after charging the cylinders—a work of a few minutes. This is a very convenient method of charging the air-cylinders, where it is not found convenient to provide an air-pump and the necessary power for driving it; which would usually be a one to three horse-power engine, or its equivalent in manual, water, or other power. The tank contains sufficient water to supply a hose with a ½ nozzle for about twenty minutes, doing the work of a fire engine until the



long, and a lateral deflection of 2 in. would show vertical deflection of  $\frac{1}{4}$  in. in the centre of the slab. The rod has deflected barely  $\frac{1}{8}$  in. laterally, so that the centre of the slab has deflected vertically about the thickness of a well-worn sixpence. On the top of this slab there is a  $\frac{1}{2}$ -brick partition wall, built about 12 ft. high, with no support except that of the slab. There are also the props of the centering supporting the slab of the next floor above." The  $\frac{1}{2}$ -brick wall and the scaffold posts do not however represent quite what may be called loading a floor. It would be more satisfactory to have details of a test load with figures given, and the effect on the floor noted.

**D**R. PAGE'S report to the Local Government Board\* (September 30) on an epidemic of enteric fever in the Northern Division of the Houghton-le-Spring Rural Sanitary District, is very instructive in regard to the unsuspected methods in which water-supply may be polluted, and the patient thoroughness of investigation often required to arrive at the *fons et origo mali*. Examination of the district convinced the reporter that defective drainage was not the cause of the disease; one or two other possible causes (milk-supply, for instance) were dismissed, and water-supply seemed to be the only possible cause left to speculate upon; but there was nothing in the obvious circumstances of the water-supply to account for this. The following sentences extracted from the report give the points of the story:—

"The Herrington supply is pumped from a well or 'staple' sunk to a depth of 330 ft. into sandstone strata of the coal measures, into a service-reservoir holding 30,000 gallons, from which it is distributed by gravitation. This well, which was sunk some fifteen years ago for the special purpose of the water-supply of this district, is above the level of the colliery workings, and has no communication with them. For the first 72 ft. it passes through clay with sand partings or seams; for the next 15 ft. through limestone marl; and for the remaining distance through beds of sandstone and shale. The sides of the well are lined with bricks set in mortar, and up to the period of my inquiry were believed to be impervious, the water being described as entering the well at the bottom. . . . From the distribution of the fever over the whole line of the particular water-service, including, as now shown, its highest as well as its lowest points, it became evident that contamination of this service near its source would alone explain the circumstances of the outbreak. Although the early occurrence of cases in New Pit-row, as well as in Red-terrace, was inconsistent with the view that pollution of the water had taken place in its passage through the service-pipes and thus brought about a general specific contamination of the supply, I thought it desirable to examine the relations of the main and the sewer where these were contiguous by the side of the railway. This was accordingly done, and both were thoroughly exposed in their entire length. As a result the sewer was found to be leaking at several points, but the water-main was quite intact, the joints of the latter, although carefully cleansed all round and tested for some time under full pressure, showing not the slightest sign of wetness. . . . Examination of the immediate surroundings of the reservoir and the well was next made."

This portion of the inquiry, given in considerable detail, afforded no satisfactory explanation. At last a careful examination of the sides of the well was made, and a "feeder" was discovered to enter it about 45 ft. below the ground, issuing from the brickwork at the rate of twenty-two gallons a minute. This water, taken direct from the fissure as it issued, gave a different analysis from that of the well-water rising from below, and showed "highly objectionable features." Eventually the origin of contamination was found in the premises of a farmhouse three-quarters of a mile off:—

"The farmhouse and buildings are upon the magnesian limestone, the beds of which dip towards the north. Owing to subsidences caused by the colliery workings below, fissures extending to the surface exist in this locality. The drainage of the farm-buildings, of a cottage, and of the farmhouse itself (in which latter there is a water-closet) are conveyed to a tank. The over-flow from this tank

escapes and disappears down an adjoining fissure in the ground. To determine whether a connexion existed between this fissure (three-quarters of a mile from the well) at Herrington Hill farm and the water-bearing strata supplying the staple, I suggested that common salt should be dissolved and thrown down the fissure. Instructions were given to this effect, and two tons of salt were accordingly thrown down on May 11. At this date the discovery of the 'feeder' in the 'staple' had not been made, and testing of the water as pumped from the well did not give any conclusive indication of increase of chlorides. On the discovery of the 'feeder' a week later a clue to the excess of chlorides shown by it (as compared with the body of water in the well) was apparently furnished, and, as will presently appear, the source of the chlorides was in the end conclusively demonstrated. From May 24 a series of daily testings of the relative amounts of chlorine in the water of the reservoir and of the 'feeder' were made. The chlorine in the water of the reservoir varied from 2.3 to 2.8 grains per gallon, that in the 'feeder' from 4 to 6 grains per gallon. On May 29, with a view to placing beyond doubt whether the increase of chlorine thus shown was due to the salt thrown down the crevice at Herrington Hill, five tons of salt were washed down the crevice with a hose-pipe running for twelve hours, during which time it was estimated that some 100 tons of water was discharged. On the following day the chlorine present in the water of the 'feeder' rose to 15 grains per gallon. The testing was continued for a few days longer, and on June 5 the chlorine reached the maximum amount of 34 grains per gallon. During the next few days it fell again to the former amount. The connexion between the two localities, the farm-tank and the 'staple,' was thus conclusively established, and the source of excremental contamination of the water-supply demonstrated."

**I**N a "Note" last week we adverted to Sir Sydney Waterlow's munificent gift of his Highgate estate (Fairseat) to the London County Council. At their meeting on Tuesday, 12th inst., Lord Rosebery intimated that this property comprises a traditional home of Nell Gwynne, which will, perhaps, be now demolished. This we take to be the house—once tenanted by Lord Westbury—and known as Lauderdale House, which in 1872 Sir Sydney conveyed to St. Bartholomew's for the purposes of a convalescent home. It is said to have been built, circa 1660, for the Royalist, John Maitland, second Earl and first Duke of Lauderdale, who died in 1682. Here, as the story goes, the king conferred the earldom of Burford upon the infant Charles, the elder of his bastard sons by Nell Gwynne. That son's descendant, William, ninth Duke of St. Alban's, married the widow of Thomas Coutts, the banker, of Holly Lodge, hard by. The duchess, Harriet Mellon, continued to occupy the Holly Lodge, well known to our generation as the residence of the banker's granddaughter and heiress the Baroness Burdett-Coutts. In a cottage which formerly adjoined the grounds of Lauderdale House, and standing over against Cromwell House, lived Andrew Marvell. His home here and its garden are described in the late S. C. Hall's "Pilgrimages to English Shrines." Close to Hall's is the retreat of the Passionist Fathers of St. Joseph, built after the designs of Mr. F. W. Tasker, architect, and dedicated by Cardinal Manning in 1876. The new buildings for the retreat have just been completed. It was originally established here, in 1858, by the late Honourable and Reverend George Spencer, where had hitherto been a once favourite hostelry, the old "Black Dog." The old Cromwell House, distinguished by its fine staircase, was restored after a fire that broke out therein about twenty-five years since. It is believed to have been erected by the Protector for his son-in-law, General Ireton; and had latterly served as a convalescent home in connexion with the Children's Hospital, Great Ormond-street. Cromwell-avenue has been built over site of the house and grounds. It is rumoured that the Small-pox Hospital, next to St. Joseph's, is about to be converted into barracks in connexion with a new scheme for the defence of London.

**I**N last week's number of *Engineering* is published a small illustration of the design which has been made by a certain Mr. Judson for an iron tower for the United States, to be 630 ft. higher than

the Eiffel Tower. The design, even on the small-scale drawing given, serves at all events to show that, objectionable as the Eiffel Tower is, it is quite possible to produce something far more ugly as well as higher. This outbreak of tower projects was to be expected after the fuss made about the Eiffel Tower; and America is just the quarter of the world where it will be thought a kind of national duty to produce a tower that will outtop the French one. It is to be hoped England will be wiser.

**W**E observe from a paragraph in the *Liverpool Courier* that Mr. Dunscombe, the City Engineer of Liverpool, has declined to enter into a second competition for the post of Engineer to the London County Council. Mr. Dunscombe was one of those whose name we should have expected to see among the selected six of the previous competition; and we can quite understand his declining, under the circumstances, to take a second chance of such selection.

**A**LL who are interested in our great architectural monuments will have been concerned to learn that so noble a church as Selby Abbey is in danger from structural decay. It is to be hoped that the funds necessary to put it in a state of security will be found before long. It is satisfactory to learn that the Vicar and others interested in the matter have no thought of doing anything in the way of "restoration" in the sense in which that phrase is too often understood.

**I**N connexion with the subject of Selby Abbey, first brought up by a letter from Mr. Poynter in the *Times*, that irrepressible person Mr. Cavendish Bentinck writes to know why Mr. Poynter denounced "vandalism" at St. Albans when neither the Royal Academy nor the Institute of Architects had protested against "the most conspicuous act of vandalism of the day," viz.: the altar screen at St. Paul's. That the placing of a screen in apsidal form in front of the structural apse of the cathedral is an architectural blunder of the first magnitude we are quite agreed, and have expressed our opinion on the subject, at all events, in the plainest terms: but Mr. Bentinck should remember that Messrs. Bodley & Garner's architectural design and detail is very different from that with which St. Albans is defaced; the cases can hardly be called parallel, though perhaps the designers of the St. Paul's screen are in one sense the greater sinners, inasmuch as they ought to have known better, which could not have been expected of Lord Grimthorpe. Why the Royal Academy has never protested against this ill-devised intrusion on Wren's plan we know not; but why the Institute has not we can understand very well. We believe Mr. Bentinck himself wished to read a paper at the Institute denouncing the St. Paul's screen and its authors. Now inasmuch as the architects who designed the screen are not members of the Institute, to have admitted an amateur to make a formal attack upon them under the wing of the Institute would have been in the very worst taste, and would probably have given rise to serious misconception.

**The New Government Buildings at Christiania.**—Twenty-seven designs were sent in for the new Government buildings at Christiania, and the awarding committee has, by six to four votes, decided upon giving the first prize to Herr S. Letzow, architect, of Christiania. Four other prizes have also been awarded. However, the committee considers that none of the designs are acceptable for execution in their present form.

**The Norwegian Wooden Villa Industry.**—In consequence of the attractive show of the exporters of wooden villas at the Paris Exhibition, numerous orders for similar structures have been received from southern Europe, in addition to which all these exhibits have been sold.

\* Eyre & Spottiswoode, London; A. & O. Black, Edinburgh; Hodges, Figgis, & Co., Dublin.



## SOME SOURCES OF EXPRESSION IN ARCHITECTURE.\*

"Had you been, in fine, anything else in the world but architectural designers, you might have been of some use and good to people."—"Two Paths," p. 148.

THIS is a fortunate time for the arts in Britain,—if for each art to be put upon its defence, and to be expected to carry its own warranty of worth, if for each artist to be compelled to strive for the honour and welfare of his own special line of work, be fortunate. But, fortunate or not, these conditions attend the pursuit of art nowadays, and mark the temper of scrutiny which sprang into existence with the overthrow of tradition in the early part of this century. Before this event art was of tranquil mood and peaceful growth, and, since Mother Eve span her pretty primeval fancies, or Tubal Cain tinkered brass at his tent-door, had run on in much the same grooves, with a grand human indifference to the canons of taste pigeon-holed by our modern art grammarians.

There was no scrutiny before this breach with tradition, for there were no critics; there was no anxiety, no annual fingering of the nation's art-pulse, for there was no malady to combat, only, shall we say, a little languor had seized the aged Titan as he rested in Sleepy Hollow where he came to his untimely end. But with the close of the great chapter of traditional art everything changed,—the age of peace was gone, and an age of revolution was inaugurated whose effects are upon us to this day. Hence our shiftiness, hence the much-ado and vague unrest of ardent minds that are for ever analysing the inner springs of art-life, looking into first principles, putting venerable things to the test that have passed unquestioned for thousands of years. Hence this art-parliament, where each of us in his turn is trotted out to prove his credentials as an artist, and to give an account of the hope that is in him, to his comrades and the critics with a fairly-informed but somewhat unreflective public looking on.

This much by way of preface to explain how it is that in this year of grace and of architectural achievement one should be here to defend the true dignity of architecture, and to claim the rank that both of courtesy and of right she has always held in the hierarchy of the arts. It is one of the ironies of art-history that this rank should be denied to the one art that has the longest and the grandest record, and that an architect should have to assert the claims of his art places him in an awkward position; for it means either that architecture is not what architects claim it to be, or that its rank as an art is misjudged and undervalued, or that, owing to the poorer quality of modern work, it has sunk so low in public esteem that people all round may run-amuck at it; and, as at Liverpool last year, the sister Arts will not so much as stoop to do her reverence.

Now, it is not my wish to make out architecture to be other or more than it is. Art is not a game of brag, and God knows we have good reason to be humble! I claim simply that architecture is an imaginative art, with noble ways of utterance, and a power of appeal as independent of the sister Arts as are painting, poetry, music, or sculpture. In illustrating this proposition, it concerns me not to defend the work of to-day as though proof of its unworthiness would dispose of my claims for architecture in the general. Not so. Yet, even if it were allowed that our work has not the solid merits of the old, surely something of the miserable utilitarian spirit of the age which clips our wings when we would soar, and something more to the overcrowding of the profession. Our having to supply work conformable to the imaginative standard of the British Philistine scarcely conduces, perhaps, to the heightening of the quality of architecture generally; and as to the second plea, you will not deny that while the number of practitioners has vastly increased, the ratio of genius remains a fixed quantity. While the world lasts,—let you and I congratulate ourselves upon it,—mediocrity is bound to prevail. High heaven is jealous of genius, and keeps it phenomenal when it does appear. Artists are still as rare as white crowes.

Grant, then, that  
"We are scarce our father's shadow cast at noon,"  
and the fact remains that while the character and fashion of it may vary to any extent, not

so the art. True, its structural types and instruments of expression have changed beyond telling: this only shows that the art of architecture is a liberal language that takes many strange accents to its bosom, and permits variety of local idiom or quality of speech without producing confusion of tongues. Thus, each city of Italy has its own school of device, its own fashion in building materials,—brick or stone, marble or terra-cotta; yet who shall say that the diverse fragmentary schools of design hindered the expression of the national mind or rendered that expression one whit less felicitous? And so, to spread the area of example indefinitely, I say, the diverse national schools of design all over the world, severally and collectively, only represent the many moods of a many-sided art.

But here you may interpose, "We quite agree with you as to the singular magic of old buildings,—that is not the question; there have been exquisite moments in art, and we hope that they'll recur again. Are you right, however, in ascribing the high imaginative qualities of these old structures to architecture pure and simple? This you must know is not the verdict of writers and talkers about art, of critics, sculptors, and painters, who say with one consent that architecture has no sources of expression independent of sculpture. Sculpture, they say, is the Alpha and Omega of architecture, the only high poetic quality in architectural design."

Such I know are the unpleasant things they say to vex us, and if we cannot agree with them 'tis because we know our business, and know that we know it. To argue, as these good people do, that a building is nothing until completed with sculptural embellishment is a strange inversion of the common-sense of the matter, for to a homely architect it is like arguing that a leg of mutton is not a leg of mutton without its trimmings: or, to use a more polite simile, it is like saying that lovely woman is not complete without her jewellery.

It was Mr. Ruskin who first set the fashion of detraction, and first launched this theory, since when it has become a perennial platitude that never stales. In his "Two Paths" he is good enough to allow that architects may possess that poor sort of invention which produces pretty proportional lines, but as for "the Influence of Imagination in Architecture" (the subject of his lecture), this is only conspicuous by its absence. A building is worse than nothing without sculpture,—to be sure, whenever he praises sculpture, he specially excludes sculpture of the modern sort that adorns gentlemen's halls and shilling galleries,—this, he unkindly calls, "furniture sculpture,"\* and he is careful to explain that what he is talking about is not "furniture sculpture," which the housemaid presumably dusts every morning; but the real old-fashioned thing, the "imperfect architectural sculpture" in the tympana from Notre Dame and the two porches at Amiens,—both foreign examples, of course, because an English text wouldn't suit his discourse!

In his indictment of modern architecture, Mr. Ruskin asks, "Do you suppose the front of Whitehall, a singularly beautiful one, ever inspires the two Horse Guards, during the hour they sit opposite to it, with military ardour?" "Probably not," the architect replies. "The military instinct was not in Inigo Jones's mind when he built the Royal Palace, any more than it was in the mind of the author of the 'Dead March' in 'Saul' when he wrote the 'Coronation Anthem.' But it was in the mind of the proud author of the figure of the Duke of Wellington at Hyde Park-corner, that your friends the sculptors have so recently smuggled away into oblivion; and the tears live in an onion that the British soldier sheds at his loss!"

"Shall we, then," Mr. Ruskin goes on, "abandon this theory of the soul of architecture being in proportional lines?" &c., &c. "Abandon it, dear sir, by all means," the architect replies. "Is a theory of your own concoction, and none of ours. Turner would not have agreed with it, to judge by his loving portrait of numberless of the unsculptured buildings of England." "Perhaps, you answer again," continues Mr. Ruskin, "our sculptors at present do not design cathedrals, and could not. That is merely because we have made architecture so dull that they cannot take any interest in it, and, therefore, do not care to add to their higher knowledge the poor and common knowledge of the principles of building." "That we have alienated the sculptors by our dull work is sad indeed," the architect replies, "but if there be

anything in Mr. Ruskin's uncomplimentary remarks upon modern sculpture, who shall say that the sculptor might not have been earlier invited to redeem our work if only he had not, upon Mr. Ruskin's showing, made sculpture so dull that we could not take any interest in it," &c. It would appear, then, that our chances of securing the aid of the sculptor's higher knowledge in design just now is very low indeed, as the poor man has first to redeem himself. Perhaps by the time Puritan superstition about sculpture has died out as completely as it has about colour-decoration, the sculptor may have proved himself fit to come and help us! The main point is, however, the alleged absolute importance of figure-sculpture in buildings,—that is, if they are to have any imaginative expression. My short answer to this is: Knock off all the heads and hurl down all the statues at Amiens and Notre Dame, and how infinitesimal the difference would be in the general expression of the structure whose architecture they enrich. Think, also, how Westminster Abbey and St. Paul's Cathedral contrive to be expressive buildings, although they are devoid of religious sculpture—for you will scarcely call the white throng of churchyard images that crowd and shroud their walls "religious." Englishmen will, I trust, continue to credit the authors of these fine structures with something higher than bird-and-beaver craftsmanship, in spite of these captious critics. And let me add in this connection, that if had sculpture fails to ruin the imaginative effect of fine buildings like St. Paul's and Westminster, neither can fine sculpture, of itself, contribute any general imaginative effect where the architecture itself is inherently bad. Take the west front of Wells Cathedral as a case in point. Everybody visits Wells to see the unique group of Mediaeval ecclesiastical buildings there which give such a wonderful expression to the place. They also go to study the fine array of early sculptures which cover the west front of the cathedral. History is silent as to the author of this façade, but it is so poor and feeble, so deficient in all that gives expression to design, that you must ignore the mean frontispiece to enjoy the grand sculptures. The sculptures contribute nothing to the imaginative effect of the general composition, and you must take them one by one. For the honour of architects, past and present, I would fain hope that both architecture and sculptures proceeded from one hand (they are contemporary), and I would gladly present Mr. Ruskin with this façade to add to his possible list of one Northern cathedral where the "prentice hand" of a sculptor is to be detected in the architectural design.

And now to come to close quarters with the sources of expression in architecture. But first as to the term "expression." It came into use with descriptive writing about art, and is freely applied to creative work of all kinds. Pull the word to pieces, and you get "ex," out of, and "premere," to press,—to press or squeeze out, to declare, utter, signify. Now in one sense there is hardly any object devoid of expression, if the term be taken as covering some differential external quality, as in a ship, or animal, or tree. But in respect of art, the word is employed in a higher sense, rather as revealing some unique internal quality. And here the thing signified is almost as hard to define as the flavour of a fruit or the odour of a flower. Here we mean by the word the pervading grace, the special quality of attractiveness, the unique character of poetic interest that the poem, or picture, or building has. From whence comes this poetic interest? Wherein lies the secret of its charm for us? I would explain it in this way. Art of all kinds comprehends the forms in which men of genius utter what is in them. Art is the speech of poetic minds, and a work of art acquires its poetic interest by the simple fact that the artist has pressed out of his imaginative self the master qualities of his mind, and imparted these to his work. The thing speaks for the man and of the man. Hence the adage, "the style is the man." There is always found in the work of a man of genius an emotional quality of style which gives us so much more than the outward garb of the thing. For example, you can tell by its quality of style that this or that piece of music is by Beethoven or Greig ere a dozen bars have been played through, though you had never heard the piece before.

Here we touch the supreme mystery of art, which declares the divinity of its source. The dead, inanimate material that the artist handles

\* A paper by Mr. J. D. Sedding, F.R.I.B.A., read in the Section of Architecture at the recent Art Congress in Edinburgh.

\* "Two Paths,"



—be it a lump of clay, a stretch of canvas, a heap of stones, is quickened into life, transfigured by the man's communication of his own spirit to the thing. The stretch of dead canvas becomes sensitive and alive under Leonardo's hand, and the thing painted is immortalised: for the flesh of Mona Lisa still glows, the pulses of her neck seem still to palpitate, the carnation upon her cheek is still there, the wistful eyes still gaze out beyond the picture, beyond you, and into eternity. The face of the landscape that Wordsworth and Turner painted had nothing uncommon about it to the eye of the village yokel, but the man of genius as he paints it imparts to the picture by some subtle magic his own unique imaginative expression, and, lo! it acquires a new influence, the added gleam—

"The light that never was on sea or land,  
The consecration of the poet's dream."

It would seem, then, that a work of art, —poem, building, or painting,—gets its singular gift of attractiveness from the personality of the man. The artist strikes the imagination of others by pressing into his work his own imaginative qualities. Sir Joshua puts the matter thus:—"It is not the eye, it is the mind which the painter of genius desires to address." "The artist," he says, "will not waste a moment upon these smaller objects, which only serve to catch the sense, to divide the attention, or to counteract his great design of speaking to the heart; and it is this power of address that entitles painting to rank as a sister of poetry."

Now, in demonstrating to you that a great building, like a great painting or poem, has this evocative power and hold over the imagination, I cannot do better than quote two short passages from the writings of men who, though not art critics, have got a word or two to say upon this point worth listening to. "A Gothic Cathedral," says Hawthorne, "is surely the most wonderful work which mortal man has yet achieved, so vast, so intricate, and so profoundly simple, with such strange, delightful recesses in its grand figure, so difficult to comprehend within one idea, and yet so consonant that it ultimately draws the beholder and his universe into its harmony. *It is the one thing in the world that is vast enough and rich enough.*"

So much for the English cathedral here described (that has no sculpture), as interpreted on its spiritual side by a master of spiritual analysis; and now for the charming bit about Noyon Cathedral, in Mr. Stevenson's "Inland Voyage" (p. 168-10), where the expressiveness of a fine building is well enforced:—"I find I never weary of great churches. It is my favourite kind of mountain scenery. Mankind was never so happily inspired as when it made a cathedral; a thing as single and specious as a statue to the first glance, and yet, on examination, as lively and interesting as a forest in detail. . . . Where we have so many elegant proportions growing one out of the other, and all together into one, it seems as if proportion transcended itself, and became something different and more imposing." "I could never fathom," says Mr. Stevenson, "how a man dares to lift up his voice to preach in a cathedral. What is he to say that will not be an anticlimax? For though I have heard a considerable variety of sermons, I never yet heard one that was so expressive as a cathedral. 'Tis the best preacher itself, and preaches day and night; not only telling you of man's art and aspirations in the past, but convicting your own soul of ardent sympathies," &c.

If the witness of two writers whose minds are of the highest imaginative class be worth anything, we should have here abundant proof of the things in architecture that I am endeavouring to demonstrate,—its innate poetry, its emotional element imparted by the designer, its evocative power over the imagination of the beholder,—in a word the self-centred purpose of an art that has noble ways of utterance of its own whether allied to sculpture or not. "A Gothic cathedral is surely the most wonderful work which mortal man has yet achieved. It is the one thing in the world that is vast enough and rich enough," says one writer. "Mankind was never so happily inspired as when it made a cathedral,—a thing as single and specious as a statue,"—says the other.

We will now dwell more particularly upon the sources of expression in architecture; this will bring us face to face with the architect, and we shall realise something of the means and instruments of his art. Let it be understood that

the architect is first and last a pictorial artist on a large scale. Indeed, none of the arts, except music and poetry, have the same chances of prolonged effort in design as the architect. The sculptor and painter nowadays are content with their brief but brilliant swallow-flights, but the architect's art reveals him to us as the stimulator of men's imaginations by means of large effects extended over a large area. He is a picturesque manipulator of vast forms, he deals with proportional lines, outlines, contrast, mouldings, masses, bulk, broad sunshine and deep shade. He is a subtle harmonist of the contending motives of his structure: a colourist who employs colour-artifice in material or pigment, or gets it by glints of light upon delicate tracery and broken wall-surface; to say nothing of his employment of the best colouring-matter of all—the essence of his own unique genius. In his capacity of pictorial artist on a large scale, he not only uses his own best faculties, but the best faculties of others, much as the musical composer secures the best soloists and the best chorus he can get to form the orchestra that renders his oratorio. And he takes occasion by the hand in using to the best advantage every adventitious circumstance of site or material or natural resource. The best architects of the past have been men in whom the shaping faculty has been highly developed; and though their names may have perished, the loftier masters of design come before us in history as giant forces; the technical power and originality of their design, the beauty of their detail, the range of their imaginative flight, all proclaim their work as the finest expression of human intellectuality.

"Many are the mighty things," says Sophocles, "and none is more mighty than man." But it is a mistake to suppose that a building is bound to be adorned with sculpture to have imaginative expression. A building is capable of high interest and expression with no aid from sculpture and scarcely any ornament; yet, whether severe and naked, or never so richly adorned, it is from the architect that it gets its expression. Whether only the skilled mason and carpenter have helped him, or whether he have enlisted the highest instincts of the finest natures, his mind will have anticipated every stroke that is there, the depth of frieze for the painting or sculpture, the niche or pediment for the figure,—architecture and decoration, will have been sketched by him on his drawings; all will have been seen by the architect before ever the sculptor or painter is called in to exercise his genius.

I have here tried to show you the architect at his work,—now for his stock-in-trade. In its first analysis architecture is the picturesque expression of plan and construction in a building. To speak broadly, there are two faculties displayed in the art,—invention and imagination. Invention has to do with the plan and scheme of a building and the relation of its parts; and the artist calls this faculty into play in much the same way as the dramatist creates his characters, disposes of their destinies, thinks out the course of events in his story, and sets the scenes. But in the best work invention goes no further, imagination must do the rest. The eye of the body can go so far, and the rest must be left to the eye of the mind. Having made the plan and settled the scheme of the structure, its heights and size, invention retires and imagination takes up the tale.

Out of the picturesque plan grows picturesque construction, and if it be a great building like the Parthenon, or Beauvais, or St. Paul's, or York, there is a delicate skeleton of admirably articulated parts underlying and sustaining everything; this skeleton of related parts not only fulfils its primary office of keeping the building from sinking on itself, a shapeless heap, but the various constructive features themselves are made beautiful, while they conduce to the general beauty of the whole.

It has been wrongly supposed that it is in Gothic art alone that picturesque planning is used as a source of expression. The art of all ages proves to the contrary. To take a typical Classic example, the architect of the Erechtheum, as Mr. Ferguson has pointed out, took the greatest possible pains to produce variety and contrast in the grouping of the three temples of which the Erechtheum consisted, and "no Gothic architect, in his wildest moments, could have conceived anything more picturesquely irregular than the whole becomes." Indeed, there can be no greater mistake than to suppose that Greek architecture was fettered by any fixed laws of symmetry. But I need not go so far afield for

an illustration of expressive planning and construction. Wren's noble series of City churches afford us quite an intellectual treat in this respect, and, in order to properly gauge the dexterity of the man, you must bear in mind that the old walls of the churches that had been burnt down were in many cases left standing, to be used as the superstructure of his new buildings. St. Stephen's, Walbrook, is an example in point, where, within the limits of the four plain walls which marked the boundary of the old church, the architect has reared a nave, choir, and transept, with a dome over the intersection, and has produced pleasant effects by means of numerous columns, and the domical ceiling which they carry.

One further note of the intellectuality of Wren's work is seen in the employment of the geometrical relations between the main dimensions, of which Professor Roger Smith has recently given many interesting examples. The great importance of geometry in architectural design was a doctrine strongly enforced by Wren, and it cannot be denied that the intellectual quality of his own work is enhanced by his own practice in this respect. Whether you agree with the doctrine or not is another matter, for some way, with Sir Joshua, prefer art that is done "by a kind of felicity and not by rule"—yet one man may best speak out of his head and another out of his heart. In yet one other particular should the power of expression in Wren's work be noticed, and that is, the way in which, without the use of any religious sculpture, he can obtain religious effects.

To come now to other sources of expression in architecture. In historic art of all periods you find certain picturesque features ever recurring, such as colonnades, arcades, buttresses, recessed openings to massive walls, towers, spires, domes, mouldings, and sculptures that grow out of the mason's art. It is by the universal adoption of the same, or analogous means, to attain the same artistic results that the unity of the art is declared. The methods employed may differ at various times, yet the quality aimed at is much the same. Take, for example, the various means adopted at different times to render vastness or sublimity. At one time it is the vastness of mass in the Pyramids, and the impression of solidity and durability that they are so well calculated to give. At another time it is the vastness of the rock-cut tombs and temples (as the Elephanta rocks at Bombay) that chill your marrow with their mysterious gloom, huge columns, and colossal details countersunk in the rock.

At another, the vastness of a gigantic columnar edifice that shall give the sense of infinite space, as at Karnak; at another, the ring of monster monoliths at Stonehenge; at another, the vastness of grand scale in the Coliseum at Rome; at another, the vastness of height in the French cathedrals; at another, the vastness of proportions as at Seville, or Milan, or St. Peter's at Rome; at another, the vastness of long-drawn aisles with monotonous columns and flat roofs, as in the Italian Basilicas, or Ely and St. Albans. In most of these examples it is sheer weight and vigour of masses that is employed as an attribute of expression,—the undivided weight of solid stone, colossal scale, broad sunshine, and unrelieved gloom. The Hypostyle Hall at Karnak is one vast oblong 340 ft. long by 170 ft. wide, that has 116 huge columns, and that covers more than 88,000 ft. No artist has been able to reproduce its form, so as to convey to those who have not seen it an idea of its grandeur. A flood of light beats down from the clearstory formed by the taller central piers, and the smaller pillars fade away into deep obscurity. Or to speak of that characteristic French way of using vastness of height in those "soaring miracles of stone" at Beauvais, Le Mans, Tours, &c. And here, though this be the leading purpose of the architect's design, it is combined with other manifest attributes of mechanical power, fertile invention, and that conformity to rule which governs the constructive side of perfect architecture; while the higher and spiritual side is proclaimed in a bright imagination, noble proportions, sublime audacity, and the restless, half-sad, half-gay humour of a spirit that yearns after the unattainable.

Of other expressive traits in Gothic art it is superfluous for me to speak. It is a mistake, however, to lay too much stress upon the forms of Gothic architecture as though it was from them and not from the man who uses them that their expression comes. Hence, I suppose, the

\* Reynolds's "Discourses,"  
† "Old Home," p. 106.



dissatisfaction with so much of modern Gothic work; the forms are correct enough, but you want the old master's soul behind them. The fact is that Medieval art gets its romantic charm from the spirit that animated its designers. So far as mere variety of form and play of fancy is concerned Wren's spire at St. Mary-le-Bow far transcends Salisbury's spire, but the conscious art of the former, the studied harmony of its proportions, the subtleties of its fancy, are not favourable to romantic effects, it lacks the simple aspiration and naive utterance of the other. The expressiveness of Gothic art is usually ascribed to the variety and contrast of its effects and to the intricate harmony of its constructive lines, such as is to be found at Abbeville, Rouen, York, or Gloucester. But to stop here were to leave the tale untold. There is a noble severity about the early phase of English Gothic, both in regard to proportion and scale, that is highly stimulating to the imagination. Think of the interiors of Durham and Peterborough, with the strange colossal scale of their features and ornamentation that hint of the sense of physical power and indomitable will of their builders. The majesty of their purposed lines carries us back to the grand buildings of old Rome that are like vast mountains haunted with mighty shadows.

That there is more picturesque of plan and construction in the later work like York or Gloucester, more harmony of related parts, more play of sequent motive, than in the tentative earlier phases, was to be expected, for art "widens with the process of the suns," and, just before the Gothic forms were forsaken, the art comes to a head in that "glorious work of fine intelligence" at King's College, Cambridge, so eloquently described by Wordsworth, with its lofty pillars, its

Self-poised, and scooped into ten thousand cells  
Where light and shade repose, where music dwells  
Lingering—and wandering, as loth to die

Yes, Wordsworth finds architecture to be something more than bird-and-beaver craftsmanship, and his spirit is stirred by its magic, though of figure sculpture it has none. What affects him is its piquant variety of light and shade, and colour, and play of motive, and borrowed charm of personality, that makes the logic of passion and imagination in a fine building, and speaks of divinely inspired cunning. What is more, he realises that not sculpture, but organ music, will interpret the meaning, fill with expression, and make to vibrate every nook and corner of the amplest and loftiest edifices. Milton found it out before him.

Of colour as a means of expression in architecture I have no time to speak other than to point out that, where colour is the felt medium of his expression, as in Byzantine or Venetian work, the architect attempts to variety of outline or highly relieved or strongly contrasted architectural form. And the self-sufficing quality of colour as a source of architectural expression is amply illustrated in the schools of southern and eastern art just mentioned, as also in such charming architecture as the Taj at Agra, which, like most Oriental art, is bound to exclude every sign of the human form out of respect to Mohammedan prejudices. Nor may I dwell upon the expressiveness of architectural features, window tracery, or gables, or sculptured doors, or buttresses, or of sculptured screens, like Winchester and St. Albans; nor of recondite, nor of monuments, nor the exquisite variety of richly-adorned roofs or stone gironing, nor of more general features, like towers, such as Seville, Florence, or St. Mary Magdalene, Oxford, or St. Giles, Edinburgh; nor of domes like those at St. Mark's, or St. Peter's, Rome, or St. Paul's, London. There is latent poetry in them all. A dome attracts from afar, whether seen across the great campagna or looming big in city smoke. You rejoice in its sense of serene power. All is calm there.

Nor, again, may I stay to dilate upon the expression that architecture can yield when applied to its site, as is notably illustrated in this grand citadel of the north, where castle and crag merge in one eminence.

But one brief word must be said in conclusion of the much-vaunted importance of sculpture in architecture, and to bring this to something of a decisive test I have reserved till now my reference to Greek art. In Greek art, is perfect architecture and perfect sculpture, perfectly applied. And in this connection I recall how a sculptor-friend of mine—one of the too few sculptors in the Royal Academy—is wont to

describe the architect as "the man who makes the box." Of course, there is an implied compliment to himself in the simile or he would not use it! Let that pass.

Now the Parthenon affords a generic example of Greek art at its height. Neither the "box" nor its images could be better made. If I now follow the fashion of the critics and compare the relative consequence of the one and of the other as found in the same structure, I feel that it is an insane thing to do. For a building, like any other work of art, is not to be judged by its several particulars, but as a whole. You should take in its expression with one sweep of your eye, its lights and shadows, its gradation of distance, its individual character.

The Parthenon has gathered into itself all the best points of Greek architecture,—it has studied harmony of proportions, delicacy of feeling in optical corrections, exquisite taste in selection of mouldings, coloured ornaments, and unrivalled sculpture. Now I took the trouble three days ago to examine Bohn's view of the Acropolis "restored," which is to be seen in the British Museum in the same room as the Parthenon sculpture; and, with all the rest of the world, I realised that the grace of the Acropolis consisted in its buildings. With the subject of this paper in mind I went further than this, and tried to estimate for myself from Bohn's careful picture, the amount of expression that the figure-sculpture dotted here and there was calculated to give. So, also, did I study the large model of the Parthenon with the same intent, and in each case I came to the same conclusion. It wasn't that there was a defect or deficiency in the sculpture, it is glorious: but that with all its loveliness and quantity it was only an accessory to the architecture.

Take away the sculpture, and some accidental grace were gone, but the building in all its transcendent beauty would remain "as single and specious as a statue." Take away the sculpture and its air of sublimity would remain in the sheer weight and vigour of its masses and in the colossal scale of its architectural forms; its air of grace would remain in the modulated harmony and exquisite perfectness of its related parts; its air of intellectuality would remain in the austere majesty of its conception; its air of religious awe would remain in the mystery and poetry that its author communicated to his work by means that he knew so well how to wield.

I spoke of the sublimity of its proportions and scale; and to be quite frank,—what a puny part must these beautiful sculptures, with the exception of the large central deity, have played, set against the vast, assertive architectural forms that hemmed them in! Think of the expressiveness of the structure as the broad rays of rising or setting sun beat aslant the clearstory in the roof upon massy columns or undivided weight of solid wall and threw the vault parts in gloomy shade! Think of the small scale of the sculptures,—the noble frieze, for instance, is but 3 ft. 4 in. deep,—and compare this with the impressiveness of mighty mouldings and of columns whose abacus is 6 ft. 5 in. square and diameter 5 ft. at the top! The young ladies who so assiduously sketch the statuary in the gallery think that all the honey out of the hive of the structure is here in this purloined imagery. But we know better. It is the glory of a great building that it is one grand indivisible whole; take away its sculpture and some accidental grace is gone, some emphasis of parts is lost, but the primary quality, the central sweetness of the thing remains. On the other hand, if a structure retains its expression, even though you remove its accessory of figure-sculpture, its different with the sculpture that is so removed. The figures formed part of the very masonry of the structure. They emphasised its parts. The glory that they had was a communicated glory. The music that they made was only a part in a grand chorus—a share in the pervading harmony of the fabric that the master-musician had blended with the melody and rhythm of the rest of the related parts. The music was not theirs, for it would go on still in the fabric and with little perceptible difference when the figures are gone. But removal makes all the difference to the figures; their inherent loveliness remains, but they become—in a manner—dumb. Remove them from the pediment, or pedestal, or niche, to which they were allied, and they wear an orphaned look like poor casuals without a home; happy if your friendly Britisher find them a corner in a

stuffy museum where daintily-dressed Slade students may portray them in chalk or charcoal four days a week.

Here I break off. I shall be right glad if, in my disjointed way, I have done something to illustrate the true dignity of architecture as a poetic, self-expressive art, with noble ways of utterance of its own that render it independent of the sister arts as at present constituted. And yet, I may not forget that there is something even better to contend for than the honour of one's own art, and that is—the welfare of the great commonwealth of art. I trust, then, that in my endeavour to brush away some of the critic's cobwebs that hinder a true conception of architecture as it really is, I have let fall no hasty word to hurt the sensibilities of any one here present, or to impair the chances of more cordial relations between architect, sculptor and painter, which it is the one great desire of my heart and the purpose of my life to promote to the utmost of my power.

#### THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A BUSINESS general meeting of this Institute took place on Monday evening last, Mr. John Macvicar Anderson (Vice-President) occupying the chair, in the absence of the President. Mr. W. H. White (Secretary) intimated the decease of the following Fellows, viz., Mr. William Millican, J.P., of Leicester, and Mr. Harry Robert Newton, of Weybridge.

Mr. White also announced that the Architectural Union Company had presented a donation of twenty-five guineas to the library for the purchase of books. It was stated that, in the following Thursday's "Journal of Proceedings," a long list of donations to the library would be published. Votes of thanks were accorded to the several donors.

#### The Church of St. Mary-le-Strand.

The Chairman said that at the last meeting the subject of the Church of St. Mary-le-Strand was referred to, and a desire expressed that, if possible, the church should be open for the inspection of members of the Institute, or of those of the public who might be interested in its restoration. He had accordingly communicated with Canon Tugwell, who had made arrangements so that the church would be open for the inspection of members of the Institute and their friends daily for one week from the 20th inst., between the hours of ten and four (applause).

#### Election of Members.

A ballot was then taken, when the following candidates were elected as Fellows, viz.:—John Edward Sears (Associate), Frederic Richard Farrow (Associate), James Herbert Stones (Blackburn), Arthur Wells (Hastings), Joseph Barker Daniel Wall (Associate), Hildebrand Attwood Wooster Reeves (Associate), Delissa Joseph, John Clarkson (Associate), Charles James Dawson, James Edward Clifton (Swanage), Frederick William Ridgway (Associate), Dewsbury; Albert Edward Murray, Hon. Secretary of the Royal Institute of Architects of Ireland, Dublin; John Howard Pentland, B.A., B.E., P.W.D., Dublin; John Tweedale (Associate), Leeds; Richard Mauleverer Roo (Associate); William Henry Syme (Associate), Watford; and Herbert Walker (Assoc. M.Inst.-C.E., Nottingham).

The following gentlemen (who had passed the examination for entrance) were elected Associates upon a show of hands, viz.:—Messrs. Herbert Lingard Whitley, Gilbert Wood (Southsea), Ravenscroft Elsey Smith, Bertram Norman Southall, Henry Vaughan Lanchester, George Kenyon.

The following gentlemen were also admitted as Hon. Associates, on a show of hands, viz.:—Colonel Samuel Swinton Jacob, Bombay Staff Corps, Engineer to the Jeypore State, Jeypore, Rajpootana; John Dibble Grace, 15, Gloucester-place, Portman-square, W.

#### The Application of Iron and Steel to Building Purposes.

The second ordinary meeting of the session was then held, when a paper was read by Mr. Frederick T. Reade, Assoc. M.Inst. C.E., hon. associate, entitled, "The Application of Iron and Steel to Building Purposes." The following are extracts from the paper:—

After a brief introduction, and having dealt with the question of foundations and piers, Mr. Reade said that as the greater part of the ques-



tion discussed had to do with weights to be supported, it would seem to be proper to begin with the subject of columns and stanchions and their foundations.

The results of many experiments showed that two tons load per superficial foot of foundation was a safe limit to assume for ordinary clay, gravel, &c. Having settled on a limit of pressure on the earth, we will now consider the question of an isolated column as being the simplest case, and will assume that it carries a not unusual load of 50 tons; such a column would weigh about 15 cwt., say one ton; thus 51 tons will be discharged on its bed stone. This bed stone may be taken as ordinary sandstone, which would carry with safety a load of 25 tons per foot; this determines the size of base flange of column, which in this case should have an area of two feet at least. In a building where the ground-floor supports are principally columns, and especially for a corner shop where there is only a party and back wall, it is advisable to make the column or stanchion bases larger than given by above rule to give lateral steadiness to the building. The concrete block under the bed stone or base plate or brick pier, should always be mixed with Portland cement, for the ordinary lime concrete is long in setting, and in large masses it will take years before the centre of block becomes hard. One of Portland cement to eight of other ingredients, if carefully and well mixed, will safely bear a load of 5 tons per superficial foot. These other ingredients should be hard materials, as gravel, broken stone and bricks, or bats of hard quality.

**Cast-iron Columns and Stanchions.**—A cast-iron hollow column to carry 50 tons should have a ratio of about fifteen to twenty times its diameter for its length; this might safely be loaded to  $\frac{2}{3}$  tons per square inch of sectional area; and, if we assume a diameter of 9 in., and a thickness of metal of 1 in., we get an area of 25 in., 20 per cent. in excess of our requirements; but for hollow columns it is always advisable to have a liberal margin of safety, as, unless great care is taken in the moulding, the shifting of the core may cause an unequal thickness of metal in the casting. The hollow column is, theoretically, the strongest form of section, but the probability of an unequal thickness of metal is an objection to its use; this may be guarded against, to a certain extent, by specifying that some of the columns shall have small holes drilled in their shafts to ascertain the thickness, and that, where the metal on opposite sides differs more than one-fifth of the proper thickness, such columns shall be broken up. Another objection to the form of the hollow column is that it does not lend itself very readily to being cased in a fire-proof material. We will assume, however, that a hollow column has been decided on for our present example to carry 50 tons. The size of its base flange has been already given, and it should have a bold rounding at its junction with the shaft, and bracketed in four directions: the thickness of the base flange should be from one-eighth to one-quarter more than the thickness of the shaft—in this case  $\frac{1}{2}$  in.

It will often be found that stanchions of the  $\perp$  or  $\Pi$  section are preferable. They have this great advantage, that the whole surface of the metal can be seen, and any imperfections detected; also the absence of the central core greatly reduces the risk of an unsound casting, while in tiers or stacks of stanchions such sections give great facilities for making simple junctions of girders and iron joists at the various floor levels. In designing a stanchion of  $\Pi$  section to be placed flat against a wall, it must be remembered that the least width of its section,—viz., the width of the flange of the  $\Pi$  section, is the measure of its strength, and it will be seen at once that an  $\Pi$  section 12 in. by 6 in. is not so strong as one 12 in. by 9 in., even though it contained the same sectional area. The commonly employed  $\Gamma$ , or  $\Pi$  section, is not to be recommended, on account of the very unequal distribution of compressive stress over its section, and also on account of its liability to become bowed in cooling—a risk which, more or less, attends all very non-symmetrical sections. These channel sections are generally fixed with the web, or back, placed against the wall; but the stanchion is under better conditions if the web is placed outwards towards the centre of the span. Whatever form of section of column or stanchion is decided on, it is important that the cap-plate on which the girder rests should be well chamfered back from the front to prevent the girder from bearing on the extreme

front edge of the cap-plate, and in the case of very narrow stanchions the cap-plate should also be narrow, to prevent as far as possible the deflection of the girder tending to bend the stanchion.

All bed-stones for ends of girders in walls should have their front edges chamfered in the same manner, and for a distance of 3 in. from the face.

**Wrought-iron and Steel Stanchions.**—It is not now uncommon to use stanchions made of rolled joists, the cap and base plate being fixed to the joists by angle-irons or gusset-plates, or both combined. As the ends of joists cannot be considered as bearing accurately on the end-plates, without special care in the workmanship, such gussets and angles must be designed so that the shearing or bearing resistance of the riveting alone is sufficient to transmit the load to the base flange. For very heavy loads,—say 150 to 300 tons,—it is usual to make stanchions of wrought iron, of tubular section, with web plates and angle-iron, or with webs made of rolled joists or channel irons. The construction of such stanchions presents many special difficulties of design in the cap and base junctions; and, as such loads rarely occur in ordinary practice, it is advisable, whenever they do occur, that an engineer should be employed to design them.

Cast-iron base plates direct on concrete are rarely used, unless the load on the column exceeds 100 tons. It is not possible to give a rule for their depth in centre, or the thickness of metal, as this will be influenced by the number of the radiating arms and their thickness; but a rough approximation would be  $2\frac{1}{2}$  in. in depth for every foot in diameter, and a nearly uniform thickness to that of the column or stanchion on it. Thus, a base plate 6 ft. diameter would be about 15 in. deep in the centre, and as the stanchion on it would have to carry a load of 130 tons, it would be found to work out to about  $\frac{1}{2}$  in. metal, and base plate should have the same thickness. Such a base should have some holes about 3 in. diameter cast in the spaces between each pair of radiating arms, so that when the base plate is wedged up, and cement is run under the same, it can be seen to flow at these holes, and thus make certain that the whole area of the plate is covered by cement.

**Cast-iron Girders.**—Cast-iron girders are now so rarely used that it will not be necessary to devote much time to their consideration; they should never be used for great or variable loads, and their proportion of depth to span should rarely be less than one-twelfth. They may be used with advantage for carrying window-backs between cast-iron stanchions in light areas in interior of buildings, or in fronts which are constructed of iron stanchions and very little brickwork. In such cases their span would rarely exceed 10 to 12 ft., and their load would only be one 9 in. window back and half a bay of wooden or concrete floor,—probably not exceeding a total of 6 tons distributed. It generally happens that although, theoretically, the top flange need only have a small area, yet, practically, to carry 9 in. brickwork, it has to be of such width that, to comply with the theoretical conditions, its thickness would be very small compared with the rest of the section.

For practical reasons, it would be unsafe to have much difference in the thickness of metal, and it would not be advisable to make the top flange less than  $\frac{3}{4}$  in. thick, the web to taper downwards. Thus, supposing the bottom flange was 1 in. thick, the web might be  $\frac{3}{4}$  in. at bottom and  $\frac{1}{2}$  in. at the top, with bold corners or mouldings in angles where joining top and bottom flanges; vertical ribs or stiffeners should be put between top and bottom flanges, about 36 in. apart; and, as the material gives facilities for treating these ornamentally, they can be moulded on the face and at the ends. The ends of the girder can be easily cast so as to make a neatly-fitting junction with the stanchion, and in a way almost impossible to treat in wrought-iron.

**Wrought-iron and Steel-rolled Joists.**—In considering the question of wrought-iron girders, it will be best to begin with the simplest forms, which may be taken to be rolled-iron joists. Lists of their sections and safe loads must be in the hands of most of the members of this Institute; but your attention should be directed to the variation in the amounts of the safe loads given in these lists by manufacturers and dealers in rolled joists. They very rarely give the limit of stress per inch on which such sections are calculated, and this accounts for the discrepancies which have doubtless been

noticed between different lists, in which joists of identical sections have safe loads appended to them, which in some cases vary nearly 25 per cent., the reason being that the smaller load has been calculated for a stress limit of 5 tons per inch, while those showing heavier loads have been taken on a limit of 6 or 6 $\frac{1}{2}$  tons per inch.

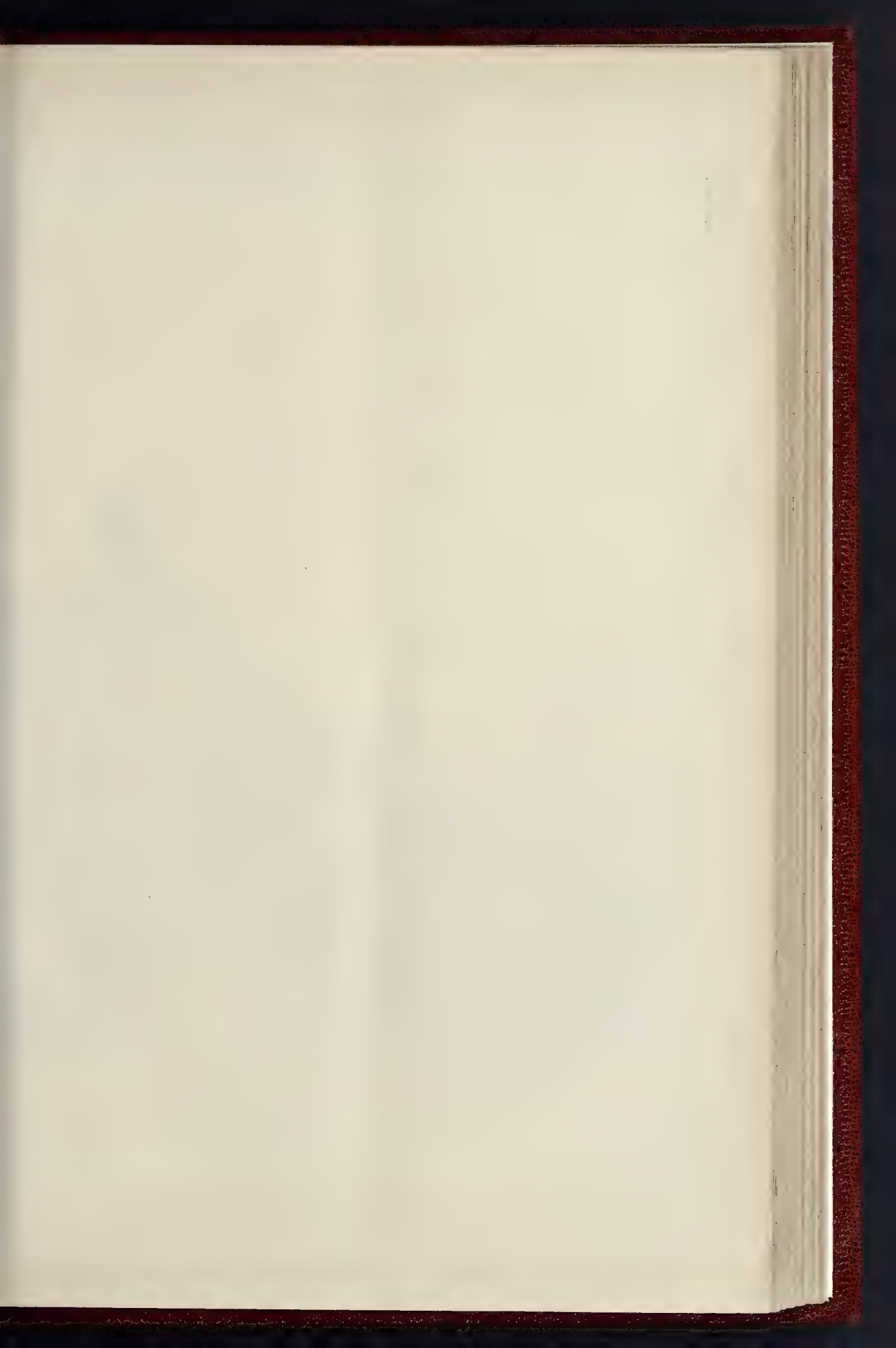
**Compound Girders, or Rolled Joists with additional Flange Plates riveted on.**—A very useful and economical form of girder can be made in this way, and the mode of calculating its strength or sectional area is identical with that given for wrought-iron girders further on, with this difference, that, considering the inferior quality of the material in rolled joist flanges, the limits of stress for these sections should not exceed five tons per inch of sectional area, and, in calculating this, only one rivet-hole need be deducted from the joist flange, the holes not being placed opposite to one another. The greater part of the flange section being usually in the joist itself, fewer rivets are required to attach the plates than in a built-up girder. If only a single plate top and bottom is used,  $\frac{3}{4}$  in. rivets at 8 in. pitch placed zigzag will suffice. The holes for rivets in the joist flanges must necessarily be under worse conditions than the rest of the metal in the joist; and I have often seen cracks in rolled joist flanges extending from the rivet-holes to the edge, the strength of girder being diminished thereby to the extent of 10 to 20 per cent. Heavy-section rolled joists carrying loads not exceeding 20 tons may sometimes have their attachments made to columns, by bolting the webs to lugs cast on the columns; but in the case of heavier loads, and nearly always in the case of compound girders, vertical angle irons should be riveted on each side of ends of web, partly to act as end stiffeners to it, and partly as a means of making a more reliable connection to the column or stanchion.

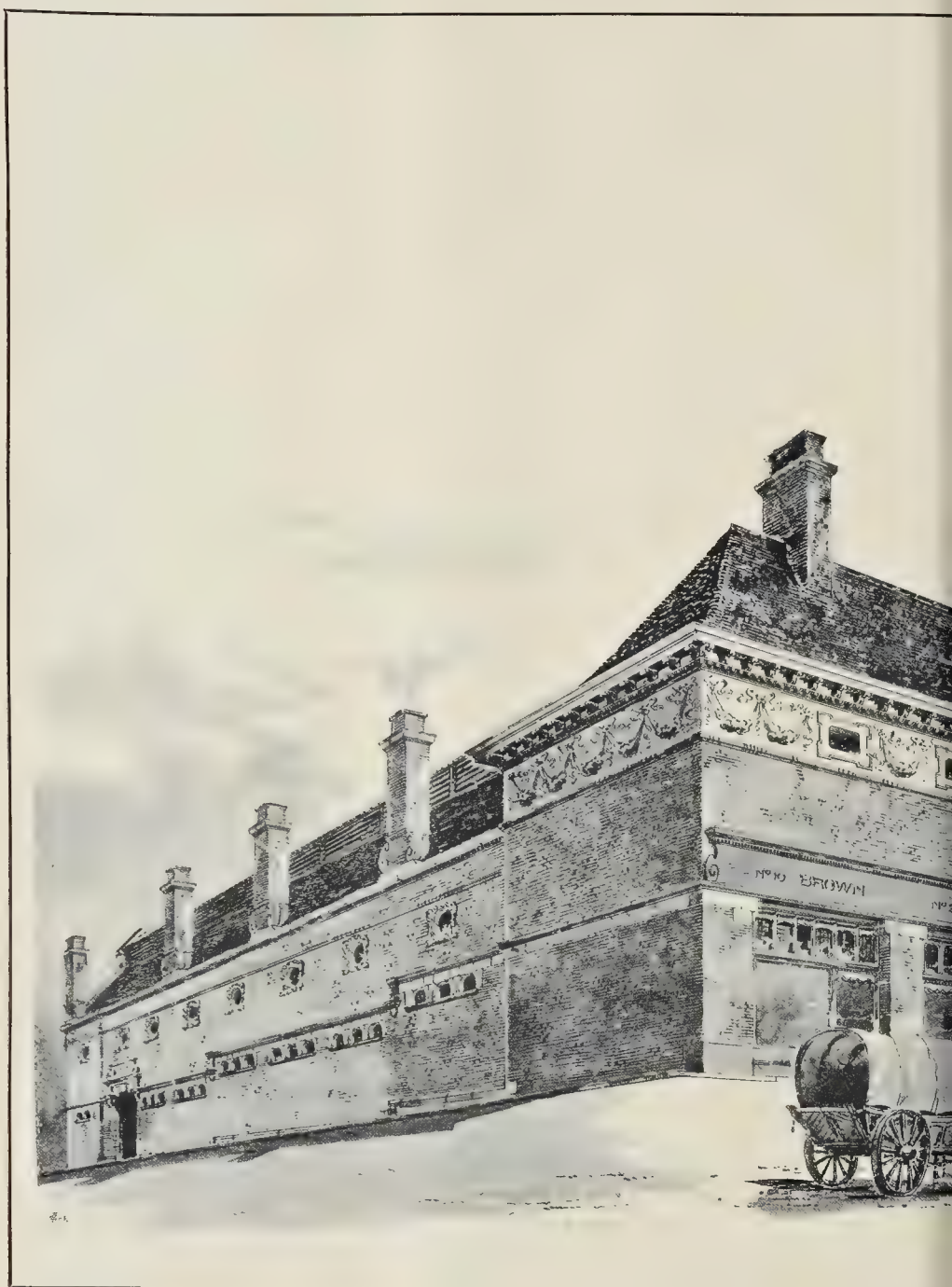
**Wrought-iron and Steel Riveted Girders.**—The process of calculating the strength and designing the section of a girder must now be briefly described. The span of a girder,—for calculation,—is the distance between the centres of its bearings, its depth is the depth between the centres of the sectional areas of the flanges, and in ordinary girders of angle-irons and plate-flanges it is usual to take the width of the web-plates as the depth for calculation, and it is important that this should not be a very small fraction of the span; if less than  $\frac{1}{10}$  of the span, it will either have extreme deflection, or be wasteful by excess of material in the flanges; or, if more than  $\frac{1}{10}$ , we shall probably have an excess of material in the web itself. A practical illustration being more useful than a bare statement of rules, we will suppose a girder has to be designed, of 20 ft. span, to carry a load of 30 tons, equally distributed over its length; we will assume that the circumstances of the case allow of almost any depth, and as the limits of  $\frac{1}{10}$  to  $\frac{1}{5}$  of the span have already been given, we will take the mean, or  $\frac{3}{10}$  of the span, which is 15 inches; this will be the depth of the girder between the inside of the flanges, which in an ordinary girder may be considered as the centres of the sectional areas. The first thing to be determined is the measure of the effect of the load, or what is called the bending moment; in other words, the load in tons multiplied by the span in feet and the product divided by 8 for distributed loads, or 4 for a central load. As girders are all levers of one sort or other, and the principle of the lever is well known, it is not necessary to explain the

$$\text{divisors 8 and 4. } \frac{30 \text{ tons} \times 20 \text{ feet}}{8} = 75 \text{ foot-tons.}$$

This is the effect of the load or greatest bending moment in the centre of the span, and we now have to find what section of girder is required to resist it, or the moment of resistance. We have fixed the depth at 15 in., and will suppose the material is to be wrought iron. If the load assumed above is a dead load—that is, a solid mass of brick or stone wall weighing 30 tons—the limit of stress for the material named should not exceed 5 tons per inch. If it were a mixed load—say, 15 tons of dead weight and 15 tons of floors which would never be completely loaded over whole area—part of the floor-load becomes hypothetical, and we may increase the limit of stress to 6 tons per inch. The latter case being the most usual condition, we will take 6 tons. The moment of resistance will then be the depth in feet, equal 15, multiplied by the limit of stress, 6 tons, multiplied by the sectional area of one of the flanges. As the moment of resistance has to be equal to the bending moment,







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the required area of the flange will be the bending moment, or 75 tons, divided by 6 tons limit of stress multiplied by  $1\frac{1}{4}$  ft. depth, or

$$\frac{75}{6 \times 1\frac{1}{4}} = 10 \text{ in.}; \text{ this is the net sectional area}$$

of the flange, after deducting rivet-holes. It was formerly considered necessary to make the top flanges of wrought-iron girder stronger than the bottom, but the general practice is now to make them equal, except under special circumstances, as, for instance, bridge or roof girders where the top flange has no lateral bracing or other support. Most of the calculations for a girder can be determined by the rules of graphic statics, and you will find the modes of doing this very clearly and simply described in two books on "Strains in Iron Work" and "Designing Wrought and Cast-Iron Structures," by H. Adams, published by Messrs. Spon. In designing girders beyond 30 ft. long, and with flanges built up of several thicknesses of plates, it is necessary to make the plates in such lengths that their weight shall not exceed the limits allowed by the ironmakers. This limit of weight may at present be taken at 6 to 8 cwt., and the limit of area at 30 ft.

It is of the utmost importance that all riveting should be done in the best possible manner. The "snap" or end of the rivet, which is hammered out while red hot, should project uniformly all round the diameter of the rivet; they should be of uniform size, and any of them showing radiating cracks, or being of a size much smaller than the others, should be condemned; also, wherever countersunk rivets are required for bearings, &c., the plates or angles should have the rivet-holes countersunk by the drilling machine, and show on the outside at least  $\frac{3}{8}$  in. to  $\frac{1}{2}$  in. larger in diameter than the size of the rivet-hole. It is a very common practice to trust to the taper given to the holes in the process of punching, and so save the small additional cost of countersinking. This cannot be too strongly condemned, as such rivets are often loose in the hole, and thus doing no work. It is easy to detect such loose rivets by placing the finger on the snap or countersunk end, and lightly tapping the head with a hand hammer; the movement of the rivet in the hole, if loose, is immediately detected, and they should be cut out and replaced by new perfect rivets. The process of designing a girder in steel is exactly as above described, except that a higher limit of stress is introduced into the calculations, it now becoming 7 tons for a dead load, and 8½ tons for a mixed load of floors and brickwork, or floors only. It is not advisable to make the webs of steel girders as thin as the increased strength of the material would seem to render possible, except in girders of dimensions much beyond our present example. In the rivet-holes in both materials it is usual in good work that all holes should be drilled; but in steel girders of any description this must be done, for the effect of punching upon the steel is to weaken the metal for a certain distance round the hole. This is sometimes remedied by punching the holes to about  $\frac{3}{8}$  in. less than the diameter of the rivets, and then drilling out the holes to the larger size.

I may mention an adaptation of iron to the purposes of shoring. It is very useful in the case of an opening requiring to be cut through a wall at such a height above the ground level that ordinary wood shores and needies would be costly, and also prevent business being carried on in the lower storeys during the alterations. Rectangular frames can be constructed of rolled joists or channel irons, connected at the corners of frames by tightly-fitting bolts. The upper and lower members of the frames are then passed separately through small openings in the wall, and the vertical sides bolted up to them on opposite sides of the wall. The weight of the wall above can then be taken up by the frames by wedging or other adjustment, and the portion of wall between the upper and lower members of the frames cut away for the insertion of the girder or girders.

The phrase "builders' ironwork," which has unfortunately now become almost a trade term, cannot be too strongly condemned; it is used to designate an inferior description of work which is considered good enough for ordinary buildings; of course, where, as in buildings generally, the constructional ironwork is usually covered, the fine finish to girder work, such as planed edges of plates, is perhaps superfluous, except where flanges of girders are to be visible; but

it cannot be too strongly insisted on that in other respects,—such as good riveting, careful jointing, and good fitting of vertical web stiffeners, &c.—there is quite as great a necessity for good workmanship and materials in ironwork for buildings as in the best description of railway and bridge work, the loads to be carried being, in some cases, much greater than for many railway bridges.

The Chairman, in inviting discussion, said that Mr. Reade had, in a very able and exhaustive manner, treated a subject which could not fail to be of great and vital interest to practising architects. The observations in regard to girders were especially worthy of attention in these days of fire-proof floors, and when sections were recommended so light as to make one tremble. Mr. Reade had mentioned that in some instances a section was recommended  $\frac{1}{10}$ th of the span, so that in a span of 40 feet there would be a girder 1 ft. deep. He hoped that as so many practical men were present an interesting discussion on the paper would take place.

Mr. Robert Walker said he could fully endorse every word that had fallen from Mr. Reade as to defective ironwork. He could not imagine a more serious fraud, a more wicked imposition, than those which were perpetrated day by day by certain manufacturers of what might be termed "rotten" ironwork. Not only were joists being rolled, in Belgium and other countries, which were totally insufficient for the loads they professed to carry, but, at the same time, castings were being made which were quite unfit for the purpose to which they were devoted. Those who walked about the suburbs of London would observe corner shops with columns at the corner, such columns being often cast from the very worst iron. He believed that architects failed to realise the serious importance of using great care in the erection of cast and wrought iron work, and he felt that many catastrophes that had happened of late years might be attributed to the fact that the contact between the architectural construction and the iron construction had not been properly carried out. It was singular, so little was ironwork construction considered by the profession or the legislature, that in the Metropolitan Building Act and its amending Acts, ironwork was practically ignored. When an architect was brought in, either as consulting architect or as District Surveyor, he had little control over the ironwork, except that of being sometimes able to condemn it. They, as architects, could never pretend to be engineers, and it would be a deplorable thing if they attempted it; but the more they associated themselves and worked in unison with the engineers, the better it would be for both parties. The section-cards sent round by the various iron manufacturers were wretched things, and he would, therefore, advise the architect to put in his specification a strong test-clause, to the effect that certain sections should be cut out of the ironwork at any time, sent to Mr. Kirkaldy, and tested; and that if these did not come out satisfactorily the ironwork should be rejected. If possible, the architect should always get the ironwork to be supplied by firms of good reputation, and the only safeguard the architect could adopt was to insert such a test-clause as he had mentioned. As to using ironwork for the purpose of shoring, Mr. Reade had lately assisted him in a considerable undertaking in the City, where they managed to shore up a building, with a large number of people carrying on work all the time, so that by the assistance of heavy timber tripod shores, and rolled joists, the whole building was lifted on steel wedges. The result was that there was not a single settlement or crack in the place. Mr. Walker concluded by proposing a cordial vote of thanks to Mr. Reade for his excellent paper (applause).

Professor Aitchison, H.R.A., briefly seconded the motion.

Mr. T. H. Watson asked for some information as to what the material called steel was. They had a rough opinion as to what cast iron and wrought iron were, as they were accustomed to deal with them. Steel, however, was now being put forward, and he certainly had no means by which he could distinguish it from wrought iron.

Professor Kerr added his testimony to the great value of Mr. Reade's paper, and when it was published in full detail, he believed the members of the Institute, and more particularly the younger members, would find it exceedingly

interesting and profitable reading. He thought that architects might recognise, without false delicacy, and as practical men, the distinction between the work of the engineer and that of the architect in iron. The time had gone by for architects pretending to know everything; in fact, they had to know a great deal too much. It was impossible for the human mind to undertake a vast range of exceedingly difficult matters, and they might, therefore, fully endorse the suggestion that when any architect had to construct a building in which there was a great deal of ironwork, he need not be ashamed to own that he had consulted an engineer. Indeed, he would venture to suggest that the architect who did not do so would make a mistake. One point that had struck him, in the little experience he had had of the matter, officially or otherwise, was this, viz., the essential, the almost more than essential importance, so to speak, of perfect precision in fixing. He had seen instances of ironwork giving way, with the result that people had been killed, and invariably, he might say, the accident had arisen from imperfection in fixing, more particularly when the engineer or smith supplied the ironwork by contract, and the builder had the fixing of it. That was a very objectionable system, as the builder often had no idea of the necessity for precision, thinking that if he laid his joists in a hole in the wall it was all right. He wished that Mr. Reade, in revising his paper, would consider whether he was perfectly right in saying that in a stanchion of the H section the measure of the strength was the sectional area of one of the flanges. He (the speaker) should say that the measure of strength was the sectional area within the extremities of the two flanges that were capable of being bent sideways; because an upright stanchion, or pillar of any sort, must be looked at as being precisely in the circumstances of a beam that was loaded on its back. He, therefore, would ask Mr. Reade whether he would not modify the phrase he had made use of?

Mr. Reade: I meant "flanges," clearly.

Professor Kerr continued that, in one of the authorities, it was stated that the accident of one side of a hollow column being thin, and the other side thick, did not affect its strength. The reason for that assertion was that so long as the proportion between the thin side and the thick side of the column was in accordance with the proportion between the top and bottom of the flange, provided the column was going to bend in the right direction, there was no harm done (laughter). Of course, they would be inclined to insist that a column ought to be evenly thick all round. There was another point he would like Mr. Reade to consider, and that was in regard to calculating the loading of floors. An old and esteemed member of the Institute, Mr. James Knowles, frequently made use of a very remarkable axiom, viz.,—"don't build strong, but stronger than strong." That was a remarkable dictum, but one which could not be too strongly impressed upon young architects. Mr. Reade, in some of his phrases, would lead the unwary to suppose that they were not to calculate upon all the floors being fully loaded. His own experience led him to believe that that would be a highly dangerous assumption. He believed Mr. Reade had said that, probably in no case would all the floors be fully loaded, and that, therefore, an allowance could be made for some of them not being loaded fully. But if safety were the great desideratum, Mr. Reade would withdraw that suggestion, which seemed to be a somewhat dangerous one. Many architects were so hard driven by parsimonious clients that the temptation was strong to save every penny, but it ought not to be saved in the ironwork, and by making only partial allowance for the loading of floors. Professor Kerr concluded by again expressing his opinion of the extreme value of the paper.

Mr. J. Tavenor Perry said he thought that

\* The passage referred to appears to have been a rather extraordinary reference to Hodgkinson in Gwilt's "Encyclopædia."—"Hodgkinson noticed in hollow pillars above thirty times as long as their diameter, that although the pillars were generally thicker on one side than the other, yet in bending the compressed was always the thinner side, and as cast-iron resists compression with about six times the force with which it sustains tension, no danger resulted from this almost unavoidable difference of thickness." The next editor of Gwilt had better give his attention to this, which certainly requires modification. Hodgkinson appears to have assumed that the bending stress would always take effect towards the thinner side; but an unequally imposed load might tell a different story.—Ed.



the architect should not specify any particular manufacturer of ironwork, but rather rely on the tests he put in his specification.

Mr. Cole asked what words should be made use of in ordinary specifications in regard to steel for joists and girders? And could Mr. Reade assure them that steel joists were to be had in a reliable form? He had been told that a large number of steel joists had recently been made which were very unreliable.

The vote of thanks, on being put to the meeting, was carried by acclamation.

Mr. Reade, in his reply, said Mr. Walker had pointed out that the Metropolitan Building Act practically ignored the question of ironwork, and that the District Surveyor could not interfere. He could only hope some of those who were District Surveyors would, perhaps, in time obtain some recognition of ironwork, so that there should be supervision over it. It had been suggested that he should give some description of steel. That was a very difficult point for him to say anything upon, because it was impossible to distinguish between a piece of iron and a piece of steel without making a chemical analysis, or testing their elasticity and ultimate tensile stress. The only chance of being able to detect steel would be to notice if it were finer in grain, and appeared to have a closer and denser surface outside. When fractured it would also be found much finer than iron, but there was no reliable test, and even an old expert might be deceived. He had seen a piece of wrought iron broken by repeated short blows at one end, showing a most beautiful silky fracture which would justify one in saying that better iron could not be had, and yet another piece might be broken off at the other end which appeared to be a mass of large crystals, and looked like cast-iron. Professor Kerr had been good enough to approve of the paper, and he agreed with the Professor as to the necessity for the engineer being consulted on such occasions (apause). He also agreed with Professor Kerr in his remarks about the scandalous way in which some iron was fixed. A builder, in fact, should never be permitted to do the fixing of ironwork—especially if there was anything to be done in connection with the drilling for bolts. He had seen  $\frac{1}{2}$ -in. bolts put into holes where  $\frac{1}{4}$ -in. bolts should have been put, so that they were as nearly as possible drawn through the holes. Professor Kerr had stated that in some book unknown to it was said there was no difference in the strength of a hollow column if the thickness of metal in it differed. If the force tending to bend the column could be brought exactly to bear on that side which was strongest, it would be all right, as the thin side would then be in tension, and the thick side would resist. But if the force operated the other way, the column would go. Mr. Perry thought it injudicious to mention the name of any firm in a specification, and he quite agreed with him, because people might then say that the architect had some interest in the recommendation. What he wished to suggest was that the architect should reserve to himself the right to reject any firm of whom he did not approve.

The Chairman then intimated that the next meeting would be held on the 2nd prox., when a paper would be read by Mr. R. Elsey Smith, Associate, on "A Tour in Greece and Cyprus in 1888, as Greek Travelling Student."

**The Monument to the Emperor William.** The committee appointed to adjudge upon the designs for the monument to be raised in Berlin in memory of the late Emperor William has awarded the first prize to the joint competitors, Messrs. Wilhelm Rettig & Paul Franz, and the second prize to M. Bruno Schmitz, all Berlin architects. The four other prizes were awarded to the following sculptors:—Hildebrand, of Florence; Hilgers, of Charlottenburg; Schiffer, of Berlin; and Schilling, of Dresden. The architects have, therefore, been victorious in this keen contest.

**The Hamburg Exhibition.**—The recent Craft and Industrial Exhibition in Hamburg appears to have been a great success, having left a surplus of 800,000 marks. Of this sum 100,000 marks will be used in extending the Industrial Museum.

**A Wagner Monument at Leipzig.**—The plan of erecting a monument to Wagner at Leipzig has been revived, the well-known Berlin sculptor, Schiffer, having been commissioned to furnish the design. It will stand near the house where the composer was born.

## Illustrations.

### COMPETITION DESIGN FOR ROTHERHAM MARKET HALL.

**H**IS design was submitted by Messrs. Mitchell and Butler in the recent competition for a new market hall at Rotherham. The sum to be expended was very limited in amount, and therefore it was necessary to keep the building plain and simple. The principal front has shops on the ground floor, with a gallery over opening into the market behind. The arrangement of the market was largely determined by the position of the foundations of a former building destroyed by fire; some of the old walls being incorporated in the new work. The roof was in three equal spans running the whole length of the building, the market being entirely lit from above. The site had a considerable fall from end to end.

The drawing from which this view is taken was exhibited at the Royal Academy Exhibition of this year.

### THE CHURCH OF ST. JOHN, STANSTEAD-MONTFICHET.

We gave a general view and description of this church in the *Builder* for August 10. The present illustration, showing the tower and the west end, is from a drawing which was in the Royal Academy Exhibition of this year. Mr. W. D. Carö is the architect.

### CLAYBURY ASYLUM.

This building, now in course of erection at Woodford, in Essex, was commenced by the Middlesex magistrates as a fourth Asylum for the old County of Middlesex, but on the passing of the Local Government Act, 1888, the site and foundations then in progress passed to the London County Council.

The site comprises an area of 270 acres, being part of the old Claybury Hall estate, beautifully situated on high ground, 230 feet above the Ordnance datum, and commanding an extensive view over the valley of the Thames. Part of the land is charmingly wooded, affording shaded walks for the patients. No better site could be found for such a building, and although only  $\frac{1}{2}$  miles from Woodford Station, and  $\frac{1}{2}$  miles from the Tower Hamlets, from which district it is expected most of the patients will be sent, the Asylum will be perfectly secluded, and comprise in its own grounds all the beauties of an English rural district.

The original design was prepared in competition in 1887, when seven architects of experience in asylum planning were invited to submit designs; six were sent in, and the one prepared by Mr. G. T. Hine, of Nottingham, was selected.

The original design, made two years ago, is, in respect of its general arrangement and accommodation, almost identical with the ground-plan to which we devote one of our double-page illustrations; but some of the blocks occupied by patients were somewhat amended in point of detail when submitted for the approval of the Lunacy Commissioners.

The building is designed to accommodate 2,000 patients, 1,200 females, and 800 males, the former occupying the eastern side of the buildings, and the latter the western, while the administrative department, the kitchens, stores, laundry-buildings, recreation hall, and chapel, occupy the centre, and are flanked east and west by two central corridors which communicate with the main corridors leading to the wards in such a way as to allow access from either male or female side to all the central buildings and offices without allowing the two sexes to come into communication.

The Asylum is placed on the summit of a hill, from which the ground slopes on all sides,—the knob at the top has been sliced off to form a level plateau twelve acres in extent, on which about two-thirds of the entire buildings are erected at one uniform ground-floor level, from which the outer main corridors slope off, generally to the outside blocks; but these in no case exceed 5 ft. in depth below the ground-floor of the main building.

The buildings comprise, in addition to the patients' blocks, large workshops for males, and laundry buildings and sewing-rooms for female workers; a general store, a bakery, a large kitchen, with ample sculleries and larders, a

recreation-hall capable of seating 1,200 people, and a chapel with 850 sittings.

To the east of the chapel is a residence for the Medical Superintendent, and on the west is the main-entrance block, containing Board and Committee rooms, offices for the staff, and on the first floor sitting and bed rooms for three Assistant Medical Officers; while in a separate building on the north side are rooms for two more Assistant Medical Officers.

Flanking the administrative centre are blocks for the attendants and nurses, comprising large mess and day rooms, with bedrooms on the first and second floors; and a similar building on the north side gives further accommodation for nurses and female officers, one wing being set apart for night nurses. These three blocks give sleeping accommodation for 108, while in the patients' blocks are private rooms for 120 additional attendants, and it is expected that a further number of married male attendants will reside out of the Asylum.

A separate residence on the north side is provided for the steward, and an Isolation Hospital for twenty patients (not shown on the ground plan) will be erected at a little distance from the main building.

The total accommodation of the asylum, including patients, nurses, and attendants, and the medical and other staff, will be nearly 2,250.

The building is erected north and south, nearly all the day-rooms occupied by patients having more or less a southern aspect. By the oblique arrangement of the outside corridors the front buildings do not interrupt the view from those behind.

The dormitories are planned on hospital principles, all having cross-ventilation, so far as is possible, by opposite windows.

The heating and ventilating of this building will be in itself a work of considerable magnitude, and has involved great consideration and labour in planning, having been designed in all its detail by a leading firm of engineers under the direction of the architect.

The system is one of hot air warmed by batteries of steam pipes in heating chambers in the basements of the various blocks, the fresh air being conducted to the batteries by underground trunks, and ascending directly from the heating chambers by air-flues built in the walls, one or more flues opening into every habitable room in the building. In addition to the inlet-flues are extraction-flues of corresponding area conveying vitiated air from each room to air-trunks and vertical shafts, with extraction-cowls in the roof spaces, coils of steam pipes being introduced at the base of each extraction-shaft so as to create a current.

The steam for heating the entire building, also for driving the laundry machinery, and for cooking purposes and hot water supply, is generated in a series of boilers on the north side of the building. All the main corridors are constructed with subways below for containing steam, water, and other piping. These main subways measure in the aggregate nearly a mile in length, there being another mile of subsidiary subways in the basements of the various blocks.

The best idea of the magnitude of the Asylum may be conveyed by stating that the actual buildings, including only the interior courts, cover an area of over twenty acres; that the main corridors measure about one mile in length; that eleven miles of underground piping will be required in the sewerage and rain-water systems, and twenty-two millions of bricks in the construction of the buildings above the ground floor line, between five and six millions having been already used in the foundations and subways, and that the weight of materials required for the construction of the superstructure is estimated at about 150,000 tons.

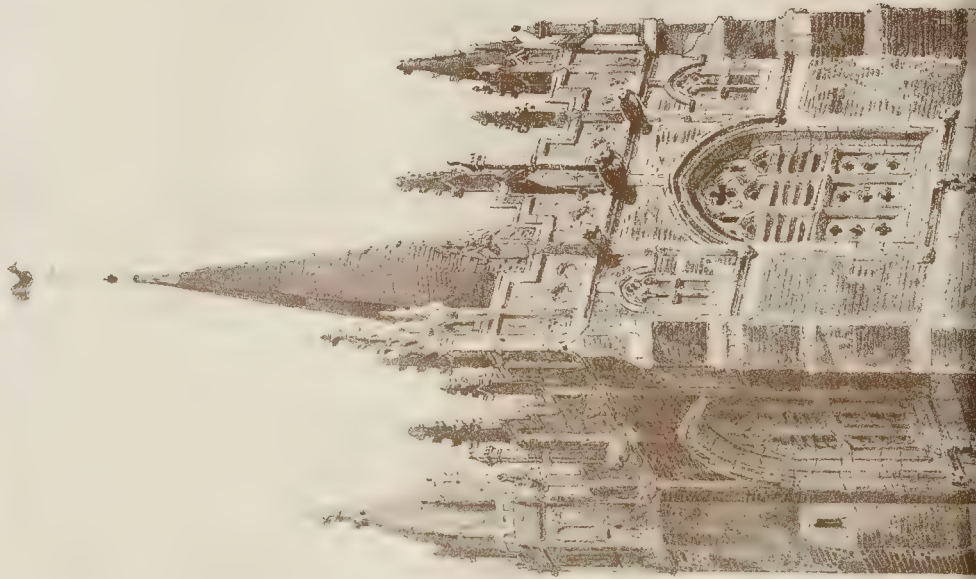
The building has been designed with every precaution against fire, the construction of all staircases, corridors, and connecting passages being fireproof, and the whole of the roofs of buildings occupied by patients being cut off from the rooms below by fireproof ceilings; the staircases are arranged to allow of two escapes from each ward, so that should a fire break out in any part of the building it would be impossible for a patient to be cut off from escape. In addition, a special service of water mains for fire with hydrants is provided, so as to command every part of the building, both inside and out.

The contract for the superstructure is let to Mr. Gabbott, of Liverpool, the amount being £37,946; the foundations, subways, and casements having previously been put in, which with the levelling of the site and the erection of





THE BUILDER, NOVEMBER 23, 1889.



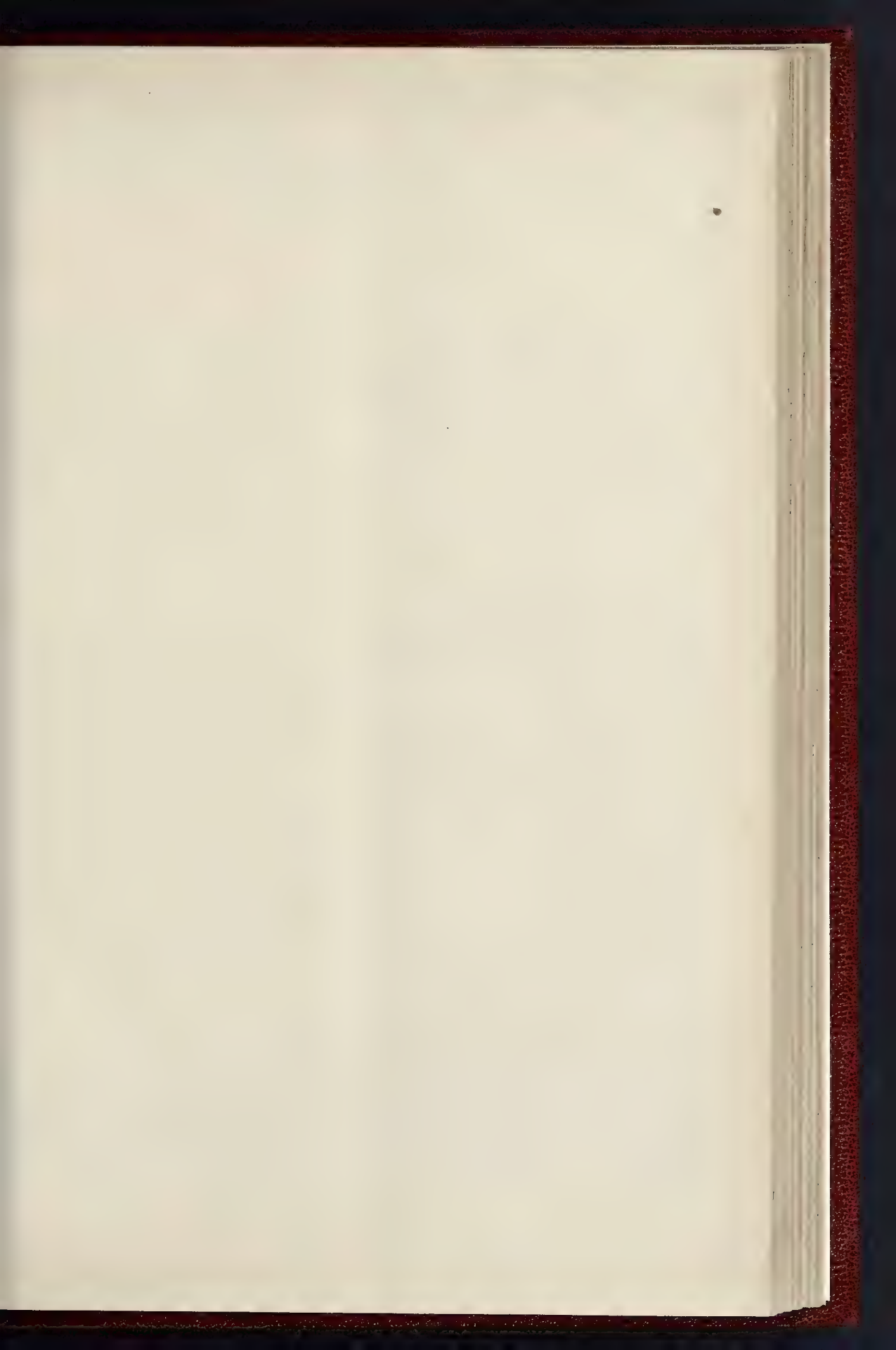




ST JOHN'S CHURCH, STANSTEAD - MONT-FITCHET TOWER AND WEST END - MR. W. D. CARO - ARCHITECT.

















entrance lodges and gateways and boundary ending has cost about 50,000*l.* more.

The foundations were commenced last year by Messrs. Howell & Son, who, unfortunately, died before they had done a third of their work, and have since been completed by Mr. I. Lovatt, of Wolverhampton. The lodges were built by Messrs. Higgs & Hill. The works are being carried out under the direction of the architect, Mr. George T. Hine, for the Asylums Committee of the London County Council, Mr. George Wise acting as principal clerk of works.

#### THE PARIS EXHIBITION BUILDINGS:

##### THE ARCHITECTURAL ASSOCIATION.

The third meeting of this Association for the present session was held on the 15th inst., in the meeting-room of the Royal Institute of British Architects, Conduit-street, Mr. Leonard Stokes (President) in the chair. The following gentlemen were elected members, viz., Messrs. R. S. Lorimer, T. M. Smith, H. D. Blowers, E. Penfold, J. A. Brand, J. Lockhead, T. McGill Cassels, W. Bone, J. A. Barclay, J. Begg, G. W. Wilson, G. Watson, C. A. Norton, and A. Stratton.

Mr. T. E. Pryce announced that the "Common Room" would be opened for the first time on Friday, the 29th inst., at 6 p.m. After that date the room will be open at 6 o'clock every evening on which the various classes meet for the convenience of members attending the classes, and to give them an opportunity of meeting and discussing any subject of class or other work that may interest them. On Thursday, Dec. 17, the first general "Common Room" meeting will be held, when Mr. Sidney Deane and Mr. Collard will open a discussion on "The Position and Prospects of Architectural Assistants." Other meetings of this nature will be held from time to time. The "Common Room" Committee will be glad to receive through Mr. Appleton any suggestions as to subjects for discussion.

Mr. A. W. Earle said he wished to make a personal explanation relative to the remarks made by the President, and by the President of the Institute, in connexion with his (Mr. Earle's) proposal for the provision of a central building for the use of architects. Unfortunately, the building which he proposed had been dubbed a "College of Architecture"; but what he wished to see established was not a "College of Architecture," but merely a central building for use by architects, where the means of study should be concentrated. Mr. Waterhouse's enumeration of the different places in London to which the student had to journey was in itself an argument for the proposal which he (Mr. Earle) had made.

Mr. Banister F. Fletcher then read a paper on "The Paris Exhibition," of which we print the greater part:—

Commencing with the Palais des Machines, by M. Dutert, architect, and M. Contamin, engineer, we find that it is an important structure, probably the most important in the Exposition for the lessons it teaches us in the proper application of iron. It is the largest building ever roofed in a single span. After several preliminary designs by M. Dutert, who, it may be remarked, wished the roof to be elliptical in form, with hipped ends, the present form was designed, which practically takes somewhat the outline of a Tudor arch springing from the ground. The pointed arch form also made the calculation comparatively easy, because it defined exactly where the strains were to come through. The plan consists of one large nave, 380 ft. long, and of twenty great principals or trusses springing from the ground, and having a clear span of 375 ft., and a height to the ridge of 141 ft. 10 in. There is no tie-rod to the roof at all.

There are galleries along each side, which are continued round the end at a height of 57 ft. 6 in. from the ground, and staircases at each end of the building under the connections dome, which give access to it. The foundations were so long a matter to go into here, but it may be interesting to state that each of the foundations to the trusses is able to resist a vertical load of 405 tons 13 cwt., and a horizontal thrust of 113 tons. I give a section of one of these foundations along with the other drawings and photographs of the building. The concrete foundations to the side galleries are connected by stonework arches. The foundations to the main trusses are built in Portland cement, those to the side

galleries being in hydraulic lime from Beffes, two of lime to five of sand. The different methods adopted of raising the great trusses by the two engineering firms who constructed it are very interesting, and the three plates I exhibit show these methods, and also the proposed scheme of raising half of each complete truss at one time. The twenty principal trusses are of wrought iron, and are bound together by five deep purlins on each side of the central articulation, the highest on each side being placed near together and carrying the exterior examining platform.

The purlins are framed in the thickness of the trusses. I give a drawing showing how this is done, and have shown resting on them, to the number of three between each truss, the principal rafters, which carry the secondary purlins, supporting the secondary rafters which carry the glass roofing.

The side galleries are covered with a segmental roof to each bay. The articulations of the great trusses are also of interest. There are three, one at the crown of the arch and one at the springing of each half truss, which, being reduced as it were to a point, rest on a roller plate of cast iron, which is fitted into the cast-iron shoe, which itself is bolted through to the stone foundation by tie-rods.

The strains, therefore, are taken right through the centre of the cast-iron roller plate. It is very similar to that of the Palais des Beaux-Arts. The lower part of the trusses is considerably strengthened by the addition of plates, the part immediately above the roller plate being made in cast-iron. The articulation at the top claims consideration. The ends of the two parallel girders forming the half-trusses are bound together by two half-cushions, which, in their turn, are clasped by a circular band of hammered iron, preventing any tendency to spread on the part of the trusses. These rest against a hollow steel pivot, which is the only point of connection between the two trusses. Through this hollow steel pivot is passed a bolt which clasps, on each side of the truss, a steel ring which binds the whole together. To these rings, by means of ears, are fixed tie-rods in the two end bays, which run diagonally between the trusses from the ridge to the gutter. The weight of each truss is 196 tons, and the thrust on each articulation at the base 115 tons (which includes the weight of the covering as also the pressure of wind and snow).

The point of support of each roller plate at the base of the truss is about 7½ square feet, therefore the total weight of ironwork (7,400 tons) rests on a cast-iron surface of only 300 square feet, or nearly twenty-five tons to a square foot.

The fact of the trusses being 12 ft. 2 in. wide at the base and 9 ft. 10 in. at the summit, necessitated, of course, by the construction, has a great deal to do with the light and graceful effect of the roof as a whole.

The trusses are composed of two parallel girders, with top and bottom webs, 17½ in. x 35 in., joined by angle irons, and each having a top and bottom flange, the exterior flange being 30 in. wide and the interior 35 in. These flanges are thickened in various parts where required; for instance, at the base it has eight thicknesses. The upper and lower portions of the truss are joined by open lattice-work, the uprights being in double T-iron and the cross-bracing in T-iron. The method of distributing this lattice-work is well deserving of notice. In the space between the two girders forming the truss is a cleverly-contrived walking way from top to bottom by the aid of an internal ladder shown on the drawing, so that all ordinary repairs can be got at without the use of any scaffolding.

The method of forming the floors to the galleries, and the ceilings to those parts of the roof not covered with glass, and which are decorated with frescoes in colour, I illustrate by a few sketches.

The roofing is particularly noteworthy on account of its enormous size: it contains 631,857 square feet. The upper part is covered with glass ½ in. thick, in slabs 6 ft. 6 in. x 1 ft. 8 in., which were severely tested; and it is painted white inside with a special solution, which it is said does not turn yellow. The vertical glazing to the Avenue de Suffren gable is composed of stained glass, representing the Battle of Bouvines. The zincwork in the main roof is laid with rolls, and that to the side aisles (about 166,000 square feet) in zinc squares.

The gutters, and the method of forming flashings by the meeting of two iron surfaces, invented

by M. Dutert, are interesting. An intermediate gutter had to be formed on the roof where the glass leaves off, this collecting gutter being necessary to break the force of the enormous sheet of descending water. This gutter empties itself into others, resting on the backs of the main principals. These gutters in their turn empty themselves into the main gutter, from which the water is led by down-pipes across the intermediate gutters of the side aisle roof and then by down-pipes to the ground. The gutters to these side roofs are made double in the event of an overflow.

To the exterior, the filling-in between the iron trusses at the bottom is in glazed bricks in patterns.

The Galerie des Machines was awarded the prize of 100,000 francs by the Press Committee, as being the most useful work in the Exposition, but one is inclined to think that it also combines beauty with utility to a marked degree. It is, in fact, the most distinctly original building in the Exposition, and as an engineering work I should say it would be considered superior to the Eiffel Tower. The St. Pancras roof, by Sir Gilbert Scott, is 240 ft. span, so that this roof is more than half as big again. It is, however, in all its details, a distinctly architectural work. It is a great thing too, that an original building of this sort should have been conceived by an architect, which is not generally the case. In the interior it will be seen that M. Dutert has attempted to take iron in ordinary sections, and by using the material in a common-sense way, to produce a building which shall be characteristic of the material in which it is built, as a building in any material should be, whether in iron, stone, brick, terra-cotta, or marble; and this is what men generally forget in designing iron structures, by endeavouring to imitate stone forms in iron.

For instance, the caps to the columns supporting the gallery are constructed entirely on a novel principle. There is no attempted imitation of the Grecian Doric, nor is there an architrave, frieze, and cornice, carefully worked out in iron, but a simple iron column, treated as such by the employment of ordinary iron sections rivetted together to form a decorative and characteristic whole. A building of this sort does more to advance a science and create an art than any amount of lecturing, and the architectural world has been waiting—well, probably, ever since iron was first employed, for an appreciative application of the material to building necessities; it has been scouted by our so-called art men, and its application in an artistic point of view spoiled by our engineers, whose bridges, viaducts, and railway stations contain no artistic feeling in their conception. The effect of this building on modern iron construction, no doubt, will be enormous. Iron may be said to be the only modern building material we have, all other building materials, in some form or other, have been used for centuries. Is it too much, then, to suppose that any new style of architecture will be based to a large extent on this material, all other styles having had their origin to a certain extent in the materials from time to time at hand? We have had half-timber houses (real ones I mean) in the Middle Ages; who knows, but that in the course of a decade or so, our town architecture will consist of half-iron buildings in which the interstices between the iron framing will be filled in with slabs of terra-cotta, instead of timber-framing and rough cast filling. This will enable us to have our hollow walls, the terra-cotta being placed on each side of a hollow space, as in the Argentine Pavilion, for example, and will also remove the old discussion of the best side to have the 4½ in. and 9 in. thickness.

In this Exposition we meet, perhaps for the first time, the architect and engineer working together, shoulder to shoulder, in the production of these great works; whether this be a foreshadowing of the amalgamation of the two professions, bringing us back to the state when they, undoubtedly, were one; or whether, on the other hand, it will lead to a more practical and genial relationship between the two, is not for me to say. It is, however, a step in the right direction, for whereas in English engineering works the architect is, if at all, called in at the last moment to beautify hideousness, the French, with the artistic instinct of their race, prefer that the architect should conceive and the engineer construct.

The "Palais des Expositions Diverses," the architect to which is M. Bouvard, I propose to dismiss in a few words. It is composed of ridge



and furrow roofing, in extremely light sections, with no tie rods. The main building is 1,344 ft. long by 626 ft. wide, and is bisected by the profusely-decorated "Galerie de Trente Mètres," which joins the great dome and entrance to the low connecting dome leading into the Palais des Machines.

The roof of the "Galerie de Trente Mètres" rests on wrought-iron standards, and is of Tudor form with lattice-framing. It has a span of 98 ft., and is divided into seven bays with an internal height of 80 ft. It is lighted from the top of the sides, the roof rafters showing, and being treated in different colours. The particular form of this roof was necessitated because it had to follow the outline of the great arch of the central dome. The arch of the roof is formed in lattice-work, there being no tie-rod. The bays which form the entrances to the French industries on either side of the gallery are, in themselves, the most important of the interior decorations in the whole Exhibition. I show a series of photographs of all these entrances as they were arranged side by side, but these, although they give the form, do not give the beautiful colouring. Each section choosing its own architect, the variety of thought and design crowded into this gallery is wonderful. All had practically the same frontage upon which to work, but the treatment of each entrance is distinct. The entrances are one and all endeavours to symbolise the products of the different sections exhibiting, or at least to give a design whose characteristic *motif* should convey an idea of the class represented. In fact, designs for entrances to an exhibition of the different trades in England would be a fascinating set of subjects for the class of colour decoration. I cannot do more here than refer to the photographs, and would specially call your attention to the entrances to "Meubles," to "Horlogerie," and to the Metallurgical section. These are three different types. That to "Meubles" is monochromatic, in plaster, and stained a dark-coloured mahogany. The general disposition will be seen by the photograph; the bas-reliefs and the figures representing a wood-carver, a cabinetmaker, &c., embellished with the names of celebrated French furniture designers, &c., go to make up a very characteristic whole.

The entrance to "Horlogerie" is a polychromatic design founded on the "Vieille Horloge" at Rouen, in which the different symbols of clockmaking, &c., are cleverly introduced. The Metallurgical section is comprised entirely of forged iron made at the works at Pompey, and is very cleverly put together, the arches being formed of lattice bracing and different *motifs* of tool making, such as hammers, wrenches, and various implements. These arches rest on circular columns, composed of open work of upright iron, held in position by bright iron bands. It is very ingeniously devised, being made entirely of ordinary sections, or sections made with ordinary machinery. All these compositions are worth study.

The Great Dome, by M. Bouvard, architect, is the marvel of decoration at the Exposition. I am fortunate in being able to show you a drawing which M. Bouvard very kindly gave me, which is an autographic reproduction of the original contract drawing, showing the construction.\*

The entrance comprises a nave flanked right and left with two pavilions. The dome itself is formed by eight half trusses, supported by eight standards, 130 feet high. The diameter of the dome is 98 ft. 6 in.; the crown 196 feet from the ground. At the first floor is formed a circular iron balcony with a gracefully-designed balustrading, from which a magnificent view is obtained down the Champs de Mars between the legs of the great Eiffel Tower, and also a view down the Galerie de Trente Mètres of the various entrances to the different French courts, full of colour and variety of outline. Extending to the connecting dome of the Palais des Machines at the level of the first belt of ironwork, i.e., 72 feet from the ground, the main coupled standards are brought together as they were by pediments in "staff" with sculptured *motifs* representing Air, Water, Steam, and Electricity, supported by pilasters. Between this first belt and the upper cornice is a deep decorative frieze 20 feet high, representing France inviting the nations of the world, and forming one of the most prominent features of the dome. It is painted in twelve panels, and

you will see the stalwart Scotchman with bagpipes complete, who, curiously enough, represents England. Above, at the height of the third belt, are allegorical sculptures of Europe, Asia, Africa, and America. The trusses are again bound together by the crowning cornice with a blocking course, containing the shields and coats-of-arms of all the Powers represented at the Exposition. The lighting is effected by twelve large windows in the dome, between the pairs of principal trusses. The French flag forms the centre of the ornamentation at the top of the dome, from which escape, as it were, golden rays upon a deep blue sky studded with silver stars. For the exterior the constructive lines of the great iron trusses are accentuated in tones of Florentine bronze, picked out with lines of gold carried up to the summit, on which is placed a statue 30 ft. high, executed in zinc *repoussé* on a skeleton of cast steel. The total weight of this enormous statue is 7 tons 17 cwt.; and the framework has been calculated to withstand a pressure of wind equal to 154 lb. to 1  $\frac{1}{2}$  square yards. The materials employed in the construction of the dome are, firstly, the eight great iron principals; and, secondly, the eight half principals which spring from the Tudor arches connecting the main principals; and zinc, glazed terra-cotta, concrete in various colours, and "staff," or canvas plaster, are other materials used.

The ridge to the exterior of the dome, above the glazing, is formed with lions' heads in zinc *estampé*. The four griffins at the springing of the dome are in "staff," and fixed by wooden braces and angle irons. The drum of the dome below the glazing is in brick *apparente*, and ornamented with terra-cotta *cabocheons*. The *motifs* in canvas plaster, which have been employed in the interior at the base, are secured to the ironwork forming the great arches by metal straps or iron network bedded in plaster. The decorative canopies in the interior are lined and fixed by the aid of glue. The general effect is pleasing, and the outline of the dome very fine, but the lines of the entrance and pediment are not happy, and the details of this part are anything but refined, the enormous statue, 30 ft. high at the top, completely destroying the scale.

It is necessary to emphasise very strongly the part which colour plays in the decoration of the dome; without it, it would lose much, if not most, of that grandeur and richness of effect it now possesses. The general effect of colouring produced in the interior, when lighted up by the electric light or with a strong western sun shining through the rich golden glass, leaves an impression never to be forgotten. The 15 metre gallery and the four pavilions along its axis are good specimens of light iron construction, which time will not allow me to deal with, and our glance at the Galerie Rapp, which is symmetrical with the Galerie Desaix, and binds the Beaux-Arts Palace with the Palais des Expositions Diverses, must be very short. It has a span of 98 ft. 6 in., and rests at a distance of 32 ft. each side of the centre of the building on a row of cast-iron columns, which also carry the gallery running round the building. The ironwork is painted grey-blue.

The Galerie Rapp forms a vestibule, as it were, to the Palais des Beaux-Arts, as does the Galerie Desaix to the Palais des Arts Libéraux; these two palaces are similar in construction, with one or two exceptions. I am indebted to M. Formigé, the architect, and M. Contamin, the engineer, for the various blue prints and autographic plates which I am able to show you. This palais, as far as the exterior is concerned, is an example of the application of iron and terra-cotta, in which the ironwork is everywhere visible, the terra-cotta not being constructive. M. Formigé explained to me that in the 1878 Exhibition the ironwork was practically hidden, but in this design he desired to emphasise the construction as much as possible. The plan consists of a great nave, 738 ft. by 175 ft. 6 in. wide in one span, with side galleries the whole length. I have no time here to go through the interesting method of scaffolding adopted, nor to enter much into any detail of construction; but beside the large detail, I give a plate showing the general arrangement of the trusses, which are spaced 59 ft. 6 in. apart from centre to centre, and have a clear height of 92 ft. 6 in., the roof principals being really, though not apparently, taken right to the ground. The vertical portion of the truss, which is 4 ft. 6 in. by 2 ft. 6 in. on plan, consists of double girders, each having its

flanges, webs, angle irons and lattice bracing is 49 ft. 2 in. high; above this starts the curve of the intrados, which is formed by portions of two ellipses, the minor axis of which do not coincide with the axis or central line of the roof itself, thus making it slightly pointed. The back of the principal is struck with a radius of 300 ft. There are six lattice-work purlins on each side of the central articulation, and these are connected by intermediate rafters, to which are rivetted the cruciform sash bars. Both palaces are lighted from the roof. The articulation mentioned above are interesting and novel. Looking at the bottom articulation, we find that the foundation-plate is hollow on its upper surface, and is bolted to the stone piers. Into the slides the top portion of the bed plate, which in its turn, receives the circular steel pin upon which the foot of the principal rests. The hollow foundation-plate was filled in with sand by withdrawing or adding to which the absolute levels of the principals were preserved. The three drawings, I think, demonstrate this thoroughly. It will be seen in this case there is a tie-rod 3 in. in diameter secured to the bed-plate, and passing under the ground to the opposite column. It is in three lengths. The articulation at the top is also interesting, and very similar to that of the Palais des Machines. It will be seen that the two upper parts of the trusses are not connected in any way, but simply rest against the steel cylinder, which is 2 ft. 4  $\frac{1}{2}$  in. long, and about 10 in. diameter—the ends of each truss being considerably strengthened by plate-iron and cast-iron plates, and bolts at the summit. The domes to these places are 100 ft. in diameter, and 136 ft. 10 in. from the ground.

M. Formigé has kindly given me a blue print showing the construction, from which it will be seen that the dome rests on four standards, from which spring the Tudor arches in light iron lattice work, supporting the dome itself. The tiles forming the covering of the dome had to be made of a special design, because there is no overlapping, the tiles presenting a level face. Several attempts were tried to get these really watertight; but even now, M. Formigé told me, they were not so, as the dome had to be covered underneath the tiles with zinc. The Beaux-Arts dome differs from that to the Palais des Arts Libéraux in this extent, that it has a wide gallery at the first-floor level, approached from staircases for the four corners of the dome. These staircases are most satisfactory in their outline and general proportions, the stonework arches supporting them following the rake of the staircase, the centre arch being a low elliptical one. The iron balustrading is extremely rich and elegant design. Externally, the roof principals to the side aisles rest on hollow iron lattice-work standards 3 ft. 7 in. square, filled in with light Venetian red terra-cotta slabs (about 1 in. thick). These slabs are fluted, but the ornamentation on them is somewhat hurried.

The sides of these standards are filled in with cross-bracing, which, however, breaks rather awkwardly through the designs on the terra-cotta panels. In front there is only horizontal bracing dividing the panels. The standards rest on a stone base, are 25 ft. apart, and have on each side a circular cast-iron column helping to carry the connecting lattice-work girder, which also carries a close terra-cotta balustrading; above this are the windows stretching from pier to pier, with double lattice arch above rivetted to the standards, and carrying the architrave, terra-cotta frieze, and cornice, arching above this the heavy terra-cotta balustrading.

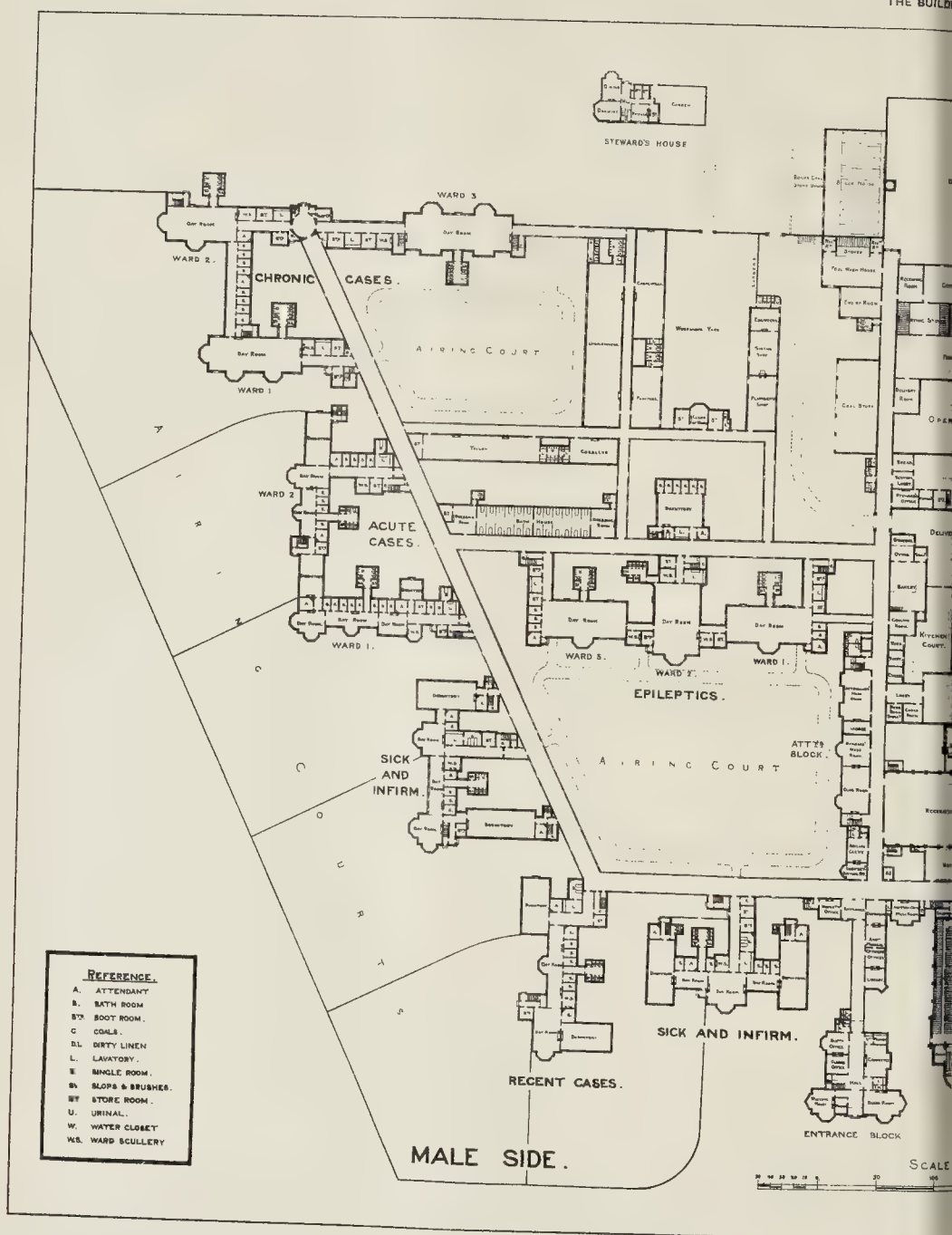
The main entrances are in terra-cotta, and differ slightly in general composition. They can be seen from the photographs.\* The façades of these two palaces are very suggestive in their composition, the grey-blue of the ironwork harmonising with the soft Venetian red of the terra-cotta. A modern street front based on the idea would be very suitable, a maximum amount of light being obtained, and the bold projection of the piers giving a deep shadow, and the harmony of the grey-blue and Venetian red being very pleasing. An ingenious architect might even turn the hollow standards into lifts, thus wasting no space at all. The appearance of the tiled domes in turquoise blue, yellow, and cream colour in patterns, with the letter "R. F." in the centre, is very satisfactory, the constructive lines being marked by broad bands of yellow tiling. The circular windows at the

\* A reduced reproduction of this drawing was given in the *Builder* for January 21, 1888 (p. 44).

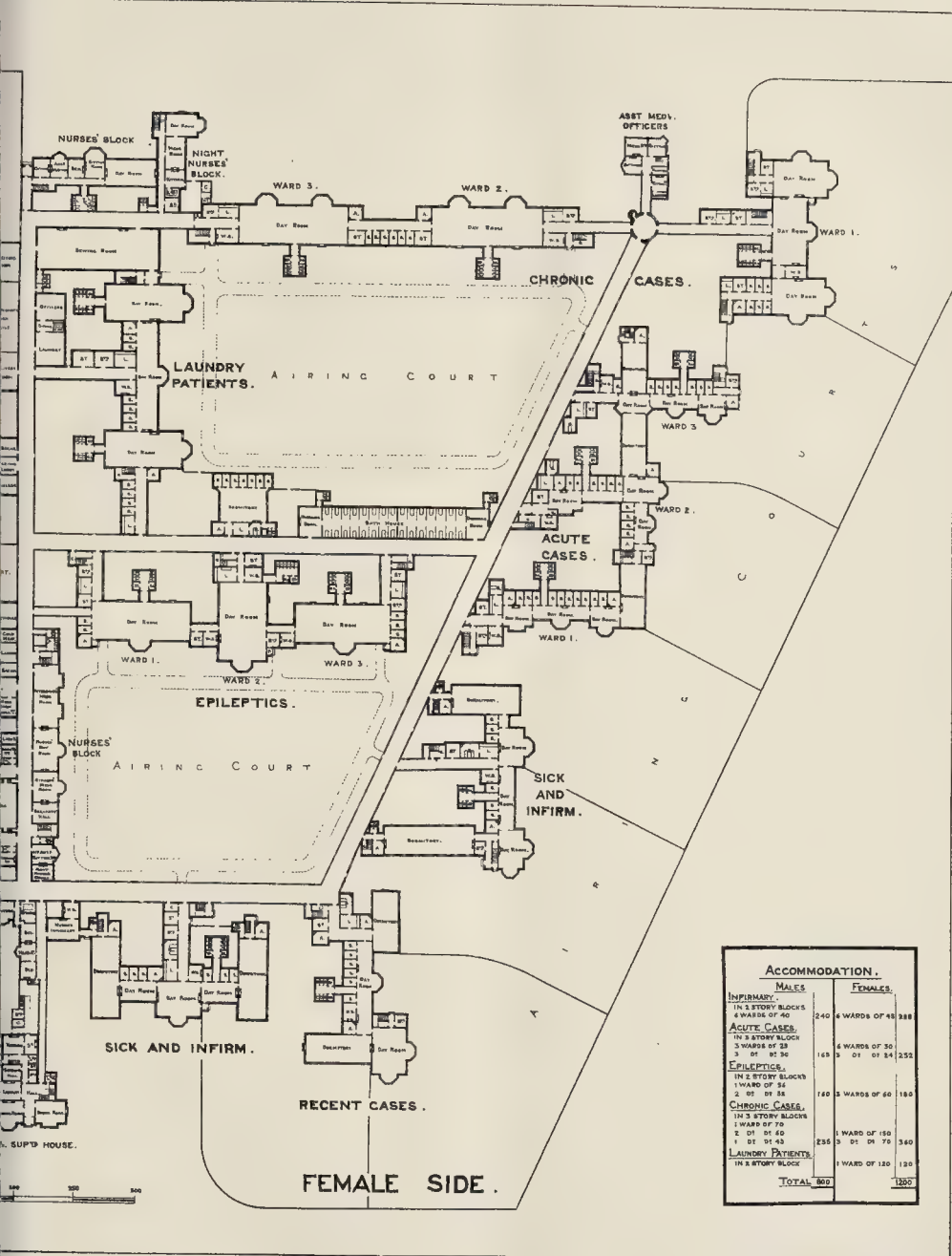
\* An illustration of the entrance to the Palais des Arts Libéraux will be found in the *Builder* for October 28 of this year, with enlarged illustrations of the sculpture decoration on the piers.











ACCOMMODATION.	
MALES	FEMALES
INFIRMARY. IN 3 STORY BLOCKS 4 WARDS OF 40	240 4 WARDS OF 40 388
ACUTE CASES. IN 3 STORY BLOCK 3 WARDS OF 28 3 01 07 36	168 3 01 07 36 252
EPILEPTICS. IN 2 STORY BLOCKS 1 WARD OF 34 2 05 01 35	160 3 WARDS OF 60 180
CHRONIC CASES. IN 3 STORY BLOCKS 1 WARD OF 70 2 01 01 60 1 01 01 43	1 WARD OF 150 540 255 3 01 01 70 540
LAUNDRY PATIENTS. IN 2 STORY BLOCK	1 WARD OF 120 120
TOTAL 500	1800





base of the dome are formed in glazed blue and white voussoirs, with consoles between supporting vases. Though lacking the boldness of M. Bouvard's dome, these domes are probably more graceful in detail and outline.

I have now given you roughly an idea of the great buildings at the Exposition, and I propose now to deal with the two most original foreign pavilions in the Exposition. And, firstly, the Argentine Pavilion, by M. Albert Ballu, architect, the son of that Ballu who, with Deperthes, erected the modern Hotel de Ville in Paris, is the most original in the whole Exposition, and I am fortunate in being able to place before you this evening a complete set of working drawings of the building, comprising fifteen double elephant sheets, kindly given me by M. Ballu. Briefly, the building consists of a central dome, with four smaller domes grouped around, and on each side of this central feature extends a wing with central naves and aisles. This is in two floors. As time is short, I do not propose to enter into details, which the drawings will sufficiently explain.

M. Ballu told me that his idea in designing the building was to make use of all modern materials which could in any way be worked into the design. The pavilion has therefore been built up with a framework of iron, and the materials used for filling in are terra-cotta, faience, glazed tiles, coloured glass as bulls-eyes, or *cabochois*, as they call them in France. The building itself is put together in its larger parts by the aid of bolts and screws, as it is the intention of the Argentine Republic to have it re-erected in Buenos Ayres. The pendentives to the central dome are in bronze.

The large semi-circular openings to the centre of the *façade* are separated by piers formed by an iron framework, and filled in with buff terra-cotta, blue tiles, and glass prisms in different colours. These latter are hollow, and at their back is placed a thin layer of glass mosaic, to prevent a hollow appearance. The projecting iron balconies, elliptical on plan, are supported by light iron cantilevers painted gold, and are extremely graceful. The main cornice is supported by iron consoles running through the frieze, and between these columns is a prism of green glass. The ironwork internally is painted gold and green. The reveals to the arches to the main entrance are filled in with real mosaic, the dominant colours being blue, red, gold, and white.

The divisions of the main *façade* are surrounded by two deep rows of plain tiles. These divisions are sub-divided into three by light circular columns and caps in the Renaissance style, with semi-circular arches, all the ironwork being painted gold, with great richness of effect. The base of the building is composed of a mixture of burnt sienna coloured terra-cotta, with a row of blue glass prisms and a cornice of bright tiles with yellow cats painted on, and treated in a conventional way. The inside ironwork is latticed—a method of iron treatment evidently considered graceful by the French. This building, no doubt, had a great influence on the design of the surrounding buildings, and M. Ballu has, I believe, taken action before the "Comité de la Protection Artistique." The building cost 48,000.

All the South American pavilions are instructive, showing something of a new method of building. In the Mexican Pavilion, for instance, the facing to the external walls is performed in stamped zinc. The Chili Pavilion, the architect to which is M. Picq, is built entirely of an iron framework, with terra-cotta panels in varied colours as a filling in. It is to be removed to Chili. The terra-cotta panels, I may mention, are placed at the edges of the upright framing in such a way as to practically form hollow walling. The ironwork internally is painted in blue-grey. It is utterly impossible even to mention the names of all the pavilions, and I must not attempt to do so; these are fully treated of in my report. I may, however, mention the work of an English architect, the only example, I believe, at the Exhibition. I refer to the Indian Pavilion, by Mr. Purdon Clarke, F.R.I.B.A., who has been kind enough to forward me some plates showing his design. It is executed with a framework of wood and covered with plaster. Parts of it are reproductions from Indian buildings.

For the buildings on the Champs de Mars I must refer you to the photographs, which are arranged in order, and which, I hope, will give you a very fair idea of the Exhibition. The habitations of man in all ages, by M. Charles

Garnier, I have illustrated by a complete series of photographs. With the want of time, space, and money at M. Garnier's disposal, I think he ought to be congratulated on doing what he has done with so difficult a subject.

Before quitting the Quai d'Orsay, I should like to bring to your attention a little circular iron building, containing the Petroleum Exhibition. It is constructed of circular iron bands of sheet iron, 9 ft long by 3 ft. 3 in., rivetted together with lead rivets in order to facilitate removing, but the most peculiar part of it is that it was built from the top to the bottom, the plates being held in position by strong cranes until the bottom plate was reached. This was done in order that the floods of the Seine during the spring should not wash the building away, there being practically no foundations.

I suppose one ought to say something of the Eiffel Tower, about which so much has been said and written. Mr. Hamerton's definition that "it is a land lighthouse prepared to resist the wind and not the waves," is probably as good a definition as can be found for it. As an engineering work there is nothing to be said against it, but it is inferior to the Forth Bridge, the total length of one of whose spans is twice the height of the Tower, and it also appears inferior to the Palais des Machines as a feat of engineering skill. It is no doubt, however, a wonderful structure in its way, and one cannot deny that the bold sweep of its four great legs, united at the base, and its circular arch, which, however, is not structural, is distinctly pleasing. Another great point is its extreme simplicity, only marred when the architect was called in to design the arading to the two *déges*. Moreover, in looking at the tower we must remember that it is an extraordinary structure (using that word in its original sense), and that we cannot bring ordinary standards of beauty, —standards, we may say, which belong to stone or brick,—to bear upon a structure outside its range. For instance, the ordinary æsthetic principles we apply to a Greek temple or Gothic church, or a Queen Anne house, are totally inapplicable here, and we must not attempt to judge it by these rules. It was from trying to do this that the architectural, artistic, and literary world of France came such a "cropper," if you will allow me to say so. They had in their mind a solid-looking structure, towering with its black mass (like a factory chimney-shaft, as they said) 1,000 ft. in the air. They had never seen an Eiffel Tower, it being the first of its race (which we may hope will be a short-lived one), and they could not realise the graceful appearance of this lace-like monument, rising like a spider's web in the air, and crumbing nothing, dwarfing nothing, by its graceful proportions; whereas a tower or lighthouse of stone or brick would do exactly what they said it would, it would crush and utterly destroy the architectural beauty of Paris.

There is no doubt that this open lace-work of the tower saves it from a failure, and I would strongly caution the powers that be to abstain from filling it with terra-cotta panels as has been suggested. This done the tower will indeed be a failure and an eyesore to Paris. The buildings on the Esplanade des Invalides are interesting, though not so much from a constructive point of view. The buildings, with some few exceptions, are devoted to the French colonies, to the Ministry of War, and to Sanitary Science, and are of a temporary nature. The colonial buildings are representative of the architecture indigenous to the various colonies, and are in this respect interesting, giving us real buildings, which in the majority of cases can only be seen by us on paper.

The Algerian Palace, Tunisian Palace, the Colonial Palace, the Annam and Tonkin Pavilion, and the Indo-China Pavilion are the principal buildings on the east side, and are constructed in *pan-de-vois*, or brick nogging.

On the west side is the Health Exhibition, the Ministry of War, the Post and Telegraph Pavilion. The construction of these latter is in some respects novel.

A very important material in use in the eastern building is clay, which, being burnt, and when in its plastic state has fragments of different coloured porcelains and marble embedded in it. This is then baked, and forms a very good constructional and decorative material. The Post and Telegraph Pavilion, by M. Bousard, is peculiar as having a large central hall, 49 ft. by 59 ft., roofed by means of wooden lattice framing bolted together and without a tie-rod.

#### Architectural Drawings.

In my report I have gone rather fully into the differences between the English and French schools of drawing. I suppose that there never has been a finer or a more representative collection of architectural drawings brought together in one exhibition. One of the chief differences is the large extent to which the French go in for classical restorations in which colour is largely introduced, the winners of the Prix-de-Rome being sent out to Greece and Rome for this purpose. English students, on the contrary, either stop at home to sketch or measure in black and white, or go on a foreign tour with the same object. Colour is the exception in the architectural drawings by English students. One sees comparatively few fresh drawings of old French work in the exhibition, and even these are all executed with colour. Another great point is the size of the French designs, and the absence of perspective which one meets in French work. The scale usually employed is two centimetres to the mètre, or  $\frac{1}{50}$ , which is practically equal to over  $\frac{1}{4}$  in. scale to the foot, and for details five centimetres to the mètre, or  $\frac{1}{20}$  full size, half full size also being used, and in all these details the shadows are carefully shown. The importance of the plan in comparison with the elevation is emphasised. In England this is not so in exhibitions. This, no doubt, is the fault of the Architectural Room at the Royal Academy.

The system of shadows and the absence of perspective naturally go together; one is not so much wanted where the other is employed. But it is in this respect of shadow throwing which accounts to a large extent for the other differences as to scale, composition, &c. We can easily see, for example, that shadows on a small drawing are almost useless, the masses are not big enough to be appreciated. With regard to detail drawing, M. Dutert, M. Sédille, and other well-known French architects admitted that they could not understand how the English architect could design them without the help of shadows. Another point is the more complete study of the figure by French architects. Both of these differences are of course brought about by the early training. The decorative competitions held at the École des Beaux-Arts, in which painters, architects, and sculptors enter, of course necessitate the architect having a complete knowledge of the human figure. Then, again, one notices the absence of new domestic work at the Exposition, and what is there is bad. French country houses are designed, if I may say so, on the "square and high" principle instead of in the "long and low," which is the proper way to design a country-house, at any rate of small size.

The English and Americans have thoroughly grasped this fact. There is no doubt that the French system of shadows, and absence of perspective, so necessary in this class of work, is partly accountable for this. From the study of the French system, then, one would say that it works admirably for public buildings with large *façades* (especially when aided, as it so frequently is in France, by plaster models of the buildings to a large scale), and also for the preparation of details, but that for the designing of country residences, the English and American perspective system is to be preferred.

Before closing, I have a pleasing duty to perform, viz., to thank those gentlemen, both English and foreign, who have been good enough by introductions or indications to help me in the somewhat large undertaking of reporting on this Exposition. Of the English architects I am indebted to Mr. Arthur Cates, the founder of this studentship, for his generosity in doing so, and for introductions to Mr. Cesar Daly, &c.

To Mr. Phené Spiers, Mr. W. H. White (Sec. R.I.B.A.), and to Mr. John Hebb, I am indebted for introductions to Parisian architects. To Mr. Purdon Clarke, F.R.I.B.A., for illustrations and information concerning his Indian Pavilion. To the foreign architects. I must specially mention M. César Daly, the eminent architect and distinguished savant and editor, who received me on my arrival at Paris as a *compère*, and with whom I had a very pleasant stay at his country residence. M. César Daly is well known in England as a writer and an editor, and also as the advocate of the "Hantes Études," and the delightful conversations I had with him on this somewhat abstruse question, coupled with the kindly way he endeavoured to explain his theories to me, are events in my life which will always be remembered with pleasure and satisfaction. To M. Marcel Daly, his son, I am also



obliged for various hints and introductions, as also the following architects:—M. Dutert (architect of the Palais des Machines); M. Formigé (architect to the two Art Palaces); M. Bouvard (architect of the central dome, &c.), and his "premier inspecteur," M. Ulysse Gravigny; M. Bousard (architect of the Post and Telegraph Pavilion); M. Yvon (architect of the Panorama du Tout Paris); M. Foulhoux (architect of the Annam and Tonkin Pavilion); M. Ballu (the architect of the Argentine and Algerian Palaces), for the complete set of plans you see on the walls; M. Louis Dauvergne (architect of the Brazil Pavilion); M. Hermant (architect of the Portuguese Pavilion); M. Fonquieu (the architect of the Bolivia Pavilion); M. Poinpelin (architect of the Spanish Pavilion); and Mr. Charles Lucas, architect, and lastly for, but not least to, Monsieur Victor Contamin, the distinguished engineer, for all the great buildings on the Champs de Mars, for drawings and also for allowing his "premier inspecteur" to accompany me over the buildings. I am also obliged to M. Viollet-le-Duc fils for information as to the formation of the celebrated Museum of Comparative Sculpture founded by his father. And to various other French architects to the buildings in the Exposition, who, during my five weeks' stay in Paris, did all they could to assist me.

I think we ought to take an opportunity of showing our appreciation of our French *confrères*, who always show such a lively desire to help us in every way when we go amongst them.

Mr. R. Phené Spiers, in proposing a vote of thanks to Mr. Fletcher for his paper, said that with regard to the Galerie des Machines, he thought Mr. Fletcher had done right in departing from a simple description of the structure to point out that it was one of the great engineering feats of our time, and marked an epoch in engineering construction which was quite as remarkable in its way, if not more so, than that marked by the building of the great roof of the station at St. Pancras. As far as he understood the description of the roof, there was absolutely no tie to it, and the building owed its stability to its foundations, which extended so great a distance into the ground that a tie was unnecessary. He believed the idea of the articulated construction of the roof principals was M. Contamin's, though its arrangement was designed by M. Dutert. If so, he could understand how M. Dutert, having had to arrange the building, gave such artistic forms to the metal-work, producing the charming results which were to be found in the building. The central dome was one of those happy features which Frenchmen, uncontrolled by constructional difficulties and considerations of expense, were able to indulge in by the use of iron, filled in partially with canvas plaster. Speaking next of the Palais des Beaux-Arts, Mr. Phené Spiers said he thought that the external piers which Mr. Fletcher had described in detail were not satisfactory. They had the appearance of buttresses, but they were not constructional buttresses; they had not to carry a downward weight, but an outward thrust, and they looked weak. The series of buildings illustrating *l'Histoire de l'Habitation*, by M. C. Garnier, presented a good many interesting points, but there were some features to which exception should be taken. In fact, it was rather curious that M. Garnier made some errors which he might easily have avoided by a little more care and investigation. In the Hindoo House, for instance, to take only one case, the building was represented with two towers covered with what was known as the *chaitya*, which was a symbol of the Buddhist religion, and used only in the Buddhist temples. It was, indeed, a most sacred feature, and one which was never employed in domestic architecture. Other buildings of the series, however, particularly the Pompeian and Greek houses, were admirable, as might be imagined by all who were acquainted with M. Garnier's knowledge of Greek and Roman architecture. It was impossible to speak on the large subject which Mr. Fletcher had introduced with reference to the question of drawings. The collection of architectural drawings at the Paris Exhibition was of the most extraordinary kind, for it not only consisted of drawings executed during the last eleven years, but of drawings produced during the last century, and many of them by men such as Duban and others, whom France counted among her best architects. As water colourists, he thought the French architects of

the early part of this century would take the palm from any who existed at the present day. He hoped they would pass a hearty vote of thanks to Mr. Fletcher for the pains which he had taken with his paper and for the admirable series of photographs and drawings which he had brought together.

Mr. H. W. Pratt, in seconding the vote of thanks, said he desired to propose a vote of thanks to the professional gentlemen in Paris who had kindly assisted Mr. Fletcher during his stay there. The Exhibition had shown them, and he hoped the public had something of the same feeling,—that it had been not only an exhibition of articles and things inside the buildings, but that the buildings themselves had formed an exhibition which was alone well worth seeing. Hitherto what buildings had been erected for exhibitions had been more or less of a temporary character, and it was really marvellous to reflect on the amount of money which must have been spent on the substantial and, in some respects, beautiful buildings erected for the Paris Exhibition. Many of the buildings, though only serving a temporary purpose, had yet been erected in a permanent manner. The great use of iron and terra-cotta throughout the buildings was very noticeable, and he thought Mr. Fletcher had done well in bringing before them so minutely the details of some of the buildings. He must confess, however, that the curve of the large roof of the Galerie des Machines seemed to him to take a very unsatisfactory form, for the straight portion of it was so straight that one could hardly believe there was any curve in it at all. He was glad that Mr. Fletcher had not wholly condemned the Eiffel Tower. Owing to preconceived notions, he certainly went to Paris expecting to see a monstrosity, and he was agreeably surprised to find that it was a much more graceful structure than he could possibly have imagined from its description. As one looked into the construction of the ironwork one was surprised to find how light that work was. The original design did not include the arches at the base, and to his mind those were the redeeming features of the design, pulling it together wonderfully. In looking at the detached buildings of the Exhibition representing different nationalities, and at the various parts of the buildings and galleries, one was struck with the way in which the French architects and engineers had worked together and had had the work subdivided. Whether the French Government was responsible for this or not, he thought it was a new departure, and one to be commended.

Mr. F. R. Farrow, in seconding the vote of thanks to the French architects and engineers who had assisted Mr. Fletcher, read a letter from Mr. Arthur Gates, who expressed his great regret at being unable to be present on account of illness, and his great satisfaction at the way in which Mr. Fletcher had fulfilled his duties as Gates Student. With regard to the construction of the roofs of the Exhibition buildings, by the use of articulated joints, it must not be supposed that the adoption of that method of construction was a new invention of the French; for a very good example was to be found in London,—the roof of "Olympia" having joints of articulated construction, somewhat similar to, although not precisely like, those mentioned by Mr. Fletcher. In "Olympia," however, the joints had not been left to be seen, but had been covered with ornaments supposed to be architectural.

Mr. F. G. Hooper supported the vote of thanks to the French architects. He had a bright recollection of their kindness to him during his stay in France last year, when holding the Godwin Bursary. Mr. Fletcher's paper, read that evening, and the much more detailed report which he had submitted to the Association, would, he thought, give great satisfaction to the donor of the prize. With regard to the exposure of the metal work of the French buildings, one was constantly hearing criticisms from the purists that if iron was used constructionally it should be visible. He did not know upon what ground the purists supported their intentions. The bones and sinews of the human body, that ideal of economic construction, were covered, but could not be criticised on that account. Hidden construction, gracefully covered, was surely quite as legitimate as the exposed ironwork which was seen at the Paris Exhibition in some of the permanent buildings. In architecture proper one of the characteristics should be durability, and a certain amount of monumental effect; and, although the French

might have taught them something in the use of iron, they had not introduced a form of construction suited to the exigencies of a damp climate without a protection more efficacious than paint. The construction of these buildings was so extremely slender that engineers, he believed, had calculated the length of time that they would last, especially so with regard to the Eiffel Tower. The grant of land to the Eiffel Company, it was said, was for twenty years, and it had been estimated that the Tower would not outlive that time. Mr. Fletcher had referred to the architectural drawings in the Exhibition, and he wished to draw the attention of any likely to pay a visit to Paris to the drawings exhibited in one of the wings of the Trocadéro Palace, in which building was housed the collections of historical casts. Most of the historical monuments in France were under the protection of a Commission, to which body plans and drawings of the building had to be submitted before any work of restoration or alteration was commenced. Since the foundation of that Commission copies of all drawings made had been kept, and a very large number were exhibited in the Trocadéro Palace. This gave a good record of the buildings as they were before restoration, and also enabled them, if they questioned the authenticity of any feature introduced by a restorer, to trace, as far as possible, the data in the possession of the architect when carrying out his work.

Mr. Cole, in supporting the vote of thanks, said that as regards the use of iron, he thought it might be laid down as a principle that its exposure inside a building was a good feature, but used outside its exposure was bad, as it was injuriously affected by the weather.

Mr. Wilfrid Stokes said he thought they would all be struck with the amount of sameness in the main features of the roofing of the Exhibition. With regard to the Galerie des Machines, it was generally supposed, but he thought wrongly, that some sort of magic had been invoked for the design of its vast roof. From his point of view (speaking as an engineer) there was nothing new in the design except its size and possibly its proportions; while he thought it would be quite obvious to any engineer that the lattice-work of the roof-principals was not very scientifically designed. With regard to the Eiffel Tower, he was agreeably surprised with its appearance, and it created a favourable impression in him, but he did not think the kind of bird-cage at the top was satisfactory.

Mr. A. O. Collard said, with regard to the question of the amalgamation of architects and engineers, the matter had often been discussed, but had long been practically settled, and such were the exigencies of the times that it would now, he thought, be impossible to combine the two professions. He trusted that the Eiffel Tower would not have a numerous progeny, but he was told that the Watkin Tower would be more pleasing to the eye and be a more original scheme than the Eiffel Tower, as well as combining art with utility.

The President said that he agreed with Mr. Pratt's remarks about the curve of the roof of the Machinery Hall not being satisfactory. The only way to treat ironwork satisfactorily was to get the lines right and to give it a broad, simple treatment, with good proportion, if possible. Ornament, when applied to ironwork, never seemed satisfactory, and the only ironwork which he had ever seen which was really satisfactory was simply constructional. He could not agree with Mr. Hooper as to the desirability of covering up the iron construction; nor could he join Mr. Fletcher in his admiration of the central dome of the Exhibition, the two domes of the Palais des Beaux-Arts and the Palais des Arts Libéraux being, in his opinion, in far better taste, though not so large. He could not help thinking that if the Eiffel Tower had been erected for some particular purpose it would have been a much more satisfactory work. If its engineers thought they had put up an ornamental structure, he could not agree with them; but if it was merely intended to show how to get up to a great height to take observations, it might be regarded as a success. He agreed with Mr. Fletcher thoroughly in the way in which he had spoken of the treatment of the iron and terra-cotta as panels in the Exhibition buildings.

The vote of thanks to the French architects and engineers who had assisted Mr. Fletcher was put first, and carried by acclamation.

Mr. Banister F. Fletcher, in reply to



the vote of thanks to himself, said that nearly all the points which had been raised about the roof of the Machine Gallery had been gone into fully in his report. In that report they would see it stated that M. Dutert designed the roof of that building, and he was also responsible for the design of the lattice work. The articulated jointing of the roof was a feature which, he believed, had been used for some time by M. Contamin in the construction of railway bridges in France. Many of the iron buildings forming part of the Exhibition were not temporary structures at all; some of them were to be left standing, and others, such as the building of the Argentine Republic, were to be taken down, transported, and re-erected in the countries whose arts and industries they had served to exhibit.

#### THE INSTITUTION OF CIVIL ENGINEERS:

##### THE PRESIDENT'S ADDRESS.

At the first ordinary meeting of the session, on Tuesday, November 12, the President, Sir John Coode, K.C.M.G., delivered an inaugural address, it being the first occasion of his occupying the chair at an ordinary meeting since his election as President. After referring to the growth of the Institution, from about 600 when he joined it as a member in 1849 to approximately 6,000 at the present time, he alluded to the visit of the American engineering societies soon after the close of the last session, and the leading part taken by the Institution in their reception and entertainment.

When considering the question of a topic for his address, it appeared to him that the experience gained during three lengthened professional visits to distant parts of the British Empire might not be unsuitably drawn upon, the visits involving journeys of more than 75,000 miles. The text of his subject was:—

"British Colonies as fields for the employment of the Civil Engineer." By the term colony was strictly meant a country, or portion of a country, inhabited by a people who had gone forth from their mother-land, and had made that country their home, though remaining more or less directly under the government of the country from which they or their ancestors had originally emigrated. These might be said to be British dependencies, held mainly for strategic purposes, in which the British element in the population was very small, such as Gibraltar, Malta, Cyprus, and Heligoland; dependencies under the British Crown chiefly used as trading stations, but also serving as coaling stations, and for repairing steamers of the mercantile marine or ships of the Royal Navy, such as Singapore and Hong Kong; colonies which were exporters of their own produce on a large scale, such as the West India Islands, Mauritius, and Ceylon; and colonies proper, as Canada, Australia, South Africa, and New Zealand. The key-note to the colonial question was best represented by the single word "transport." Wherever there was trade, there would of necessity be a demand for the means of transport, and where there was a demand for the means of transport there would be found a need for the works of the civil engineer. Whilst the population of the world had increased by a little less than 10 per cent. between 1870 and 1880, the increase in transport within the same period had been fully 53 per cent. The connexion was obvious between transport and the several engineering works comprehended under the construction of railways, tramways, roads, canals, harbours, docks, steam ships, locomotives, bridges, viaducts, aqueducts, tunnels, waterworks, gasworks, sewage works, and irrigation channels; breakwaters and lighthouses might be included within this same category, and he ventured to affirm that this factor of transport pervaded the domain of electric telegraphy. Harbours and docks assumed a special importance in connexion with our colonies. As respected external trade, they formed the terminal links of the great chains of communication which served to bind them to the mother country. As regarded our larger colonies, the practice had been to extend the roads and railways from the sea-ports back into the interior, with the result that the land lines of communication parallel to the coast had been as yet but little developed, and much the larger proportion of the traffic between different parts of the same colony was sea-borne. Hence in most of our colonies, harbours and navigable rivers assumed greater importance in the matter of transport

than was generally assigned to them in the mother country.

After dealing with the means of reaching the colonies, he said that one result of recent improvements in steam-ship building was a reduction in the cost of ocean transport. The cost of the freight of heavy goods, such as unmanufactured iron, say to Sydney, a distance of nearly 12,000 miles from England, was about 25l. per ton twenty years ago, whereas recently it had been as low as £1. 10s. a ton, or a little more than  $\frac{1}{4}$ d. per ton per mile, and the saving in distance by the Suez Canal route as compared with the route by the Cape was only about one-ninth of the whole distance.

The President then entered into the statistics of the chief engineering works which had been, or were being, carried out in British colonies, and the scope which existed in those colonies for the future employment of civil engineers, giving their position, general configuration, and physical features, area and population, climate, industrial prospects, and mineral wealth; and public works, whether executed, in progress, or contemplated in the immediate future.

Canada, the largest of the colonial dependencies of Great Britain, had an area of 3,610,000 square miles, of which 140,000 square miles were covered with water, and the system of inland navigation was the largest in the world. The St. Lawrence alone, in conjunction with the great lakes, afforded unbroken water communication to Port Arthur and Duluth from Liverpool. The total length of railways in the Dominion was about 14,000 miles, and the area of territory in the Dominion per lineal mile of railway was in the proportion of 258 to 1. Although completed thirty years ago, the Victoria Bridge across the River St. Lawrence still remained one of the finest engineering works of the last half-century; and the ship-canal in the St. Lawrence, 27½ ft. deep, completed twelve months ago, had a very important bearing upon the commercial prosperity of the Dominion, enabling merchant steam-ships of the largest class to reach Montreal. Two large graving-docks had been constructed, one at Esquimaux in British Columbia, and the other at Halifax in Nova Scotia, while a ship-railway, 17 miles long, was being laid for the transport of vessels across the isthmus which connected Nova Scotia with New Brunswick. . . . In New Zealand, 1,750 miles of railway had been completed up to the end of March, 1888, giving one lineal mile of railway to fifty-nine square miles of territory. Breakwaters and training banks were being constructed for the improvement of the entrance of the River Buller at Westport, and similar works were in progress at Greymouth. A new graving-dock had lately been completed at Auckland, 500 ft. long and 80 ft. wide, with a depth of 33 ft. of water over the sill at spring-tides. Otago harbour entrance had been improved, and a harbour created at Lyttelton, near Christchurch, enclosing an area of about 112 acres, with jetties and wharves having a length of berthage of 11,000 ft., with lines of railways in connexion with the general system of the island. The depth of water within the harbour varied from 19 ft. to 25 ft. at low-water. In Tasmania, 440 miles of railway had been opened at the end of 1887, being one lineal mile of railway to fifty-five square miles of country. Sir John Coode then referred to Australia, treating it first as a whole, and afterwards dealing separately with the five colonies into which it was divided. It was about six-sevenths of the size of Canada, and only about one-fifth smaller than the continent of Europe. An index of its magnitude was to be found in the size of the catchment basin of the River Murray and its tributaries, the area of which was 510,000 square miles, or nearly six times greater than Great Britain. In Western Australia, with a population of only one inhabitant to twenty-five square miles, there were 450 miles of railway, or one lineal mile for each 2,375 square miles of territory. In South Australia, at the end of 1888, there had been constructed 1,820 miles of railway, or one mile to 496 square miles of land. At Port Adelaide there was a total wharf frontage of about 13,000 ft., and the channel leading up to the port from the sea had been deepened from 9½ ft. to 22 ft. at low-water. The works for the water-supply of Adelaide were of a very extensive character, and when completed would include a storage reservoir of 2,760,000,000 gallons capacity. Victoria, the smallest colony in Australia, had 2,260 miles of railway in operation at the end of 1888, being one lineal mile to forty square miles of area. As an instance of

the wonderful growth of the city of Melbourne, the capital of the colony, the President stated that little more than fifty years ago a corner plot of land, near the centre of the city, was sold from a tree-stump as a rostrum for 45s., and that the same plot, with the buildings upon it, had just been valued at 493,500l. Until recently, the navigation from the bend of the bay, by the River Yarra-Yarra to the city, a distance of 6½ miles, was through a narrow, tortuous channel. This had been greatly improved by training-works and the cutting of a canal, and the navigation was now through a channel 5½ miles in length, and when completed would have a depth of 20 ft. and bottom width of 150 ft. The storage capacity of the Yan Yeam reservoir, for the water-supply of Melbourne, was 6,400,000 gallons, the expenditure on the system had exceeded £2,500,000, and further works were in progress. Irrigation on a large scale had been fostered by the Government of Victoria, the area intended to be irrigated amounting to nearly 1,250,000 acres. In New South Wales, at the end of 1888, 2,160 miles of railway were open, being one lineal mile to 14½ square miles of country. The length of the great bridge over the Hawkesbury River, which formed the last link in the continuous railway system between the principal cities of the four colonies of South Australia, Victoria, New South Wales, and Queensland, was 2,900 feet between the abutments, and the foundations of the several piers, six in number, were carried to depths varying from 101 ft. to 162 ft. below high-water level. The President then referred to the recently-constructed graving-dock on Cockatoo Island, in the harbour of Sydney, 600 ft. long and 84 ft. wide, to the Macquarie lighthouse at the entrance to Port Jackson, to the water-supply of Sydney, and to the works at Newcastle, at the mouth of the Hunter River, the great coal-shipping port of the colony. In Queensland, the returns up to the end of 1887 showed that 1,770 miles of railway were open, or one lineal mile to 378 miles of area. River improvements had been effected in the channel leading up to Brisbane, at the Fitzroy River from the sea up to the town of Rockhampton, at the entrance of the Pioneer River, and also at the entrance to Norman River in the Gulf of Carpentaria. As an instance of the mineral wealth of this colony, the Mount Morgan Mine, near Rockhampton, was now turning out gold to the value of 128,000l. per month, of which 28,000l. went in working expenses, and the balance in dividends to the shareholders.

The President then observed that the questions naturally arose: "Whether the colonies had been justified in constructing public works? and whether they were capable of bearing the financial obligations they had thereby imposed upon themselves? To these questions, he said, circumstances warranted a reply in the affirmative; taken as a whole, the market value of the public works already executed by the colonies would be fully equal to their cost. The earlier settlers had in many cases been brought face to face with large and pressing demands, for the execution of such public works as had been absolutely essential for securing ready inter-communication between district and district, more especially between the sea-board and the interior, involving roads, railways, &c., within their own borders, and between themselves and the outer world. Further, in not a few instances, our colonies have found it absolutely necessary to incur a considerable annual expenditure on subsidies to ocean-going steam-ships, to insure frequent, regular, and rapid communication with the rest of the world. The question whether our colonies were capable of bearing their financial burdens could only be answered in general terms; but perhaps the most conclusive reply in the affirmative was to be found in the readiness with which invitations by British colonies for large loans were met in the "Money Market" of the City of London. It was doubtless not overlooked that in the larger colonies vast areas of land were yet unappropriated, and formed so much capital in reserve. Moreover, in the case of some of the government lands occupied by squatters, the rentals were subject to a percentage of increase periodically. Further, the financial position, and consequently the spending power, of the colonies was favourably affected by the present low rate of interest obtainable for capital in this country. Many were now able to raise loans at 3½ per cent. which not so very long ago found it necessary to offer 6 per cent. While our own



country had for the last three hundred years been steadily building up a great Empire by the acquisition of colonial possessions, it was only within the last decade that any other European State had taken action of importance in the matter of colonisation. It was also worthy of remark that, within those portions of the world possessing such a climate as to admit of the employment of white labour upon out-door operations, there was not now a single region of any magnitude available for colonisation, and that no inconsiderable part of the area of the globe was under the imperial agis of Britain. In concluding, Sir John Coode spoke of the capabilities and possibilities yet to be developed by the civil engineer, whether in the colonies or in the mother country. The field was indeed a vast one; great advances had recently been made, and were still being made, in every branch of engineering. Notwithstanding, he would be rash who would venture to prescribe a limit to engineering achievements. He was convinced that as long as the present dispensation might last, so long would there be a continuous progress in the science and practice of every branch of labour in the field appertaining to the civil engineer. Neither to the engineer, nor, indeed, to any other disciple of natural science, would it seem to have been announced, "Thus far shalt thou go, but no farther."

#### THE LONDON COUNTY COUNCIL.

The ordinary weekly meeting of this Council was held at the Guildhall on Tuesday afternoon, Lord Rosebery in the chair.

*The Vacant Chief Engineer'ship.*—The report of the Committee tentatively appointed at the previous meeting (see last week's *Builder*, p. 351) to consider the steps necessary to be taken for filling the vacancy caused by the death of Mr. Joseph Gordon, reported as follows:—"Your Committee have to report that they have considered the subject of the appointment of an Engineer to fill the vacancy caused by the death of Mr. Gordon. They have had before them several candidates, and, as a result, they submit the names of Mr. F. E. Duckham, Mr. J. W. Girdlestone, and Mr. A. R. Binnie, and recommend—

"That Mr. Duckham be appointed Chief Engineer of the Council at a salary of 1,500*l.* a year, upon the following conditions:—That he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office, and be not allowed to take any private practice; and that on retirement he shall not be entitled to any superannuation or pension."

This recommendation gave rise to a long and acrimonious discussion, it being asserted, in opposition to the Committee's recommendation, that Mr. Duckham, although no doubt a competent dock engineer, had had little or no experience of sewerage work. Furthermore, it was alleged that to appoint Mr. Duckham to the vacant post would be to perpetrate something very like a job, inasmuch as his friends on the Council (one or two of them relatives) had systematically touted for votes on his behalf. In reply to the cry of "Names!" Mr. John Burns, who made the latter allegation, said that the Councillors he referred to were Mr. McDougall and Mr. Lidgett. Mr. McDougall was stated to be the brother-in-law of Mr. Duckham, and Mr. Lidgett was said to be his father-in-law. Mr. McDougall admitted the relationship, but denied that he had asked anyone to vote for Mr. Duckham. Mr. Lidgett, while not denying that he had voted for Mr. Duckham on the Committee, denied that he was Mr. Duckham's father-in-law. It was contended that several of the candidates who presented themselves on the last occasion, such as the City Engineers of Liverpool, Manchester, Bradford, and other towns, were much more eligible candidates for the appointment than Mr. Duckham. Eventually, an amendment, moved by Mr. Collard, and seconded by Mr. Rhodes, the ex-Chairman of the Main Drainage Committee, to refer the matter to the Standing Committee, was carried by a large majority.

*Building Works at Cane Hill Asylum, Coulsdon.*—The Asylums Committee reported that they had proceeded upon the resolution of the Council of the 12th inst. (see last week's *Builder*), referring back to the Committee their report of the 5th inst., recommending the acceptance of the tender of Messrs. Peto Bros. for the execution of the works for the extension of Cane-hill Asylum, for the sum of £52,447, with instructions to accept such tender, as amended by Messrs. Peto owing to the rise in the price of building materials since September

30, the date of the presentation of the tender, and had accepted such tender amended by the addition of the sum of £1,400. The Committee now submitted the contract for the execution of the work, and recommended—

"That the contract with Messrs. Peto Bros. for the execution of the works for the extension of the County of London Asylum for pauper lunatics, at Cane-hill, Coulsdon, for the sum of £53,847, be approved, and that the contract be sealed."

This was agreed, to after considerable discussion.

*The Site of Millbank Prison.*—Earl Compton moved the adoption of the report of the Housing of the Working Classes Committee, in which a statement occurred with reference to the Millbank prison site. It would be remembered, the Committee said, that the site occupied between twenty-two and twenty-three acres, and that the third section of the Housing of the Working Classes Act, 1885, gave power to the Secretary of State to sell the site to the Metropolitan Board of Works at a fair market price. At the date of their last report the Committee had received no reply from the Secretary of State to their inquiries as to the price of the land, but they had now received a communication from the Home Office, stating that it was not possible to name a price applicable to all portions of the site, inasmuch as the "fair market price" varied with the situation and advantages of frontage. The Secretary of State, however, suggested that the Council should acquaint him with the amount of land required for the erection of artisans' dwellings, when a fair valuation might be arrived at by surveyors to be named by the Council and the Secretary of State. The Committee instructed the Architect to make a careful valuation of the whole site, and they had received from him a report, pointing out the uncertainty of any estimate, caused by the disproportion between the area and its frontage, which would render it necessary to construct new roads and approaches, and also by the exceptional character of the foundations. The Committee, after full consideration of the whole question, were of opinion that it would not be desirable, having regard to the character of the site and the cost involved, owing to the state of the foundations, for the Council to acquire the whole area for the purpose of artisans' dwellings, but that if eight acres could be secured at a price not exceeding 2,000*l.* an acre, it would be most desirable that provision should be made for erecting artisans' dwellings thereon, and accordingly they recommended:—

"That a letter be addressed to the Secretary of State, inquiring whether her Majesty's Government would be willing to dispose of eight acres of the site, for the erection of artisans' dwellings, at the price of 2,000*l.* an acre."

A long discussion took place on this recommendation, which, after an amendment, suggesting that the Council should endeavour to acquire the whole of the site, had been rejected, was ultimately agreed to.

After the transaction of further business the Council adjourned.

#### ARCHITECTURAL SOCIETIES.

*Birmingham Architectural Association.*—A meeting of the Birmingham Architectural Association was held on the 19th inst., in the small lecture theatre of the Midland Institute, when Mr. G. A. T. Middleton delivered a lecture, entitled "The History of England written in Stone." The lecturer illustrated his remarks with photographs of Stonehenge, Porchester Castle, Sompston Church, Tower of London, St. Botolph's Priory; Colchester, Durham, Chichester, Ely, Salisbury, and Lincoln Cathedrals; Tewkesbury Abbey, Haddon Hall, and other historic buildings.

*Manchester Architectural Association.*—The second ordinary meeting was held on the 19th inst., at the Diocesan Buildings, Mr. J. H. Woodhouse (President) in the chair. Mr. F. M. Simpson, of London, read a paper on "Old House Work," in which he said the difficulty in treating a subject like this was to decide upon what head to attack, but for the present he would confine his remarks to England. The rude accommodation of the twelfth century was described, and its gradual development traced up to the present time. The most marked improvement in house-planning began in Elizabeth's reign, but the hall continued to be the principal feature of the house until the Gothic revival. About the seventeenth century we find traces of the foreigner having worked side by

side with the English workman. A vote of thanks was proposed by Mr. Davies-Colley, seconded by Mr. J. S. Hodgson, and supported by the President and Mr. Mee.

#### The Student's Column.

##### WATER-SUPPLY.—XXI.

THE ESTIMATION OF THICKNESS OF STRATA IN PROPOSED WELLS.

THE student of hydrogeology ought, under certain circumstances, to be able to predict the thickness and nature of strata which will be passed through in proposed well-borings, especially when these latter are only to be of moderate depth; and our present object is to discuss the methods by which tolerably accurate estimates may be arrived at.

The subject naturally divides itself into two parts,—(1) where the boring is to be in a town or city, and (2) in the country. Let us firstly consider the former, and, in continuation of our remarks on London water-supply, proceed with reference to a proposed well-boring in the metropolis.

Probably no city in the United Kingdom has had so many wells constructed as London, and the materials at hand for arriving at the thickness of the strata under any part of the metropolis are enormous. In the last two articles we have given a few particulars concerning the depths of London wells, together with the thicknesses and nature of the different strata passed through, and this was enough to indicate the general disposition of the strata. But, however useful that might be, in imparting a general idea of the substructure of the metropolitan area (a very necessary preliminary in the study of private water-supply), it does not go very far to show the student how to accurately estimate the thickness under any given site. To find this it is necessary, firstly, to examine the records of well-borings, and these will be found in certain works on geology, now to be alluded to.

The records of borings in the London district, whether successful or not in finding water, have been for many years perseveringly collected by one geologist, Mr. Wm. Whitaker, F.R.S., Director of the Geological Survey, and the student is referred to the writings of that gentleman for full information on the subject. His most important work in reference to it has only just left the press. It is a Government publication, in two volumes, issued as a "Memoir of the Geological Survey," entitled "The Geology of London and of part of the Thames Valley." Vol. I., Descriptive Geology; Vol. II., Appendices (wells, borings, &c.). The latter is the most useful volume for the subject in hand, and can be bought separately. A glance at it shows that there are hardly any main thoroughfares and but few side streets in London in the houses of which, at some time or another, wells have not been constructed. Another work by the same author dealing with a more extended tract of country, chiefly the southern and western part of the London basin, is also very useful, and is entitled "Memoirs of the Geological Survey, &c." vol. iv., part I. (1872). He has written, in addition to the above, several pamphlets, giving details of borings in various parts of the home counties, all of which have a special value, but which are, unfortunately, almost buried in the "Proceedings" of provincial societies. Occasionally, on the production of a Government "Memoir," they are unearthed, however, and made more available to the professional public. We should not enlarge so much on these publications, only that they are very little heard of by practical men, owing mainly, we believe, to the well-known apathy and neglect of general business principles on the part of certain departments of the Government. These books, especially the first-mentioned, are absolutely indispensable to architects and engineers studying the water-supply of the metropolis and the outlying parts of the Tertiary basin.

Having fixed on a site for a proposed well in London, the first thing is to find its height above Ordnance datum, which can be done approximately on reference to large-scale Ordnance maps. Then refer to the Geological Survey Memoir, to which we have just alluded, and in the Appendix, search for particulars of all the wells within a reasonable distance (say, within a radius of half a mile) of the site, and plot their positions on the map, accurately!



noting in each case their height above Ordnance datum also. The Geological map (6 in. to one mile) of the district should now be consulted to ascertain the boundary of any drift, superficial accumulations, or "solid" strata, if any of these limitations come within the area concerned. We next prepare to draw a section to scale, commencing, of course, by making a datum line, and plot on it the heights of the surface of the ground of the various sites of the wells (found within the half-mile radius), and their distances from each other, making the sections pass, as near as possible, through the site of the proposed well. Three or four sections may be drawn, including as many wells as possible along each line of route taken. Join the heights above Ordnance datum together, whilst consulting the Ordnance map, and then it will be seen that we have drawn in section an approximate contour of the surface of the ground between each well-boring, with the site of the proposed boring in the centre. Note on the contour line the exact position of any geological boundary-line as derived from the geological survey map. Now, take in succession the account of each boring from the memoir, and from the respective sites on the contour line drop a line (vertical to the datum line) representing the depth of each well from the surface. Then observe the thicknesses of the important strata passed through by the borings in every case, and commencing from the contour line, mark them off, to scale, along the verticals. It will now be seen that each vertical has marked on it the depth (from the surface of the ground) of the limits of thickness of each important stratum met with in the particular boring represented by the line. Join the respective limits together. For example, draw a line through all the points indicating the base of the London clay, or representing, say, the top of the chalk. Also join up the limits of any geological boundary line shown on the contour line, and be very careful to be accurate in regard to this, should the lines come anywhere near the centre of the area. It may be found that some of the strata met with in the borings crop out at the surface within the area. Where this is the case, the boundary lines (if any) indicating the limits of such outcrops must be connected with the strata to which they refer on the verticals representing the wells in question. We are now presented with geological sections surrounding and passing through the position of the proposed well; the dip and general disposition of the beds are clearly shown, and all we have to do to estimate the thickness of the strata which will be passed through at the desired spot, is to drop a vertical from the site on the surface contour, down through each section, to the proposed seat of supply, and measure the respective depths at which the limits of the different beds are met with on it. Then compare the thickness of each stratum as derived from the sections, and draw up an average thickness from the data obtained. For example, suppose we have drawn three sections, we shall get three accounts of the strata to be encountered in our proposed well, and all these will differ slightly from each other. The Woolwich and Reading series may be indicated, say, as 54 ft. thick in one section, 2 ft. in another, and 49 ft. in the third. On striking an average between these, we find we should have, as nearly as possible, 51 ft. 8 in. of this series to pass through, and so on. In drawing geological sections it is usual, for obvious reasons, to exaggerate the vertical scale in comparison with the horizontal, though the less this is done in practice the better.

The foregoing method of estimating thicknesses only applies to large cities, where a number of wells have already been sunk. By way of illustration, we have taken a most simple case, that of sinking a well in the metropolis, and what we have said holds good for London and suburbs. The underground structure of the metropolis is so simple that a very small hodium of pure geology suffices to enable the student to work out the details in the manner described—it is really only a matter of draughtsmanship. But something more is required when we are dealing with a district in which the strata are much complicated, or where well sections are few and far between. In these cases the evidence derivable from existing wells is of comparatively little use—in fact, it is often misleading. It is true we must take advantage of all the sections we can muster, whether natural or artificial, but we cannot treat them in quite the same manner as

in the London area. In such instances we have to know a great deal about the pure geology of the district; we must be able to trace the direction, inclination, and influence of faults or dislocations, and the regional curvature and local contortions of the strata surrounding the site of the proposed wells, together with many other matters of a technical nature, especially those dealing with the influence of the irregularity of unconformities in the distribution, thickness, and nature of the formations. These problems the non-geological student cannot hope to solve without much previous training in the details of the science, and it is not within our province to do more than just refer to anything of so technical a nature. We can only deal with the more apparent and practical side of the question.

At the same time, we may mention the fact that Mr. Whitaker has obtained particulars of a very large number of wells all over the kingdom, and that accounts of some of them will be found in the appendices to most of the official memoirs describing the different geological maps issued in recent years.

In certain parts of the country the structural geology is not much more difficult to understand than that of the London area, and, although it may not always be possible to estimate the thickness of strata to be passed through in a proposed well so accurately as in that area, the appendices in such cases are useful in assisting us to form an approximate idea, and especially if the site happens to be very close to some of the recorded wells. In districts where the strata are not much complicated, and where the proposed well is to be near a large surface section, such as a cliff or quarry, and no other evidence is at hand, care should be taken to observe the dip of the strata, and the distance of the well site from the exposure. After ascertaining this distance and the angle of dip, the thickness of strata to be met with may be calculated by slightly adapting the methods described by Mr. Ralph Tate, F.G.S., in "Physical Geology" (1879), pp. 119 et seq.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

17,823, Improved Closet for Ships' use. J. Carter.

The closets which are the subject of this patent have one or two valves, these valves to be opened or shut as required by a sort of rack and pinion, one end being attached to, or working on, the valve-shaft, and the other end to the handle or pull-up. By this arrangement, when the handle is raised, the top valve is opened, and its contents discharged into the bottom compartment, and upon the handle being pushed down to its lowest position, the top valve is again closed previous to the opening of the bottom valve. Upon the bottom valve being opened, contents that were formerly in the top apartment are passed into the drain, and all bad smells are avoided. Suitable mechanism for effecting the aforesaid purposes is described in the specification.

18,584, Gas-service and Fittings-cleansers. W. Fiddes and W. Stagg.

This invention relates to an improved form of air force-pump, designed to cheaply effect the same purpose as those of more expensive pattern at present in use for the same purpose.

13,774, Wood Substitute. C. O. Thielemann (Freiburg).

According to this invention, a material designated hornite by the inventor is made from waste pieces of wood which are disintegrated and mixed with lime well kneaded up into a paste, and then poured into moulds and allowed to harden under pressure for about two hours, and then dried in the open, when it becomes hard and tough like bone. The inventor particularly applies the material for use in making coffins.

14,282, Door-bell. H. Leach.

This invention relates to a bell actuated by mechanical means so arranged as to bring about the same result and be the same in appearance as an electric bell. Thus a small push-button is made to actuate a rod connected with the alarm mechanism which will rise as long as the button is depressed. The bell is really struck by a hammer controlled by clock-work concealed within its circumference or dome.

14,664, Door-bell. A. F. Rockwell.

This patent relates to an American device for an exactly similar purpose to the foregoing; but the mechanism is slightly different, and the invention is here carried a point farther, for provision is made for working the bells by means of levers and cranks at any distance from the door.

#### NEW APPLICATIONS FOR PATENTS.

Nov. 4.—17,447, E. Christie, Combined Door Chain and Latch.—17,453, F. Baker, Flush-bolts.—17,497, P. Cowley, Attaching Door-knobs or Handles to Spindles.

Nov. 5.—17,531, G. Cheetham, Automatically Securing Windows in any Position.—17,560, S. Adams, Automatic Cisterns.—17,589, J. Hearth, Fastener for Window-sashes, Doors, &c.

Nov. 6.—17,640, W. Thompson, Artificial Stone.—17,653, S. Hill and R. Hodges, Locks and Fastenings for Doors, Cupboards, &c.—17,665, J. Kighley, Chimney-pot or Ventilator.—17,666, J. Emson and others, Valves for Cisterns, &c.—17,670, C. Grimmer and J. Simpson, Fastenings for Window-sashes, &c.—17,700, J. Thomas and others, Ventilation, Smoke Prevention, &c.—17,705, J. Braidwood and J. Johnston, Fireproof Construction for Buildings.—17,705, Millar's Patent Window Co. and H. Millar, Holding or Securing Reversible Window-frames.

Nov. 7.—17,712, T. Bradley, Bench-stops or Hooks for Joiners' Benches.—17,752, T. Collins, Hanging-irons for use with Ladders.—17,758, H. Bassett, Building Material.—17,775, E. Killick, Drying-chambers of Kilns.—17,779, R. Rammage, Novel Construction or Build-up of Iron Breast-summers and Girders.

Nov. 8.—17,809, J. Pye, Water-taps.

Nov. 9.—17,904, J. Ganzert and I. Schiel, Adjusting and Fixing Ventilating Windows, &c.—17,908, S. Warr, Ornamental Bricks or Mouldings, &c.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

11,488, J. A. Duckett, Waste-water Closets.—15,115, W. Joy, Manufacture of Cement.—16,140, J. Kaye, Handles for Doors.—15,171, C. Gabriel, Cisterns for Flushing Water-closets.—15,303, W. Moseley, Electric Bells.—15,510, G. Nottan, Filtering Cisterns.—15,717, J. Macky and J. Mitchell, Nails.—15,884, H. Dixon, Veneering Pianoforte Cases.—16,183, H. Smith, Fastener for Window-sashes, &c.—16,218, M. Rogers, Securing Window-sashes in any required position.—16,801, S. Hill, Door-closing Springs and Checks.—16,835, W. Bird, Self-closing Door Apparatus.—16,838, F. Stewart, Mitre Clamps.—16,527, W. Menkin, Attaching Sash-lines to Sashes.—16,651, L. Groth, Brazing Band-saws.—16,752, J. Jofch, Checking Workmen's Time.—16,804, J. Wilson, Nail.—16,860, E. Urry and G. Farini, Closing Doors.—17,211, W. Akerman, Kilns, &c.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to Opposition for Two Months.

15,920, J. Lightbody, Water-cisterns, &c.—17,839, J. Cole, Ventilating Sash-fastener.—18,705, H. Condy, White Lead.—195, J. Greathead, Tunnelling Apparatus.—198, A. Vingner, Hydraulic Lifts or Hoists.—12,397, H. Owens, Opening, Closing, and Securing Movable Case-mats, &c.—13,004, J. Routledge, Sash Fastener.—15,523, J. Connell, Ventilators.—15,669, J. Erslev, Artificial Asphalts.

#### RECENT SALES OF PROPERTY:

##### ESTATE EXCHANGE REPORT.

Nov. 11.—By C. W. MILLAR.  
Portman-sq.—72, 74, and 80, George-st., u.t. 33 yrs.,  
g.r. £103, r. £250 p.a. £1,800  
Dalston—i.g.r. of £21, u.t. 48 yrs. 365  
Islington—F.g.r. of £21, with reversion in 69 yrs.  
to e.r. of £135 540  
F.g.r. of £26, with reversion in 65 yrs. to e.r. of  
£125 595

By A. CHANCELLOR.—At Richmond  
Richmond, George-st.—"The Rose and Crown"  
public-house, f. 2,500  
Marshgate-rd.—A plot of f. land, area 570 ft. ... 820  
39, George-st.—f. area 690 ft. ... 970  
"The Tower House," f. r. £100 p.a. ... 1,250  
2, Heron-ct., f. r. £120 p.a. ... 2,900  
Two f. bathouses, r. £30 p.a. ... 1,600  
F. livery premises and business premises in Hill-  
st., r. £30 p.a. ... 1,420

Nov. 12.—By BROAD & WHITBURN.  
Farringdon-rd.—Nos. 83, 85, and 87, u.t. 77 yrs.,  
g.r. £300, e.r. £1,200 6,070  
By L. G. LEWIS.

Upper Berkeley-st.—No. 77, u.t. 35 yrs., g.r.  
£11, 11s., r. £120 1,690  
Chelsea—35, Smith-st., f. r. £20 p.a. 1,390

By J. A. W. THOMP.  
Hackney—29 to 35 (odd), Clarence-rd., u.t. 49  
yrs., g.r. £12 950

By DAVID & CO.  
Leicester-sq.—No. 31; and 1, Green-st., f. area  
1,070 ft., r. £120 3,325

8, Green-st., f. r. £80 p.a. 1,325  
17, Bear-st., f. r. £25 p.a. 1,700

Kensington—Palace Gardens-ter., i.g.r. of £60 a  
year, u.t. 64 yrs., subject to g.r. of £3 1,130

By MONTAGU & ROBINSON.  
Spitalfields—18 and 19, Church-st., f. r. £180  
p.a. 2,600

Bromley-sd.—48 and 50, Runcorn-rd., u.t. 61  
yrs., g.r. £10, f. £39 585  
52 and 54, Beverly-rd., u.t. 59 yrs., g.r. £9, r.  
£62 610  
77, Port-rd., u.t. 40 yrs., g.r. £4, r. £31 300



By VANTOM, BULL, & COOPER.  
Barbican—"Staines House," f. area 1,350 ft. .... £3,520  
Wood Green, Mayes-rd.,—"Waverley House," f. .... 610

By P. D. TUCKETT.  
Hyde Pk.—112, Westbourne-ter., u.t. 48 yrs., g.r. 224, r. £250 ..... 2,500

Nov. 13.—By H. DONALDSON.  
Row—2 and 4, Britch-st., f. r. £22 ..... 700  
Lower Clapton—35 to 43, Luckhurst-st., u.t. 84 yrs., g.r. 51. 5s. .... 665  
Islington—14, Oakley-rd., u.t. 49 yrs., g.r. 48, 245 p.s. .... 375  
Sydenham—F.g.r. of £40, with reversion in 48 yrs. to e.r. of £140 ..... 850

By WARD & CLARKE.  
Chelsea—69 and 65, College-pl., u.t. 19 yrs., g.r. £18. 10s. .... 400

By BATTAM & CO.  
Lee—19, Leyland-rd., ..... 700  
4, Leyland-rd., ..... 910

By D. YOUNG.  
Battersea, Hope-st.,—"Bedford Cottage," f. r. £33. 18s. .... 230  
New Cross-rd.—Nos. 237 and 239, u.t. 55 yrs., g.r. £14 ..... 955

Rotherhithe, Lower—A profit rental of £51. 15s., u.t. 69 yrs. .... 750  
8 and 10, Old-rd., u.t. 61 yrs., g.r. 46, r. £57 ..... 420  
52, West-lane, u.t. 785 yrs., no g.r., r. £22 ..... 140

12, 14, and 16, Elough-rd., u.t. 59 yrs., g.r. £7. 10s. .... 200  
23, 25, and 27, Silwood-st., u.t. 66 yrs., g.r. £28. 17s., r. £2 ..... 650

Upper Clapton, High-rd.—A plot of land, u.t. 13 yrs., no g.r. .... 50  
L.g.r. of £22. 10s. p.s., u.t. 13 yrs. .... 110

Nov. 14.—By FLOOD & SONS.  
Westbourne-pk.—57, Tavistock-crescent, u.t. 74 yrs., g.r. £20 ..... 410

By J. M. KILNER & CO.  
Hackney, 3, 4, and 5, Consey-villas, f., r. £70 ..... 710

By DOWSETT & CO.  
Camberwell-grove—No. 189, f., r. £75 p.s. .... 950  
Nos. 171, 173, and 175, Camberwell-grove, f., r. £214 p.s. .... 3,010

By NEWSON & HARDING.  
Islington—Nos. 141, 142, and 143, Upper-st., and Myddleton Hall, f., area 8,230 ft. .... 5,100

By F. J. BISHOP.  
Rotherhithe—6, Bush-rd., u.t. 49 yrs., g.r. £28. 12s. 35, Reculver-rd., u.t. 89 yrs., g.r. £20 ..... 600  
26, Colling-rd., u.t. 65 yrs., g.r. £25. 5s. .... 415

Bermondsey—11, 13, and 15, Yalding-rd., u.t. 46 yrs., g.r. £13. 2s. 6d., r. £23. 12s. .... 755  
77, St. James-rd., u.t. 50 yrs., g.r. £45. r. £36. 8s. .... 340

Camberwell—72 and 74, Picton-st., f., r. £55. 5s. .... 560  
Rotherhithe—98, Pavement-st., f., r. £31. 4s. .... 300

By C. C. & T. MOORE.  
Stoke Newington—6, Church-rd., u.t. 71 yrs., g.r. £3. 6s. .... 350

St. George's-in-East—84, Christian-st., u.t. 10 yrs., g.r. £9. 5s. .... 120

Old Ford-rd.—No. 395, f., r. £24 p.s. .... 250  
No. 399, f., r. £40 p.s. .... 320  
Nos. 399 and 391, u.t. 73 yrs., g.r. £7 ..... 610  
2, Wendon-st., f., r. £15 p.s. .... 230

Nov. 15.—By FOSTER & CHANTFIELD.  
North Finchley—1 to 4, Bangor-cottages, u.t. 91 yrs., g.r. £20 ..... 590

By P. HODSON.  
Lower Clapton—27, Clifton-rd., u.t. 77 yrs., g.r. £5, r. £26 ..... 215

By WESTON & SON.  
Brixton-hill—12 to 18 (even), Talma-rd., f., r. £120 ..... 1,690  
89, Burton-rd., u.t. 55 yrs., g.r. £25. 4s. .... 250  
Clapham—98 and 100, Lansdown-rd., u.t. 52 yrs., g.r. £18, r. £110 ..... 710

[Contracts used in this list.—F.g.r. for freehold ground-rent; L.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.s. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

SATURDAY, NOVEMBER 23.

University College, London (Archæology).—Demonstration at South Kensington Museum. 7 p.m.

MONDAY, NOVEMBER 25.

Surveyors' Institution.—Mr. E. Hyde on "The Tithe Question, with Suggestions for the Redemption of the Rent-charge." 8 p.m.

TUESDAY, NOVEMBER 26.

Institution of Civil Engineers.—Further discussion on Mr. J. I. Thornycroft's paper on "Water-tube Steam Boilers for Marine Engines." 8 p.m.

WEDNESDAY, NOVEMBER 27.

St. Paul's Ecclesiastical Society.—Mr. Andrew Oliver on "Flemish Brasses in England." 7.30 p.m.

University College, London (Archæology).—Mr. Cecil H. Smith on "Peculiar Art." 6 p.m.

Society of Arts.—Dr. Gladstone, F.R.S., on "Scientific and Technical Instruction in Elementary Schools." 8 p.m.

THURSDAY, NOVEMBER 28.

Institution of Electrical Engineers.—Mr. G. L. Addebrooke on "Electrical Engineering in America." 8 p.m.

University College, London (Archæology).—Demonstration at the British Museum. 5 p.m.

Edinburgh Architectural Association.—Mr. W. M. Conway, M.A., on "Egyptian Architecture." 8 p.m.

FRIDAY, NOVEMBER 29.

Architectural Association.—Mr. E. Pridham Warren on "The Decoration of Churches." 7.30 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. G. H. Sheffield on "Principles of Iron Foundry Practice." 7.30 p.m.

SATURDAY, NOVEMBER 30.

University College, London (Archæology).—Demonstration at the South Kensington Museum. 7 p.m.

## Miscellanea.

**Royal Meteorological Society.**—The first meeting of this Society for the present session was held on Wednesday evening, the 20th inst., at the Institution of Civil Engineers, Dr. W. Marcel, F.R.S., President, in the chair. Nine new Fellows were elected. The following papers were read:—(1) "Second report of the Thunderstorm Committee." This is a discussion by Mr. Marriott on the distribution of days of thunderstorms over England and Wales during the seventeen years, 1871-87. Notices of sheet-lightning are included in the term "thunderstorms." The years of greatest frequency were 1880, 1882, 1884, and 1872, and the years of least frequency, 1887, 1874, 1879, and 1871. Years of greater or less frequency alternate regularly throughout nearly the whole of the period. The average yearly number of thunderstorms is about thirty-nine. The districts with the greatest yearly frequency are the south of England and extreme northern counties, and those with the least yearly frequency are Cheshire, Lancashire, and Yorkshire. The greatest number of thunderstorms occur in July, and the least in February and December. (2) "On the Change of Temperature which accompanies Thunderstorms in Southern England," by Mr. G. M. Whipple, B.Sc., F.R.Met.Soc. (3) "Note on the appearance of St. Elmo's Fire at Walton-on-the-Naze, Sept. 3, 1889," by Mr. W. H. Dines, B.A., F.R.Met.Soc. (4) "Notes on Cirrus Formation," by Mr. H. Helm Clayton. The author, who has made a special study of cloud-forms and their changes, gives a number of notes and drawings on the formation of cirrus under various conditions,—e.g., in a previously cloudless sky, cirrus bands with cross fibres, cirrus from cirrocumulus clouds, cirrus drawn out from cumulus clouds, "mares-tail" cirrus, &c. Curved cirrus clouds, when accompanied by decreasing barometric pressure, frequently indicate that a storm of increasing energy is approaching. (5) "A Comparison between the Jordan and the Campbell-Stokes Sunshine Recorder," by Mr. F. C. Bayard, F.R.Met.Soc. As a result of a year's comparison between these two instruments the author found that the Jordan photographic recorder registered nearly 30 per cent. more sunshine than the Campbell burning recorder. (6) "Sunshine," by Mr. A. B. MacDowall. This is a discussion of the hours of sunshine recorded at the stations of the Royal Meteorological Society. (7) On "Climatological Observations at Ballyboley, Co. Antrim," by Professor S. A. Hill, B.Sc., F.R.Met.Soc. This is the result of observations made during the five years 1884-8.

**The English Iron Trade.**—Speculation is still an important factor in the English iron market, and has been the means of retarding legitimate business during the week. At the same time, the speculative fever has somewhat subsided. The demand for pig-iron would, no doubt, be greater if it were not for the upward tendency. Scotch warrants, after various fluctuations, have gained upon the week, while Scotch makers' iron is from 1s. to 3s. per ton dearer. Middlesbrough pig, after similar aberrations, closes the week a shade lower. Lancashire and Midland brands are quoted higher, and where transactions take place, the top prices are paid. In Bessemer pig the changes in quotations have been less pronounced, but its value has been increased 6d. per ton in the north-west. Owing to the high prices which manufacturers of finished iron are obliged to quote to meet the increasing cost of pig and fuel, both iron and steel are less eagerly bought. In the North of England, trade in manufactured iron is almost at a standstill, but high rates are less of a hindrance to business in Lancashire and Staffordshire. Steel material is quoted from 2s. 6d. to 12s. 6d. a ton higher in the North-west, but in the North of England rates have had to be lowered. Yet the demand for steel is almost as large as ever. Shipbuilders continue taking fresh orders for ships, and engineers are as busy as ever.—Iron.

**The Acme Wood Flooring Company, Limited.**—We are informed that the directors of this company have declared an interim dividend of 3½ per cent. on the preference capital for the half-year ending October 31, 1889.

**Carmarthen.**—St. Mary's R.C. Church, Carmarthen, has been re-opened, after restoration, decoration, and improvements, under the direction of Mr. Albert Vicars, architect.

**The Society of Arts.**—The 136th session of the Society of Arts was opened on Wednesday evening at the Society's rooms, John-street, Adelphi. There was a large attendance. The Duke of Abercorn, as Chairman of the Council, had written the opening address, which, in the unavoidable absence of his lordship, was read by Sir F. Bramwell, who occupied the chair. It was a review of the Society's work since 1754. At that period little progress had been made in science. It was, however, a time when industrial activity was commencing, and the Society began its operations by offering prizes for inventions and improvements in connexion with arts and manufactures. As the country had been to a large extent denuded of timber by the necessity of building ships and by the wants of the iron manufactures, the Society offered numerous prizes for tree-planting. It was to this action that the existence to-day of many fine woods was due. Similar work was done by the Society in connexion with agricultural inventions. This system of awarding prizes for specified objects worked much good in its time; but the growth of science and its constantly-increasing application to industry rendered the system obsolete. Even yet, however, it was found occasionally useful to offer a prize for the purpose of directing public attention to some specified object. The principal work of the Society was now the dissemination, through meetings and lectures, of information on the relations of science and to industry. The Society's exhibitions led to great international exhibitions of 1851 and 1862. In connexion with similar efforts, both at home and abroad, the Society had done good service. It was to this country's interest that she should take part in all important foreign exhibitions; and it seemed desirable that to promote that object some small sum should be given by the Government. If this were done, the Society would no doubt be ready to provide the necessary organisation, and to direct the expenditure. It was the Society that originated the system of local examinations directed from a single centre which had since developed into the Science and Art Department. They made the experiment of technological examinations, and as soon as it showed signs of success handed it over to the important organisation of the City Companies. The Society was now making a similar experiment with regard to examinations in commercial knowledge. Should it succeed, some body would, no doubt, be found to continue it on a larger scale than the Society's resources permitted. They claimed to have practically started the movement which had resulted in our art-industries of to-day, a matter which they had still in hand. After referring to other subjects in which the Society had done good work, the paper suggested that if they had sufficient funds they might carry out researches into problems of applied science. On the motion of Sir D. Galton, seconded by Lord A. Churchill, a vote of thanks to the writer and the reader of the address was unanimously accorded.

**The Italian Building Crisis.**—The building crisis in Italy again threatens to become serious, the advances made by the Government to certain banks in Turin and Rome heavily involved in the same having failed to afford the relief expected. In consequence, several contractors have suspended payment. It is feared that the reckless over-speculations in building in Turin and Rome carried on during the last two years may lead to a serious financial crisis in Italy this winter.

**A Bridge across Behring Strait.**—It is proposed in Russia to construct a bridge across Behring Strait from Siberia to Alaska, thus connecting the new and the old world. It is stated that the scheme is quite feasible, the narrowest part of the Strait being only 96 kilometres. At this point there are besides three small islands, lying in almost a straight line, which would enable it to be made in four sections, each being shorter than those proposed for the Channel Bridge.

**West Kirby.**—The new buildings for the Wesleyan School Chapel consist of a chapel that seat 800 persons, with minister's vestry at the rear. The school premises consist of a large assembly room and four class-rooms. The whole will be built of local red sandstone. The contract for the school buildings is let to Mr. W. Christian, of West Kirby, for £2300. The contract for the chapel is not yet let. The architect is Mr. John Wills, of Derby.



**Liverpool Engineering Society.**—The fourth ordinary meeting of the sixteenth session of this Society was held in the Royal Institution, Colquitt-street, on Wednesday, Nov. 13, under the presidency of Mr. Henry H. West, M.Inst.C.E., &c., when a paper was read by Mr. George Farren, Assoc.-M.Inst.C.E., entitled, "The Stability of Earthwork and Masonry Dams." The paper, which was illustrated by many lantern views, dealt with the sources of the inherent weakness to which the failure of the Johnstown Dam in America was due, and embraced a description of dam designs in America, France, and Great Britain, with a contrast of the main differences of each. The great dams of Furens and Ban, which had been examined by Mr. Farren in connexion with the preparation of his paper, were also described in detail, and compared with our own Vyrnwy dam. With great elaboration Mr. Farren discussed, with the aid of diagrams, the construction of the latter in all its bearings. He contended that, compared with other dams now in existence, and apparently quite safe at the present day, the safety of the Vyrnwy dam, so far as it could be arrived at by calculation of known natural laws, was enormously in excess of these. The dam was, he said, not merely safe as regarded its base, but was theoretically and actually as safe throughout as human skill could make it.

**Appointments.**—At a meeting of the Wakefield Union Rural Sanitary Authority, held on Wednesday, the 13th inst., Mr. Frank Massey, Assoc.-M. Inst. C.E., F.S.I., was elected to the position of Engineer, Surveyor, and Waterworks Manager from amongst a hundred applicants. —The Harbour Board of Southampton have appointed Mr. John H. Blizard, A.-M.Inst.C.E., and Mr. H. J. Weston, A.-M.Inst.C.E., Joint Quantity Surveyors for the Royal Pier Extension Works, to be carried out there. The works are expected to cost 200,000l., and will be under the direction and supervision of Mr. J. G. Poole, the Surveyor to the Board.

**Competition: Board Schools, Bromley.** Mr. R. Norman Shaw, R.A., the referee, has reported in favour of the plans submitted in competition for the Aylesbury-road schools, for the Bromley School Board, Kent, by Mr. John Ladds, architect, and the Board have appointed him architect for the work.

#### PRICES CURRENT OF MATERIALS.

TIMBER.		E. s. d.	E. s. d.
Greenheart, B.G.	ton	7 0 0	9 15 0
Teak, B.L.	load	12 0 0	14 0 0
Sequoia, U.S.	foot cube	0 2 8	0 3 0
Ash, Canada	load	3 0 0	4 5 0
Birch	do	3 0 0	4 15 0
Elm	do	3 10 0	5 15 0
Fir, Dantzic, &c.	do	2 0 0	8 10 0
Oak	do	2 10 0	4 10 0
Canada	do	5 10 0	6 10 0
Pine, Canada red	do	2 10 0	3 10 0
Do, yellow	do	3 0 0	5 5 0
Do, batham	do	4 0 0	8 10 0
Do, Petersburg	do	5 0 0	6 10 0
Walnut, Bigs, &c.	log	2 15 0	4 5 0
Do, Finland, 2nd and 1st	std. 100	8 10 0	11 0 0
Do, white	do	7 0 0	9 0 0
Do, 2nd	do	9 0 0	11 0 0
Do, 3rd	do	6 10 0	10 0 0
Do, 4th	do	8 0 0	10 10 0
Do, 5th	do	9 0 0	11 0 0
Do, 6th	do	10 0 0	12 0 0
Do, 7th	do	11 0 0	13 0 0
Do, 8th	do	12 0 0	14 0 0
Do, 9th	do	13 0 0	15 0 0
Do, 10th	do	14 0 0	16 0 0
Do, 11th	do	15 0 0	17 0 0
Do, 12th	do	16 0 0	18 0 0
Do, 13th	do	17 0 0	19 0 0
Do, 14th	do	18 0 0	20 0 0
Do, 15th	do	19 0 0	21 0 0
Do, 16th	do	20 0 0	22 0 0
Do, 17th	do	21 0 0	23 0 0
Do, 18th	do	22 0 0	24 0 0
Do, 19th	do	23 0 0	25 0 0
Do, 20th	do	24 0 0	26 0 0
Do, 21st	do	25 0 0	27 0 0
Do, 22nd	do	26 0 0	28 0 0
Do, 23rd	do	27 0 0	29 0 0
Do, 24th	do	28 0 0	30 0 0
Do, 25th	do	29 0 0	31 0 0
Do, 26th	do	30 0 0	32 0 0
Do, 27th	do	31 0 0	33 0 0
Do, 28th	do	32 0 0	34 0 0
Do, 29th	do	33 0 0	35 0 0
Do, 30th	do	34 0 0	36 0 0
Do, 31st	do	35 0 0	37 0 0
Do, 32nd	do	36 0 0	38 0 0
Do, 33rd	do	37 0 0	39 0 0
Do, 34th	do	38 0 0	40 0 0
Do, 35th	do	39 0 0	41 0 0
Do, 36th	do	40 0 0	42 0 0
Do, 37th	do	41 0 0	43 0 0
Do, 38th	do	42 0 0	44 0 0
Do, 39th	do	43 0 0	45 0 0
Do, 40th	do	44 0 0	46 0 0
Do, 41st	do	45 0 0	47 0 0
Do, 42nd	do	46 0 0	48 0 0
Do, 43rd	do	47 0 0	49 0 0
Do, 44th	do	48 0 0	50 0 0
Do, 45th	do	49 0 0	51 0 0
Do, 46th	do	50 0 0	52 0 0
Do, 47th	do	51 0 0	53 0 0
Do, 48th	do	52 0 0	54 0 0
Do, 49th	do	53 0 0	55 0 0
Do, 50th	do	54 0 0	56 0 0
Do, 51st	do	55 0 0	57 0 0
Do, 52nd	do	56 0 0	58 0 0
Do, 53rd	do	57 0 0	59 0 0
Do, 54th	do	58 0 0	60 0 0
Do, 55th	do	59 0 0	61 0 0
Do, 56th	do	60 0 0	62 0 0
Do, 57th	do	61 0 0	63 0 0
Do, 58th	do	62 0 0	64 0 0
Do, 59th	do	63 0 0	65 0 0
Do, 60th	do	64 0 0	66 0 0
Do, 61st	do	65 0 0	67 0 0
Do, 62nd	do	66 0 0	68 0 0
Do, 63rd	do	67 0 0	69 0 0
Do, 64th	do	68 0 0	70 0 0
Do, 65th	do	69 0 0	71 0 0
Do, 66th	do	70 0 0	72 0 0
Do, 67th	do	71 0 0	73 0 0
Do, 68th	do	72 0 0	74 0 0
Do, 69th	do	73 0 0	75 0 0
Do, 70th	do	74 0 0	76 0 0
Do, 71st	do	75 0 0	77 0 0
Do, 72nd	do	76 0 0	78 0 0
Do, 73rd	do	77 0 0	79 0 0
Do, 74th	do	78 0 0	80 0 0
Do, 75th	do	79 0 0	81 0 0
Do, 76th	do	80 0 0	82 0 0
Do, 77th	do	81 0 0	83 0 0
Do, 78th	do	82 0 0	84 0 0
Do, 79th	do	83 0 0	85 0 0
Do, 80th	do	84 0 0	86 0 0
Do, 81st	do	85 0 0	87 0 0
Do, 82nd	do	86 0 0	88 0 0
Do, 83rd	do	87 0 0	89 0 0
Do, 84th	do	88 0 0	90 0 0
Do, 85th	do	89 0 0	91 0 0
Do, 86th	do	90 0 0	92 0 0
Do, 87th	do	91 0 0	93 0 0
Do, 88th	do	92 0 0	94 0 0
Do, 89th	do	93 0 0	95 0 0
Do, 90th	do	94 0 0	96 0 0
Do, 91st	do	95 0 0	97 0 0
Do, 92nd	do	96 0 0	98 0 0
Do, 93rd	do	97 0 0	99 0 0
Do, 94th	do	98 0 0	100 0 0
Do, 95th	do	99 0 0	101 0 0
Do, 96th	do	100 0 0	102 0 0
Do, 97th	do	101 0 0	103 0 0
Do, 98th	do	102 0 0	104 0 0
Do, 99th	do	103 0 0	105 0 0
Do, 100th	do	104 0 0	106 0 0

METALS (continued).		E. s. d.	E. s. d.
LEAD—English, com. brands	13 10 0	13 15 0	
TIN—Strait	95 10 0	0 0 0	
Australian	0 0 0	0 0 0	
English Ingot	100 10 0	0 0 0	

OILS.		E. s. d.	E. s. d.
Lined	ton	21 0 0	21 2 6
Cocanut, Coochin	26 10 0	0 0 0	
Ceylon	23 5 0	0 0 0	

OILS (continued).		E. s. d.	E. s. d.
Palm, Lagos	ton	26 0 0	0 0 0
Rapeseed, English pale	34 0 0	34 10 0	
Do, brown	33 15 0	33 0 0	
Cottonseed, refined	23 15 0	0 0 0	
Tallow and Oleine	21 0 0	40 0 0	
Lubricating, U.S.	6 10 0	8 10 0	
Do, refined	7 0 0	12 0 0	
Tar—Stockholm	1 6 0	0 0 0	
Archangel	0 15 8	0 25 9	

#### COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

##### COMPETITIONS.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Altering and Enlarging Asylum	Dorset County Lunatic Asylum	40l. and 20l.	Jan. 21st	ii.
New Conservative Club, Oswaldtwistle	The Building Committee	Not stated	Not stated.	i.

##### CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Repair of Private Roads	Croydon Corporation	W. Powell	Nov. 26th	ii.
Supplying and Laying Water Pipes, &c.	Pocklington Water Co. Ltd.	Fairbank & Son	Nov. 27th	x.
Well Sinking	Com. of Sewers	Official	Nov. 29th	ii.
Alteration and Extension of Schools	Burton-on-Trent School Bd.	R. Churchill	Nov. 30th	ii.
Vagrant Wards	Amersham Union	Official	do.	ii.
Surface-Water Drains, &c.	Mortlake Highway Bd.	H. Richards	Dec. 2nd	x.
Wrought-iron Fencing, Gates, Pillars, &c.	Hendon Local Board	S. S. Grimley	do.	x.
Cast-iron Pipes	Southend Local Board	P. Dodd	Dec. 3rd	x.
New Well	East Grinstead Gas and Water Company	E. Easton & Co.	do.	ii.
Alterations, &c., at Fire Brigade Stations	London County Council	Official	Dec. 4th	ii.
Stores	G. N. R. Co.	do.	Dec. 7th	ii.
Additions to Refuse Destructor	Bournemouth Commrs.	F. W. Lacey	Dec. 8th	x.
Underground Urinals and Water-closets	St. Pancras Vestry	W. B. Scott	do.	x.
Painting, Plumbering, Fencing Works, &c.	St. Olave's Union	Newman & Newman	Dec. 10th	x.
Roadmaking and Sewering Works	West Ham Council	Lewis Angell	do.	x.
Under-Drainage of Little Wormwood Scrubs	London County Council	Official	Dec. 11th	x.
Wrought-iron Bar Fencing, Ravenscourt-pk	do.	do.	do.	x.
Roadmaking Works	Wood Green Local Bd.	do.	Dec. 13th	ii.
Roadmaking, &c., Canning Town	United Land Co. Ltd.	do.	Dec. 16th	x.
Bakery, &c., Woolwich	War Department	do.	Not stated.	ii.
Materials for Repair of Permanent Way	London Street Tramways Co.	do.	do.	ii.
New Church, Stoke-on-Trent	do.	C. Lynam	do.	ii.

##### PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Premium.	Applications to be in.	Page.
Surveyor	School Bd. for London	600l.	Nov. 30th	xvi.
Clerk of Works	York School Board	50s. weekly	do.	xvi.
Sanitary Inspector & Inspector of Nuisances	Bethnal Green Vestry	120l.	Dec. 2nd	xvi.
Drawing Clerk (Surveying Department)	Hackney Bd. of Works	30s. weekly	do.	xvi.
Highway Surveyor	Gloucester C. C.	250l.	Dec. 6th	xvi.
County Surveyor	Glamorgan C. C.	750l.	Dec. 20th	xvi.

##### TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

AVONMOUTH.—For proposed alterations and additions to Mr. J. Hort's farm buildings, Avonmouth, in accordance with the plans of Mr. C. F. Miller, architect, Shirehampton, Bristol, on the estate of Mr. F. N. Miles, J.P.	
E. Walters, Bristol	£1,240 0 0
E. T. Hatherley, Stoke Croft	1,175 0 0
George Humphrey, Bristol	1,050 0 0
H. A. Forre, Bristol	1,640 0 0
Stride & Davis, Shirehampton	1,080 0 0
J. Perkins, Bristol	985 0 0
J. Herd, Shirehampton	965 0 0
Ford & Sons, Cheddar	935 0 0
Pugsley, Clifton	919 0 0
W. Colston, Bristol	831 0 0
Hodge & Flower (accepted)	825 0 0

BATH.—For building a new billiard-room, for the Lansdown Grove Hotel Company, Limited, Mr. T. B. Sheek, architect, Bath:—	
J. Foster, Bath (accepted)	£328 0 0

BROMLEY (Kent).—For works of surface drainage &c., in Beckenham-lane, for the Bromley Local Board:—	
Mr. Hugh S. Oregon, Surveyor:—	
E. Fell & Sons	£175 0 0
T. Lansbury (accepted)	164 18 9

CATFORD.—For residence at Catford, for Dr. Hamerley (exclusive of decorations). Mr. Henry Hopton, architect, High-street, Lewisham:—	
Kenard	£2,700 0 0
Laird	2,300 0 0
Low, Chichester (accepted)	2,174 0 0

KINGSTON.—For the Hook, Southborough, and Long Ditton Sewerage, for the Kingston Rural Sanitary Authority. Mr. William H. Hope, Engineer, Kingston-on-Thames:—	
J. W. & J. Neave	£13,695 8 6
W. Neave & Son	13,819 18 9
Holmes & King	13,211 11 10
T. Adams	13,977 1 7
John Mackay	12,661 18 8
W. I. Botterell	12,565 0 0
E. & W. Iles	11,899 0 0
C. Karavanagh	11,675 1 11
L. Botterell	11,339 0 0
B. Cooke & Co.	10,879 0 0
W. Cunliffe (provisionally accepted)	10,421 0 0

JOHANNESBURG (Transvaal).—For adding a basement to the Johannesburg Stock Exchange, Post, and Telegraph Offices, for the Johannesburg Estate Company. Mr. Lennox Canning, A.R.I.B.A., and Fred G. Good, C.E., architects, Johannesburg. Quantities by the architects:—  
Contract No. 2.  
A. L. Lawley (accepted) £3,142 0 0

LINCOLN.—For the erection of premises on Waterdale South, for Messrs. Doughty, Son, & Richardson, Lincoln:—	
Do.	A. B.
Otter & Broughton	£1,827 0 0
J. M. Harrison	1,769 0 0
Landsdown & Son	1,762 17 11
H. S. & Wm. Close	1,640 0 0
C. Sands	1,597 0 0
Wright & Sons	1,549 0 0
G. Cowen	1,549 0 0
J. W. Harrison	1,367 0 0
Accepted.	1,383 0 0

LINCOLN.—For the erection of premises, No. 37, Silver-street, for Mr. R. C. Carline. Mr. William Watkins, F.R.I.B.A., architect, St. Edmund's-chambers, Lincoln:—	
J. W. Harrison	£1,450 0 0
Otter & Broughton	1,454 0 0
J. B. Harrison	1,450 0 0
Wright & Sons	1,374 0 0
H. S. & William Close	1,248 0 0
J. M. Harrison (accepted)	1,180 0 0

LONDON.—For the erection of central offices for the Institute of Chartered Accountants in England and Wales, at Coleman-street-buildings, Moorgate-street, E.C. Mr. John Reicher, F.R.I.B.A., architect. Quantities by Mr. R. C. Gled:—	
Dove Bros.	£26,145 0 0
Foster & Dicksee	25,027 0 0
Cubitt & Co.	24,870 0 0
Dowds	24,620 0 0
J. and J. Greenwood	24,560 0 0
Hall, Reddell, & Co.	24,315 0 0
Colls & Sons	23,940 0 0
Perry & Co.	23,634 0 0
Bissett & Sons, Sheffield	22,996 0 0

LONDON.—For alterations to the "Cock Tavern," Holloway-road, N., in forming entrance and new staircase to billiard-room, with all necessary lavatory accommodation, for Mr. Frederick Hall. Mr. A. J. Ferriam, architect, 52, St. John's-village, Upper Holloway:—  
Wm. Evans, Upper Holloway (accepted) £272 0 0  
[Without competition.]

LONDON.—For additions to factory, Valentine-place, Blackfriars-road, for Mr. James Pascall. Mr. W. H. Woodroffe, architect:—

Colls & Son .....	£3,354	0	0
Higgs & Hill .....	3,330	0	0
Smith & Son .....	3,847	0	0
W. Downs .....	3,831	0	0
Hall, Beddall & Co. ....	3,774	0	0
Houss & Son .....	3,710	0	0
Wall Bros. ....	3,677	0	0
F. Parker .....	3,560	0	0
Quinlan & Son (accepted) ..	3,485	0	0

LONDON.—For additions to dairy farm, Stanhope-road, Homsey-lane, N., for Mr. J. F. Spencer. Mr. Henry S. Tynack, architect, 4, Duke-street, Adelphi:—

Matlock Bros. ....	£779	0	0
Hayworth & Sons .....	697	0	0
Burman & Sons .....	690	0	0
P. M. Keenle .....	626	8	0
F. Voller, Truro-road, Wood Green* ..	579	0	0

\* Accepted.

NEWPORT (Mon.).—For the erection of one block of model lodging-houses in Dock-street, Newport, for the Newport Model Lodging House Company. Mr. E. A. Lansdowne, architect, Newport. Quantities by the architect:—

Francis & Son .....	£2,950	0	0
H. C. Parfitt .....	2,670	0	0
Gadwall (executors of Messrs.) .....	2,553	0	0
W. A. Linton .....	2,548	0	0
W. Blackburne .....	2,485	0	0
J. Linton (accepted) ..	2,460	0	0

[All of Newport.]

NEWPORT (Mon.).—For the erection of two small cottages at Panteg for Mr. F. Phillips. Mr. E. A. Lansdowne, architect, Newport:—

John Burgoyne, Pontypool .....	£340	0	0
Morgan and Evans, Pontypool* .....	327	0	0

\* Accepted.

NEWPORT (Mon.).—For the erection of two cottages with house and shop on the Llanover Estate, at Newbridge, for Mr. James Griffiths. Mr. E. A. Lansdowne, architect:—

C. Morgan, Newbridge (accepted) ..	£715	0	0
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READING.—For the erection of a block of cottages on the Colley Park Estate, Reading, for Mr. J. Bligh Monck, J.P. Messrs. Cooper & Son, architects, Blagrove-street, Reading. Quantities by the architects:—

Winter & Fitt .....	£2,488	0	0
J. Wicks .....	2,375	0	0
Collier & Catley .....	2,340	0	0
Bottrill & Son .....	2,285	0	0
Geo. S. Lewis .....	2,247	0	0
Higgs & Son .....	2,173	0	0
Wm. Goodchild .....	2,173	0	0
Geo. Wernham (accepted) ..	2,160	0	0

[All of Reading.]

SYDENHAM.—For winter garden, at Horner Grange, for Mr. W. Knight. Mr. J. Fogarty, architect, 51 and 62, Suffolk House:—

Lascelles & Co. (accepted) ..	£2,300	0	0
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WINDSOR.—For works at the "White Hart" Hotel, Windsor, for Mr. Martin. Mr. H. Robson, architect:—

Frank Akery .....	£11,800	0	0
Dove Bros. ....	11,775	0	0
Lansdown & Co. ....	11,478	0	0
Peto Bros. ....	10,989	0	0
Silver & Sons .....	10,940	0	0
Perry & Co. ....	10,697	0	0
William Johnson .....	10,450	0	0
* F. H. Adamson & Son .....	10,000	0	0
* J. Bottrill & Son .....	9,987	0	0
Chas. Oldridge & Son .....	9,984	0	0
Chas. Woodbridge .....	9,849	0	0
* Winter & Fitt .....	9,805	0	0
Wm. Watson .....	9,885	0	0

Those marked \* do not accept condition of tender.

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#### TO CORRESPONDENTS.

Letter about Westminster Abbey (no name or address given).—J. H. M. J. J.—W. A. B. (too late).  
All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, and must be received by the Editor. We are compelled to decline pointing out books and giving addresses. None.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications. Letters or communications (signed names) which have been duplicated for other journals, are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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# The Builder.

VOL. LVII. No. 2415.

SATURDAY, NOVEMBER 30, 1880.

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### Byzantine Architecture in Greece: The Athenian Churches.



architects the name of Greece is generally associated with the great monuments of Classic antiquity which the volumes of Stuart and his successors have made familiar to us, and Athens is synonymous with the Parthenon and Penrose's great work on its geometric proportions and subtleties; still there exist, for those who care to look for them, specimens of the more homely and less pretentious architecture of the Byzantine and Mediæval period, in the shape mostly of quaint and curious little churches of striking individuality which the visitor cannot help coming across in the streets of Athens, on the slopes of its Acropolis, and scattered about in various parts of the country, and where the churches themselves have disappeared he is often surprised to find against the walls of pagan structures remains of Byzantine paintings, sometimes hardly distinguishable, showing that a Christian shrine once stood there. In the great temple of the Athenian Acropolis itself he sees traced on the walls of the interior the faint outlines of Christian saints and martyrs; on the pillars of the exterior the records of the Christian bishops of the city; and in the floor he may observe the vaults where they were laid to rest. As we get familiar with these things we wish to know more about them, and we feel that history did not stop in Greece with the coming of the Romans and begin again only with the War of Independence, as the Greek of to-day would have us believe, but that this little country played a not unimportant part in the troubles and changes of Mediæval times.

Couchaud, a French architect, published, over forty-five years ago, a book on the Byzantine churches of Greece, and illustrated it with drawings of several of the most important ones; these studies, however, are very slight, and in many cases not to be trusted; but his work is, nevertheless, interesting, as giving us valuable data regarding churches which have since entirely disappeared, or have been altered beyond recognition.

After the Greek revolution, when Athens

was quite a small village, it contained a large number of interesting churches; and although a great many of these were in ruins, having suffered severely during the struggle, they still retained valuable records of Christian history in their sculptured slabs and frescoed walls. The greater part of them have since been pulled down, and in most of those that remain the old paintings have disappeared under a coat of whitewash, or have given place to modern decoration.

Mommsen tells us that in Athens alone over seventy churches were destroyed by order of the Greek Government about the year 1840, and the money realised by the sale of the materials was used to help the building of the new Cathedral, the new University, &c. Finlay, in his History of Greece (1855), says:—

"The Acropolis and city of Athens, even to the present day, contain some rude but laborious sculptures executed during the period of Frank domination; and their number was much greater before the recent reconstruction of the town and the destruction of numerous Mediæval churches, which formed a valuable link in the records of Athens, and an interesting feature in Athenian topography, while they illustrated the history of art by their curious and sometimes precious paintings. But in the space of a few years the greater and most valuable part of the paintings have disappeared, and hundreds of sculptured monuments of Byzantine and Frank pride and piety have been broken in pieces, and converted into building materials and paving-stones."

This process of destruction has been going on continuously since then. On the Acropolis of Athens, in the great desire to retain only remains of classic times, most valuable evidences of Mediæval and Turkish occupation have been completely swept away. To show further the absolute indifference with which the Greek archaeologists regarded things Mediæval only a few years ago, another case may be cited which speaks for itself. During the digging round the Erechtheum, about three years ago, where the Archaic statues, now in the Museum, were found, all the surplus soil was thrown over the north wall of the Acropolis, close at hand. Immediately under lay a small Byzantine church; no means were taken to protect it, and the accumulating pressure of earth from above soon turned it into a ruin and almost entirely buried it, and to-day part of a wall and a carved door-lintel can still be seen showing through the mass of débris which disfigures this side of the Acropolis rock.

It is only within the last two years that

the Greek authorities, principally through representations from foreign travellers and archaeologists, have become alive to the importance of looking after and preserving these relics of Mediæval times which have not been cleared away in this stream of devastation, and now steps are being taken to have the buildings cared for and assured from further neglect.

Naturally paganism died hard in Greece. The old religion and the new went on side by side, and Athena continued to be worshipped in the Parthenon 200 years after the founding of Constantinople, although, according to contemporary historians, the greater part of the revenues of the temples had already been converted to other purposes, and part of them had been handed over to the Christian bishops. At length Justinian, about the year 529, published an edict ordering the closing of the Parthenon. The philosophical schools were also suppressed by this Emperor, and the worship of the old gods of Olympus thus received its death-blow at Athens.

The Parthenon was afterwards converted into a Christian church, and dedicated to the Holy Wisdom. The Erechtheum also was turned into a church. Generally, we find that the temples of the old heathen deities became the shrines of the new faith, and in the same way the gods of the old religion gave place to the saints of the new; thus the temple of Poseidon, the god of the sea, became the Church of St. Nicholas, patron saint of sailors; Theseus was changed to St. George; Zeus to St. Elias; Aphrodite to the Virgin; and the twelve gods to the twelve Apostles.

Although the old gods and goddesses had continued to be worshipped up till this time, Christianity had made great progress. Tradition says that in Justinian's reign there were more than 300 churches and chapels in Athens alone, but this number does not appear so great when we consider that every little cave where burned a light before a sacred picture was deemed a chapel, and that each church had only one altar, on which only one mass could be celebrated daily.

Justinian himself is supposed to have built twenty-four new churches in the city, but we cannot identify any of those now standing as of his time.

Although we have hardly any record of the dates of the Athenian churches which now exist, it is possible to roughly classify them according to their architectural characteristics, and principally by the different types of plan. Of these, broadly speaking, there are three

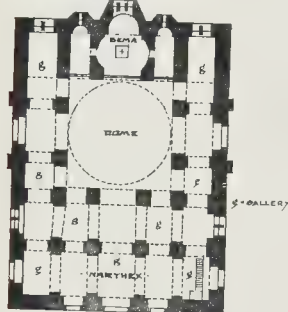


which we may distinguish as, first, the plan with the large central dome, this we may call the St. Sophia type; second, the Greek cross plan, with a small dome at the crossing; third, the western or basilica form. In addition to these are the small grottos or cells in the caves of the Acropolis, which we need hardly touch on here, and the Heathen temples which were converted into Christian churches. The former are generally covered with remains of interesting paintings, of the latter none are in actual use at the present day.

The Parthenon probably became a place of Christian worship early in the seventh century, and the changes made in adapting it to its new use were apparently very slight. The western door, that into the opisthodomos, became the entrance. The opisthodomos itself became the narthex, and the naos of the temple became the naos of the church. The internal pillars were removed, whether at this time or later we cannot determine, and smaller pillars substituted with undoubtedly a gynaeceitis or gallery for the women over on each side. The original entrance from the east was widened, and an apse projected into the pronaos of the temple. This apse had a mosaic on a gold ground, containing a representation of the Virgin.

Whether the roof was a simple vault it is impossible to say, and how the lighting of the interior was managed must remain entirely conjectural. In the opisthodomos or narthex are still to be traced remains of paintings, some of an early period, probably contemporary with the time of its conversion into a church, and some much later. These paintings are in a lamentable state of decay, and bear traces of having been restored at various times. They have been painted directly on the walls, the polished surface and mellow tone of the marble forming a delightful background.

To return to the churches in the town: the first, or St. Sophia type, is represented by one church, that of St. Nicodemus, the largest and probably the oldest of all. Fifty years ago it was falling to pieces through decay and neglect, but since then it has been handed over to the Russian Legation, who have restored and redecorated it, and it is now used as their chapel. From the accompanying plan (fig. 1) it will be



CHURCH OF S. NICODEMUS

Fig. 1.

seen that externally it is oblong in shape with three apses projecting from the east end. Internally the central square, over which rises the dome, is the most prominent feature; this dome is of the earlier variety, the hemisphere springing direct from the pendentives and the windows impinging into it all round. There is a gallery for the women, the only one remaining in Athens, round three sides of the church.

It is vaulted throughout and externally has a terraced roof, where it again differs from the other churches in the town. In Couchaud's time there were considerable remains of frescoes in the interior. In none of the Athenian churches have been found traces of marble linings to the walls or

mosaics to the vaults and domes; if these ever existed they must have long ago perished and given place to fresco painting.

Tradition assigns the building of this church to the Empress Irene (died 803), who was a native of Athens, and who was said to have founded twelve churches in her native place. There is no authority for this tradition, but judging the church architecturally, it might well have been erected early in the ninth century either in the time of Irene or shortly after under the Emperor Theophilus (829), who was a lover of the arts and a great builder.

We now come to the churches with what we have called the Greek cross type of plan. In Athens the principal illustrations of this variety are the old Cathedral or Metropolis, the church of St. Theodore and the Kapnikarea church. Of the former we shall speak in detail further on. The dates of the two latter are very uncertain. In 1019 the Emperor Basil II., after having defeated the Bulgarian invaders of Greece, visited Athens amidst general rejoicing, and presented rich gifts to the city and rich dedications at the shrine of the Virgin in the Parthenon. These churches are not earlier than this time, and may probably have been built during the period of prosperity which followed. The name "Kapnikarea" is curious, and Christian archaeologists are divided as to the nature of its origin. There is a legend that the interior of this church was set on fire during the disturbances which followed the Venetian occupation of Athens towards the end of the seventeenth century, and that a sacred picture of the Virgin, a precious relic, kept in this church, which was dedicated to her, was found afterwards miraculously preserved, having only been blackened by the smoke—*kapnos*. Others trace its derivation from a Turkish word signifying a handkerchief or veil, the picture having been protected by a covering of this nature.

We may here take a plan of this second or Greek cross form (fig. 2) as a general type of a Byzantine church, and proceed to examine it in detail. The plan is of oblong form externally, with one or three apsidal projections at the east end. Inside is inscribed centrally a Greek cross, with short arms, and having a dome over the joining. The internal arrangement of the church may be broadly divided into three parts:—1st. The bema, or sanctuary, with its parabemata or side-chapels, occupying the eastern part. 2nd. The naos, or body of the church, comprising the cross and the small squares filling in its four angles. 3rd. the narthex, or pronaos, at the west end. These three divisions serve three distinct purposes,—the sanctuary for the Holy Mysteries, the naos for the faithful (clerks and laymen), and the narthex for the penitents and catechumens. The bema or sanctuary, which is raised one step above the rest of the church, is strongly marked off by the ikonostasis, or picture-stand. It does not take the place of the rood-screen in a western church, but rather that of the altar-rail. In the earlier churches this screen was generally of an open character; two marble columns divided it into three parts, and on the top of these was a lintel or cornice of marble richly carved. Between the columns, at the sides, were often placed carved slabs breast high, and over these the altar was screened off from the vulgar gaze by embroidered curtains attached to the lintel. The central opening had a low door, and over that a curtain also.

The cornice being kept moderately low, worshippers were able to see the painting and decorations which covered the upper part of the walls of the bema. Remains of these screens are still to be found, but the form more generally met with is made of wood, and of a light construction. It has one or three doors, and is divided into compartments by pilasters, and in these compartments the sacred pictures are arranged according to fixed rule. The upper part has a continuous series of small pictures representing the twelve apostles and the principal scenes in the life of Christ. The cornice over this is ornamented with palms or vines, and over the

centre is a cross. Lamps are suspended before and near the pictures, and in front of the screen stand large candelabra.

Inside the bema is the altar, or sacred table, its proper position being the centre of the chord which bounds the apse. The Greek churches have each but one altar, and only one mass is allowed to be celebrated on this altar every day. However, in abbey churches, where there are several priests, we may find several altars, but this is an exception to the general rule. The altar-table is usually of stone. It represents Christ as the Rock and Head Corner-stone of the Church.

These stones are often fragments of antique columns. The altar of the Eastern church is essentially a table, recalling that of the Supper at Cana, and it was never a martyrium or tomb, as in Western churches. It sometimes had over it a ciborium, supported on four columns and covered by a dome.

The apses of the earlier churches were similar to those of the Western basilicas. They were semi-circular, and that shape is still retained internally. It is related of Justinian that he intended to construct the apse of St. Sophia without windows, but an angel, clothed in the imperial purple, appeared to the architects when they were going to carry out his instructions and ordered them to light the altar by three windows, in honour of the Father, of the Son, and of the Holy Spirit. Most of the later apses have either three distinct windows or one window with three lights. The throne of the bishop usually occupied the end, and on either side were seats for his subordinates. In the semi-dome of the bema is generally a representation of the Panagia, the All Holy, the Mother of God, seated on a throne, and in her arms the infant Christ. Under this is often depicted Christ, as the Great High Priest, dispensing the Holy Communion to his disciples.

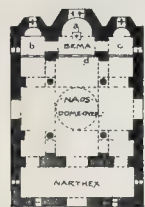
The chapels on either side of the bema are occupied, that on the north as the Prothesis, or Chapel of the Credence, the other as the Diakonikon, or Vestry. These have usually smaller apses projecting externally.

There is no chance, properly so called, the singers grouping themselves in front of the screen in one or more bodies.

As we have already mentioned, the naos or body of the church occupies the space taken up by the cross and its complements; over the central part is the dome; the top limb of the cross next the bema may be called the choir, it being the place where the singers take their stand, and the other end is the nave. The side arms of the cross form short transepts, and they generally have doors communicating with the outside. The dome is supported on four square pillars or circular columns joined by arches, and also connected by arches and vaults with the main walls of the church. In the angles over these piers are pendentives supporting, in these later churches, a vertical drum in which are the windows, and from which springs the dome itself. Thus the dome is considerably heightened, but while this may, perhaps, improve its external appearance, it takes away from its effect internally, and prevents the faithful on entering the church from seeing the figure of Christ the Pantokrator, the All-powerful, which always occupies the centre of the hemisphere, symbolising His triumph over death and His ascension into heaven, from the celestial vault of which He watches over and protects His church on earth.

Between the naos and the narthex or pronaos is a wall pierced by three doors, the central one being larger and more ornamental than those at the sides; it extends across the whole end of the church, and is entered from without by a single door. In front of this again we occasionally find an exonarthex or porch, which sometimes has an open colonnade in front, like those of the Western basilicas. A distinction is often drawn between the paving of the body of the church and that of the narthex; this difference has existed from early times, and marks the narthex as being outside of and subordinate to the church proper. At Kaisariane, a monas-





PLAN OF GREEK CROSS TYPE.

a. Altar-table.  
b. Prothesis, or Chapel of the Cradle.  
c. Diakonikon, or Vestry.  
d. Iconostasis.

Fig. 2.



SIDE ELEVATION OF GREEK CROSS TYPE.

Fig. 3.

tery at the foot of the Mount Hymettus, the floor of the church is of marble slabs, and that of the narthex of terra-cotta tiles.

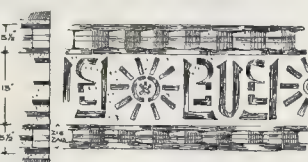
Instead of the square façades and terraced roofs of the earlier buildings, the exteriors of these churches (fig. 3) are more broken up, and show plainly the general lines of the internal subdivisions.

Thus we see the form of the cross clearly defined, the small angle squares being roofed over at a lower level. At the end of each limb of the cross is a gable, and over the centre rises the dome, the most prominent feature of the grouping. Each gable is separate and distinct; where we find a multiplication of gables on the same face, we know that they are of later time and show Western influence. To the east is the bema, its roof slightly lower, and beyond it again are the apses abutting on the end walls. At the west end is the narthex, the lines of its roof clearly marked. This emphasis of bema and narthex is more developed externally on some churches than on others. The walls are generally built of squared blocks of Poros stone, a species of lime-stone which has been largely used since early times; alternating with each course of stone is a course of flat tiles about 1½ in. thick, the mortar joints between being of an equal thickness (fig. 4). These tiles are

ornament. This same zig-zag is to be seen in colour, copied undoubtedly from a practical example, dividing the rows of figures in the early frescoes on the walls of the Parthenon. The eaves courses are formed somewhat similarly to these strings, but with this difference, that while in the strings the angle tiles are set in flush with the face of the wall, at the eaves they project forward.

The Church of S. Nicodemus, which is built with alternate courses of stone and tiles as described above, has a more elaborate string-course going round the building at the level of the springing of the door arches (fig. 5).

DETAIL OF ORNAMENTAL BAND, S. NICODEMUS.



PLAN OF ZIGZAG.

Fig. 5.

It is 2 ft. deep over all, a long top and bottom are zig-zag, and, between these, curiously-shaped tiles are set endwise into the mortar, and arranged to form a repeating pattern. These curious tiles are also used for filling in over the two and three light windows between the outer and inner arches.

The windows are of three kinds, one, two, and three lights. The single windows (fig. 6) are

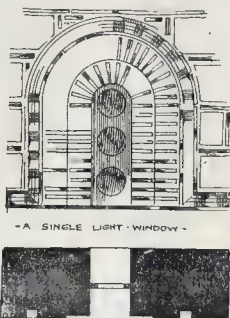


Fig. 6.

generally found on the side elevations lighting the narthex, and the small squares of the

naos. They have simple tile jambs and arches, usually a double row of tiles, the inner one being set about an inch back, and on the outside of these the zig-zag course runs round.

The two-light windows (fig. 7) are used in

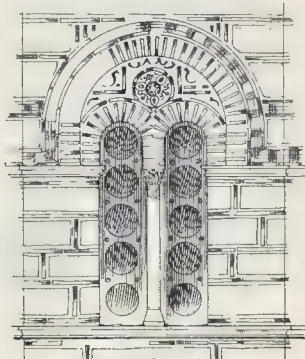


Fig. 7.

the side gables and in the smaller apses, and sometimes the large apse has three two-light windows, one on each of its three sides. Those in the gables have tile-jambs and arches, the inner row of tiles forming an arch over each light, the outer enclosing both. The mullions are thin, flat marble slabs, rounded or splayed into an octagon form on edges, and finishing on the top with carved patenas or leaves. The cap is of a splayed form, and projects much more in front than at sides; on the face a foliated cross is usually cut. Occasionally we find a splayed base, but often there is none at all. In the apse windows the jambs are formed of the stone and tile courses of the walls, the arches of tiles only. Some of the windows in the church of St. Theodore have had ornamental glazed lustre plates fitted in the spaces between the inner arches and the outer enclosing ones. We find plates used decoratively in this way on the exteriors of some of the Early Italian churches. The church of St. Theodore also possesses a very fine string-course band of reddish terra-cotta slabs, which runs along under the windows of the gables. These slabs are about 15 in. long by 7 in. deep, and about an inch thick, and the forms of the flat ornament vary on each.

The three-light windows (fig. 8) are generally situated at the end of the main apse. The lights are sometimes of equal height and width, but occasionally the central one is both higher and wider. They are arched as the others, but frequently with only a single row of tiles, and no outer enclosing arch.

The window openings were filled in in various ways. A wood trellis of a delicate and ornamental character was used in early times. This gave place to thin marble slabs, pierced with openings of various shapes, such as circles, stars, or polygons. Few of these now remain.

The doors are also arched, and sometimes the arch takes a horseshoe form, as in the side doorway of the Kapnikarea church. This kind of arch was used by Byzantine architects as early as the fourth century, and was undoubtedly borrowed by them from the further East. In the opening under the arched head we find inserted a set of marble jambs and a square lintel and cornice. These are moulded and often carved. In the tympanum, which is usually recessed, are seen traces of painting over the west door, generally a figure of the saint to whom the church is dedicated. The gables of the cross are of a flat pitch, the roofs being almost universally tiled. Probably



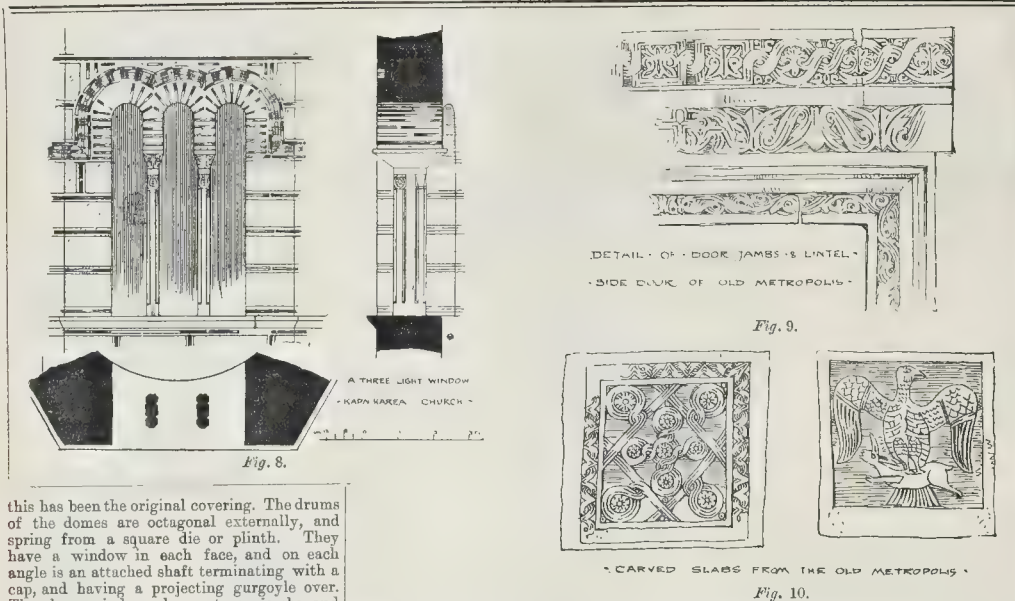
ARRANGEMENT OF WALL SURFACE.

Fig. 4.

placed between the stones vertically as well as horizontally, and they form a pleasing combination, the red of the tile with the yellow colour of the stone. Where old marble blocks of larger size have been worked in, as in the lower part of the Kapnikarea church, they are often used in combination with the smaller blocks of stone and tiles, and the result is an effective and rational method of wall treatment.

String-courses, where they are not a simple marble hollow or splay, are composed of a course of tiles laid diagonally between two straight rows, this forms a kind of zigzag





this has been the original covering. The drums of the domes are octagonal externally, and spring from a square die or plinth. They have a window in each face, and on each angle is an attached shaft terminating with a cap, and having a projecting gargoyle over. The dome-windows have stone jambs and double tile arches with a marble coping over, taking the line of the arches. These window-heads cut up into the sphere of the dome-roof. Lenoir cites St. Theodore's as the only instance he knew of a dome of this kind with two-light windows in it. The roofs of these domes are tiled also. The walls of the apses stop a little short of the height of the main-wall heads, and have hipped roofs.

Although in other parts of Greece we have many instances of the multiplication of small domes grouped round the central one, in Athens itself there is no example.

The Church of St. Theodore has a belfry of three openings over its south gable. This is a late addition. Greek churches had originally no bells, the people were summoned to worship by the striking of wooden planks or thin slabs of iron or bronze. Bells were not introduced into the East till after the middle of the ninth century, when the Venetians presented a peal of twelve to the Emperor Michael, but it is unlikely that they came much into favour for a long time after this.

The Kapnikarea church has additions to the north and west of considerably later date; that on the north takes the form of a smaller church or chapel of an unpretentious character, and having a small dome over the centre. The western addition is a kind of exonarthex or porch. Its elevation presents a continuous series of four similar gables pierced by single windows, and having a somewhat elaborate arrangement of tile ornamentation. Under the two central ones are double openings, each divided by a circular column, and arched over. They have probably been open originally, but the level of the external ground has risen in the course of the centuries to over 4 ft. above the internal floor level, and they have been filled in and glazed to serve as windows. On each side are two simple arched openings. At the south end, on the side, is a projecting gabled porch supported on two pillars, and with a square-lintelled doorway under, which now forms the main entrance to the church.

This addition is built in conformity with the rest of the building, and harmonises with its general detail. It may probably date from the fourteenth or fifteenth centuries.

The Metropolis church (see lithograph) is perhaps the most interesting in Athens. Topographers have identified its site with that of the ancient serapeum.

Couchaud dates it from as far back as the sixth century, but Buchon conjectures that it was built by the Frankish Dukes in the

beginning of the thirteenth century, as an expiatory offering for certain acts of extortion practised on the Greek clergy, and he claims to find amongst the numerous Byzantine carvings on its walls the arms of the French Dukes of Athens and the Morea.

The building is very small, the frontage measuring only 24 ft. across. It is built entirely of marble, the lower part of large blocks removed from an ancient edifice, the upper of carved slabs of all kinds.

Mixed up together are details of Greek and Roman times and carvings of the Christian era; amongst them are Greek steles, some built in on their sides, others upside down, pieces of carved friezes and cornices (fig. 9), Corinthian capitals, cofferings, pediments, &c. Here also are Byzantine panels covered with grotesque animals, others with the cross forming the central motive, and surrounded with interlacing or flowing ornament (fig. 10). In the arrangement of these slabs on the walls much ingenuity has been displayed, a wonderfully symmetrical composition has been made up from this collection of odds and ends, and the result is not unpleasing.

Most of the pagan carvings have been inscribed with crosses, and thus they seem to have been fitted for use in a Christian church. Many small crosses have also been cut on the plain slabs, and it is possible to count on the exterior of this one little building over sixty crosses carved in the marble.

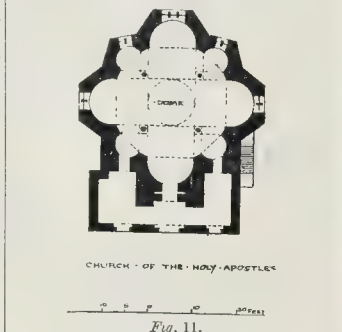
On the west front is a portion of a frieze of perhaps the third century B.C., representing the labours of the months and with them the signs of the Zodiac. This is probably the only Christian church in the East which shows on its facade decoration of this nature. Lenoir tells us that the plain surface of the lower part of the external walls was decorated with frescoes painted on the coating, which had been put on the walls for this special purpose. When he visited the church there were still remains, on the south wall, of a large St. George on horseback and of several other figures. This external painting was, we can hardly think, the original intention of the builders, and must have been added at a later time.

The plan of the church is one of the most beautifully-proportioned of its kind. It has only one projecting apse at the east end, the dome is supported on four square piers, and the narthex is very wide in proportion to its length. The doors from the narthex into the church have carved jambs and lintels. On the jambs of the central doorway is repre-

sented a flowing vine with birds at intervals picking the grapes. They still retain indications of colouring.

This church served as the Cathedral of Athens till the year 1827. When Couchaud saw it it was used as a library, and there were still to be seen considerable traces of its old internal decoration, but it has since been restored and these have been painted over.

We now come to speak of another church, which differs from those already mentioned and from all the others in Athens. It is known as the Church of the Holy Apostles, and is situated on the lower part of the northern slope of the Acropolis, between the stoa of King Attalus and the Areopagus. The plan (fig. 11) is that of an octagonal church,



with apses to each of the four principal sides, and smaller ones between, and over the centre is a dome. The main entrance was originally through the western apse, and there was a narthex butting on to the west end, this probably being a later addition. Unfortunately, within the last few years the entire original character of the west end has been destroyed, the apse and narthex have been cleared away, and a new nave like a huge barn has been added, spoiling the whole building. Lenoir shows the old arrangement, and we have reproduced it from his plan. There are some interesting geometric coincidences in this church. A circle struck from the centre of the dome passes through the centre of all the apses. The radius of this circle is equal to one diameter of the large apses plus the radius of one of the small ones. The width of the small apses with the



piers on either side added is equal to that of the larger ones. From the centre of the four pillars supporting the dome to the centre of the small apses is one-half the diameter of the large ones, and the total external width over the apses is four of the large diameters.

If we knew the original level of the floor we might possibly find that the heights also worked out in proportional relation to the plan.

The eastern apse is emphasised by having a three-light window, while those in the side apses have only a single mullion.

This building is now used as an ordinary place of Greek worship, for which its plan is quite unsuited, and an iconostasis has been run across in front of the two easternmost pillars. It is said to be the old Baptistery of Athens, and is supposed to have had an octagonal font in the centre under the dome, like the baptisteries of the West. It would be interesting to know if any trace or remains of this font still exist beneath the present floor.

Externally it has many similar characteristics to the churches already described. The walls are built of Poros stone and tiles, but in this case each horizontal stone course is divided by a zigzag band in place of a single row of tiles; vertically between the stones are curious arrangements of shaped tiles in the manner of the band at S. Nicodemus. These are said to have a symbolic religious meaning, some Greek archaeologists holding the theory that they are signs representing scriptural words and texts.

The octagonal form of the interior becomes subordinate, in the arrangement of the lines of the exterior, to that of the cross which spreads itself out on four sides from the central dome, with a gable at the end of each limb. The main apses abut on to these, the secondary ones being roofed over at a lower level, and looking as if filling in the angles of the cross.

Apses to side transepts are not usual, but they are sometimes found, as in the church of S. Elias at Salonika, which dates from the beginning of the eleventh century. They are more common in the Armenian churches.

Of the churches of the Western or Basilica form of plan we may mention the following—the Church of the Virgin of the Great Monastery (fig. 12), and those of St. Andrew,

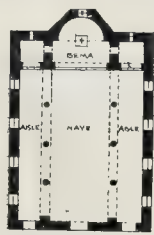


Fig. 12.

St. Philip, and St. John the Precursor. Of the four the first is the best preserved, but many of its most interesting features have been swept away during a recent restoration. The others are in a very ruinous state, only portions of the walls in some cases remaining, but it is still possible to learn from them many facts worthy of notice.

They are undoubtedly of Frankish times, thirteenth century or later, and have generally a nave and aisles of from three to five bays; at the east end is the bema, with projecting apsidal end and its parabemata, which sometimes have also projecting apses, but often mere semi-circular recesses in the east wall instead. Walls with communicating openings divide these, and towards the nave and aisles they are spanned by arches, under which was the ikonostasis. The roofs of the nave and aisles were usually of wood, and, where

so, have long since disappeared. The fact of the Church of the Virgin having a barrel-vaulted roof accounts for its present good condition. The Church of St. John has a square bema, with a groined and vaulted roof, and no apse. This is the only example of this form in Athens.

In the windows and doors we find the ogival or pointed arch in general use.

These churches have no narthex, but the west walls show traces of wooden lean-to porches to protect the penitents and others from the burning rays of the sun and from the rain.

In front of the Church of St. Andrew are indications of an atrium, which has been cleared away in the formation of the present street. This church also contains on its ruined walls the remains of interesting frescoes which through constant exposure to the weather are gradually becoming more and more faint, and will soon altogether disappear. The west ends show the lines of the nave and aisle roofs, the central part forming a gable pierced by a two-light window and ornamented with carved slabs or glazed plates let in.

There are three doors, a central one into the nave and side ones to the aisles. They have plain jambs and lintels with arches over.

Above the central door is a canopy on corbels, under which is a fresco of the patron saint. The Church of the Virgin differs from the others in some important respects (fig. 13).



WEST END OF THE CHURCH OF THE VIRGIN

Fig. 13.

The roof of the nave does not finish at ends with gables, but is hipped back, the front wall showing a set-back as well 2 ft. or 3 ft. below the line of eaves; the corners are splayed away, and this shows internally in the main vault as a small angle pendentive; immediately under the eaves at each end is a small window; apart from these the church entirely depends for light on the side windows in the aisles. The bema roof is slightly lower than that of nave, and at the end of it is the apse. Under the canopy of the western door, in addition to the figure of the Panagia supported by the two archangels below it, are a series of fathers of the church. The walls, which formerly showed their stone and tile construction, are now plastered over and painted in yellow and pink strips.

In addition to the churches there are in Athens, on the Acropolis and in the National Museum, where a mediæval room is in course of being arranged, numerous valuable fragments of architectural detail of all descriptions and periods which, when sorted out and put into some kind of order, may help to clear up points, which are still hopelessly dark, to the student of Christian archaeology in Greece; and there is even now, time, by a little judicious expenditure and oversight on the part of the authorities in Athens, to rescue much from needless destruction, and to stay to some extent the effacing hand of time on the many interesting relics of these times which still exist there.

Important as are the churches, in Athens itself, those in other parts of Greece are not less so. Around Athens, within the distance of a few miles, are several of no mean merit. The Monastery of Kaisariane has a good church of the second period, with a fine series

of frescoes of the thirteenth or fourteenth centuries, which are in good preservation, and will well repay careful study. The church has several points worthy of notice, such as a dome over the narthex and an atrium in front. On the other side of Hymettus, at Teraka, are three others. There are several more in different parts of the Attic plain; and west of Athens, on the old sacred way to Eleusis, in the picturesque pass which runs through the range of Ægaleos dividing Attica from the Thrisian plain, is the beautiful church of the Monastery of Daphne, with its fine mosaics sadly ruined through the vandalism of the Turks and the effects of earthquakes. The plan of this church is somewhat similar to that of S. Nicodemus, in Athens, but without the women's galleries. Its walls have been lined with precious marbles, a few traces of which remain in places, especially round the bema, in the upper part of which is a splendid piece of marble mosaic paneling. Several large sarcophagi found here, with fleur-de-lys carved on them, seem to point this out as being the burial-place of some of the Frankish dukes. Adjacent to the monastery on the hillside is a small chapel of more purely Western character, with a crypt containing several tomb chambers, which have all been rifled long ago.

Further afield, at Chalcis, in Eubœa, we find remains of what is perhaps the earliest church now existing in Greece. It has been a fine basilica of the Ravenna type, and of contemporary date, viz., sixth century. The Cippolino marble columns and the beautiful carved caps, which may still be seen, attest its former grandeur. Added on to it are chapels with groined and vaulted roofs, probably built during the Venetian occupation.

Near Livadia, in Phokis, is the monastery dedicated to the memory of St. Luke, a renowned Greek hermit who lived in the early part of the tenth century, and who died and is buried here. It has two churches, built shortly after 950, it is said by the Emperor Romanus II. They are both interesting, and the larger one, with its rich mosaics and marble linings to its walls, is the finest specimen of its kind in Greece. Their architectural characteristics differ in many respects from those of the Athenian churches, and happily the buildings themselves are as yet practically unrestored, although there is great danger of their suffering from the ignorant meddlesomeness of the monks, who have recently demolished a porch of the sixteenth century, their excuse being that it did not form part of the original buildings. However, of these churches, and of the many beautiful ones at Mistra, near Sparta, which was for long the seat of the Byzantine governors of the Peloponnese, and of others scattered about in different parts of Greece, we hope to speak more in detail at a future time. Suffice it now to remark that the work of collecting authentic records of these has yet to be done, and, as every passing season leaves behind it traces of the destroyer's ruthlessness, all encouragement ought to be given to the School at Athens which, with praiseworthy foresight, has allotted to itself the task of getting together before they perish for ever, a complete series of memoranda and drawings of the Byzantine and Frankish monuments of Greece.

**Paris Exhibition Awards.**—By a mistake on the part of the writer of "Last Notes on the Paris Exhibition" (*Builder*, Nov. 16), Mr. Skelsey's "Adamant" Portland cement, and Messrs. Francis & Co.'s cement, were mentioned as not having received medals. Mr. Skelsey's silver medal and Messrs. Francis & Co.'s gold medal were, in fact, duly reported in our list of awards to English exhibitors, printed in the *Builder* of Oct. 5. The mistake in the recent article, which we regret escape our notice, arose from the fact that a number of exhibits were labelled as having received awards, and the writer of the "Notes" assumed that those not so labelled had been passed over. Messrs. Francis & Co. also state that it was they, and not the other cement firm of the same name, who exhibited the Parian cement and scagliola mentioned in the article.



## NOTES.

**T**HE recent exposure of the manner in which builders' work has been done at some of the London Board Schools, which has been seized on with such avidity by some daily papers always disposed to pose as moral reformers, is, we fear, a not unnatural outcome of the principle (a combination of hurry and economy) on which the building work of the Board has been for many years carried out. At the time when there was an attack made on Mr. Robson by some members of the Board in consequence of defects found in schools built nominally under his supervision, we remarked on the total impossibility of ensuring good building under the system which the evidence disclosed, of planning and specifying schools at railway speed, with the utter impossibility that the responsible architect of the Board, having (as he said) "only one brain," could really control all the buildings, even though he is a man with quite exceptional power of getting through work. Given an immense building business to be carried out in the shortest possible time, and with an architect's staff cut down to the very lowest limit possible for preparing the plans at all, and with more buildings going at one moment than the principal could keep any eye upon except by deputy, and there is of course the chance prepared for unprincipled people to make advantage to themselves out of the work, with the additional temptation arising out of the acceptance of the lowest possible tenders that can be got. Unless the School Board were charitable enough to assume that all mankind of the contracting order were entirely trustworthy persons, who could never succumb to any temptation to feather their own nest, there was a way left invitingly open for misdemeanours in building. We do not think that the London School Board, in its corporate capacity, can escape the censure of having indirectly contributed, by a bad system and an ill-judged striving after economy, to the kind of results which have caused such a scandal. The particulars mentioned in the report (given in another column) about Woodland-road and Salter's Hill schools are of course disgraceful to whoever is directly responsible for them, and it does not appear that any excuse can be offered for the worst faults mentioned; some minor matters we imagine have been exaggerated, and of course the daily papers have made the worst of it; they enjoy doing that. Messrs. Wall have sent us a letter which, as it has appeared in various daily papers, we must decline to give space to, but we have read it carefully. Some of the explanations given in it as to minor points appear to set matters in a different light; but in regard to such a serious thing as the composition of the mortar, we observe that while Messrs. Wall assert that they sent good sand on to the site, they do not attempt to deny the fact (which we presume is undeniable) that bad mortar was used, nor do they offer the slightest suggestion as to how it came about. They state that the clerk of works made an exhaustive reply to the charges, which the School Board have not published. If so, his reply ought to be published, as one means towards getting at the truth, which we evidently have not got to yet. If the facts as stated in the Works Committee's report are correct, it is evident that the *onus* must rest either with the contractors or their employes or with the clerk of works; and the latter must either have been negligent or have been taken in; under either of which suppositions he is responsible, in one sense or another. It is a bad business, and we ought to have the means of getting to the bottom of it.

**E**VERYBODY with any perception of logic must have seen that the case of Mr. Gibbs against Lord Grimthorpe in regard to the St. Albans faculty could not have ended otherwise than it has. The case was argued of course merely on legal grounds; and with every sympathy with Mr. Gibbs's

well-meant attempt, it must have been evident from the first that his position was untenable, and that a faculty to restore the Abbey could not be held to exclude certain parts of it because they had not been specially named. So we shall now see, probably, the last remaining portions of one of England's greatest historic buildings covered up with the botching of a quack architect and his contractor. The real cause of all this being possible is the total want of a cultured public opinion about architecture on the part of the English press and the English public. In France such a thing would be impossible, for popular opinion, to say nothing of State regulation, would not allow it. In England, by the small section of the general public who pay any attention to the matter, it is only regarded as a joke.

**T**HAT the London County Council do not slowly profit by their experiences of their first year of office clearly appears in some of the "miscellaneous powers" sought to be secured in a Bill for next session. These include the following objects:—To exempt their members from serving on juries; to confer further powers with regard to the purchase of lands in connexion with improvement schemes under the Artisans' and Labourers' Dwellings Improvement Act, 1875; to authorise them to establish one or more places for the reception of unidentified dead bodies, and to make by-laws and regulations in respect thereof; to enable them to maintain or subsidise a band or bands to play in the different open spaces under their control; to enable them to prosecute inquiries and negotiations relative to markets and water-supply; to empower them to administer oaths in certain cases of applications for licences; to provide as to the method of signing and approving plans referred to the Building Acts Committee; and to enable the "City" councillors to act in certain cases wherein they are at present disabled under section 41 of Mr. Ritchie's Act of 1888. It will be remembered that Lord Rosebery referred to these restrictions at a recent meeting of the Council. The Council's local measures, as provided for by this Bill, are of no great magnitude. They comprise a rebuilding of the iron bridge which spans Bow Creek, joining the East India Dock-road and Barking-road, with subsidiary works at that spot—the West Ham Corporation and the Essex County Council to contribute to the cost thereof; and the acquisition of Brockwell Hall or Park, lying between Norwood-lane and Lower Tulse-hill, with contributions from the Vestries of St. Mary Lambeth, St. Mary Newington, and St. Giles Camberwell. It is reported that towards the purchase-moneys of 122,000*l.*, the following amounts are promised:—Lambeth, 20,000*l.*; Newington, 5,000*l.*; Camberwell, 6,000*l.*; the Charity Commissioners, 25,000*l.*; London County Council, 61,000*l.*; and private donations, 2,500*l.*; thus leaving a balance of 2,500*l.* still to be met.

**T**HERE seems to be some considerable difficulty in finding an adequate and suitable water-supply for Brussels. Numerous projects have from time to time been brought forward, but objections in one form or another have been raised in respect to all the more serious of them. The great interest taken in the question by scientific bodies and the public generally indicates that the inhabitants of the Belgian metropolis have nearly had enough of the fluid supplied from the present heterogeneous sources. On the one hand we hear of high-sounding projects, deriving the water from elevated ground in the south-eastern part of the country, and purposing to feed all the more important towns *en route* to the capital—a scheme which very much reminds us of certain ambitious proposals to supply London and towns in the midlands, only that in our case we should, at any rate, have a copious supply to draw from, whereas it appears that in regard to theirs, the Bruxeellois are in some doubt as to this point. On the other hand, we have now before us a more modest, if not a more satisfactory, proposal

by the well-known Belgian water-engineer Captain Verstraete. The essential features of this scheme are the construction of three very long tunnels in water-bearing strata at some depth from the surface of the ground, after the manner of the usual "galerie de drainage" methods. All three are to be driven in an east and west direction, two draining the system of the Meuse, which river at present runs into the Meuse at Huy; and the third along the valley of the Geer, which latter stream, taking a north-easterly direction, passes through Tongres, and joins the Meuse at Maestricht. It is intended that the two first-mentioned "galleries" shall be constructed for the present wants of the city, and that of the Geer be held in reserve as a future supplementary supply. The question as to whether Captain Verstraete's scheme is feasible is now being discussed by competent authorities. In the meantime, we wonder why so little attention is being devoted to water-bearing strata nearer Brussels; it is a remarkable fact that when a question of general water-supply for a great city is raised, no matter where, the magnitude of the subject seems to enlarge the minds of authorities to such an extent, that anything like a simple proposal is shelved as not being worthy so grand an object. In such cases it is fashionable to look for a supply many miles from the place where the water is wanted, though, in the end, the more distant projects have generally to be discarded on financial grounds. Captain Verstraete's scheme may be all very well, but in our opinion the geological conditions of the water-bearing strata nearer the Belgian metropolis are infinitely more suitable and economical for the end in view. It yet remains to be shown why the present system of "galleries" to the south of the city cannot be extended, and small rivers being further taken advantage of, whilst the methods of distribution are susceptible of much improvement. But an unsatisfactory state of things must always obtain whilst the private wells in the lower part of the city are permitted to be sunk into the alluvium, the water in this instance simply being that of the dirty river Senne filtered through sands and gravels. In summer, the water from this source, as might be imagined, is always exceedingly objectionable, but it is difficult to move the Legislature in the matter.

**T**HE case of Walker v. Hobbs & Co., reported in the November number of the "Law Reports," though short, is of some interest at the present time. By the twelfth section of the Housing of the Working Classes Act, 1885, it is provided that "in any contract made after the passing of the Act for letting for habitation by persons of the working classes a house or part of a house, there shall be implied a condition that the house is in all respects reasonably fit for human habitation." The Queen's Bench Division held that this gives a tenant a right to sue a landlord for damages, if, in fact, the house is not "reasonably fit"; that it does not only allow a tenant to repudiate a contract, but renders the landlord liable, as we have said, in damages. In the case in question some plaster had fallen from the ceiling and injured the wife of the tenant. The jury awarded 50*l.* damages. Without having the evidence, before us it is impossible to say if this verdict on the facts was justified. At first sight it appears to be carrying the Act somewhat further than was intended. Be the facts, however, as they may, the enunciation of the above principle of the judges clearly is of great importance to landlords. Perhaps the poor professional man may justifiably inquire why he also should not be protected by the law, as much as his plumber or glazier.

**O**N the southern slopes of the Hartz Mountains stands the Kyffhäuser, a hill of some 1,400 ft. elevation. It is well detached, thus forming a conspicuous object for many miles, and is dear to the myth-loving German,



for it is from a cave beneath this hill that Charlemagne will one day rise to resume his sway over the German Empire. This is the site chosen for a national monument to the late Emperor William, and the details of the competition (which, however, is confined to German artists), with prizes of 300*l.*, 200*l.*, and 150*l.*, are now published. It is left to the competitors to submit either purely statuesque designs, or statues with architectural treatment, and the cost must be guaranteed not to exceed 20,000*l.* The jury consists of the sculptors Prof. Dietz, of Dresden; Eberle, of Munich; and Siemering, of Berlin; the architects Prof. Dr. Durrm, of Karlsruhe, and Von Leins, of Stuttgart; and the painters Prof. Geselschap and Dr. Jordan, of Berlin. It is considered a hardship that models of the statue itself must be executed to so large a scale as 1 in 10, and it is not unlikely that this part of the instructions will be modified.

**MAJOR BOTTICHER**, a retired officer of the Prussian Army, having repeatedly attacked and thrown doubts upon the discoveries of Dr. Schliemann at Troy, Dr. Dörpfeld, Dr. Schliemann's faithful companion and assistant, has sent the following to the *Neue Freie Presse*:—"The excavations of Troy (Hissarlik) will be resumed on November 25, the necessary permit having been granted by the Turkish authorities. Major Botticher is hereby publicly invited to be present, and his expenses out and back will be paid. The Academy of Sciences at Vienna has selected the architect, Professor George Niemann, as an impartial witness, and Major Steffen, of Cassel, will act in a similar capacity for the Academy of Berlin. We are prepared to open up any parts of the remains of Troy which may be desired either by Major Botticher or by the two official witnesses. Should Major Botticher not put in an appearance, the excavations will, of course, be resumed without him."

**WE** understand that the Glasgow Subway Scheme is to come before Parliament again (although twice rejected within three years), in the hands of the original promoters, who seem at all events to have faith in their own project. The idea is that of a double-line railway under the streets, describing a complete circuit of irregular form, and giving frequent passage to very light trains on a system of rope traction. The harbour is crossed in tunnel at one point and recrossed at another, as in last year's proposal; and this is a feature likely to tell against success, as, having already sanctioned one harbour tunnel of equally large proportions for ordinary traffic, which is now about to be commenced, Parliament will hesitate about adding to the number until after some trial of the pioneer undertaking. Powers are also sought to extend the suburban connexions of Glasgow Central Railway (an underground line in the hands of the Caledonian Company, the building of which is on the point of beginning), and from its western terminus to project a new line twenty miles westward to Loch Lomond shores, along, practically, the same route as that now, and so long, in the hands of the North British. A private company proposes a line of a light order of construction from Milngavie, which is at present a Glasgow suburban terminus, to the lake of Menteith, Perthshire; the West Highland Railway Company, whose line is now making, apply for certain plans, deviations, and minor additions to works and sidings; and elsewhere over Scotland generally, the new short railways at this time announced are numerous. The North British and the Glasgow and South-Western apply mutually for an endorsement of their plan of amalgamation, some time ago announced; while the Caledonian Company at the same time, on its part, asks to be permitted to absorb the Glasgow and South-Western itself, or to share equally with the North British in the property thus sought to be acquired. This presents a position of involved rivalry, which is unprecedented in the history of the great lines, and the work-

ing out of the final adjustment will be a matter of some difficulty. The Clyde Trustees propose the construction of a new graving dock, and several new roads; the Clyde Board of Lighthouses want extended margin for works in progress; and the Glasgow Corporation are introducing a bill for a comprehensive extension of the city boundaries, based on the report of the Royal Commission which sat last year.

**A**MONGST the illustrations to an article in our columns of Feb. 11, 1884, will be found that of a late seventeenth-century doorway (on the first floor) of No. 21, College-hill, Upper Thames-street. Writing to the *Athenæum*, "F." directs attention to this and the adjoining house, No. 22, which he boldly avers "belonged to the 'Zimri' Duke of Buckingham, and was sometimes inhabited by him." He makes no doubt that this,—the now Nos. 21-22,—is the original house; adding, "to which opinion I am guided principally by the staircase [of No. 21], which is a good specimen of the period." The staircase in question is commodious, certainly, and has a well-built hand-rail carried by single twisted balustrades; but it presents no very remarkable features besides. This, "F." says, is about to be removed, in order to gain additional space. The corresponding staircase in No. 22, by the way, seems as though it had been reversed at some later date, inasmuch as the wall panels now range crosswise with the flights of its steps. These two adjacent houses are clearly shown, with their divided courtyard, in Horwood's large scale-map of 1799, as lying between the old Cutlers' Hall, at the corner of Cloak-lane, and Whittington's almshouses north of St. Michael Paternoster Royal Church. The court-yard, being at a lower level than the house terrace, is entered through the two fine existing gateways on College-hill, eastern side, whereof No. 22 was photographed (1884) by the Society for Photographing Relics of Old London, *et curis* Mr. Alfred Marks. Each of the sister gateways is conspicuous for its heavy curved pediment resting upon large consoles, and overshadowing a sculptured head with a curtain, or mantle, and two massive floral wreaths. These features are also reproduced beneath the pediments of some carved doorways in the interior of No. 21. We learn that the vaults beneath the wine-merchant's premises between the two gateways are called Whittington's cellars. An old inhabitant of the parish reminds us that in this quarter he clearly remembers "Whittington's pump," hard by, as well as the set of privies which that worthy established by the river-side for porters and watermen. Whittington was buried in the Collegiate Church he had endowed, here, by the Queen's Wardrobe, to the Holy Ghost and St. Mary, which is now represented by Wren's St. Michael Paternoster in the (Tower) Royal. His almshouses (or college), were removed eighty years ago, to Highgate: their site is that of the Mercers' School, which migrated hither from Budge-row.

**OUR** contemporary's correspondent quotes Peter Cunningham,—second edition, 1850, *sub* Buckingham House,—who says, "part of the court-yard still exists." But he apparently fails to notice that Cunningham, whilst he places that "spacious mansion on the east side of College-hill," quotes Strype, who says it stands "almost over against the church (St. Michael's, College-hill)"—that is, on the western side of College-hill. Moreover, Cunningham, *sub* College-hill, again justifies himself in writing (second edition) that "the second and last Duke of Buckingham of the Villiers family lived in a large house on the west (*sic*) side of College-hill, towards the top." In Hatton's work (1708) Buckingham House is stated to be on the eastern side of the street. Hatton describes it, as also does Strype, as being then or lately occupied by Sir John Lethieullier, the eminent merchant. But Northouck's map, 1773,

marks the house on the western side, by where is the Newcastle-court of Horwood's plan. Of these two houses, No. 21 retains its red-brick front and cornice; No. 22, to the north, is stuccoed; and, if they were originally one, the rows of windows are not, at the present day, symmetrical. Since the foregoing was written, Mr. Marks has addressed a reply to the *Athenæum* (of last Saturday) to say that inquiries made by him at the time of taking the photograph failed to establish the actual identification of the houses with the residence of the Duke of Buckingham.

**THE** General Manager of the London and North-Western Railway has been undergoing quite an ordeal at the Railway Rates Inquiry before the Board of Trade. Mr. Findlay has again been under examination this week, and has been questioned by representatives of the most diverse trades and industries. One sitting, which opened with cattle traffic, concluded with the iron trade,—hardware, fish, meat, and several other descriptions of traffic being dealt with during the day. Each and all are assured that the railway companies have no intention of disturbing the present rates, but it is being made more and more evident that the difference between these and the proposed maximum rates is, in many instances, very great. The companies seem to have made up their minds to put a most literal interpretation upon the "preference rate" clauses of the Act of 1888. "In the compilation of the schedule," said Mr. Findlay, "we took care that smaller traders should not be sacrificed by undue advantages being given to the greater." In fact, the railway companies contend that the granting of truck and train load rates would be contrary to the spirit of the Act, and they have, therefore, made no provision for such consignments. Train loads, however, are very rare in this country, and would, perhaps, be no less so even if lower rates were offered. The granting of truck rates, on the other hand, would probably result in more full loads (and, consequently, fewer half-empty wagons) being conveyed, and this would be an advantage to both parties.

**THE** citizens of Wakefield, says the *Athenæum*, are minded to celebrate the approaching three-hundredth anniversary of their free grammar-school by rescuing the original school-house from its present ignoble uses as a furniture-broker's store. The old buildings, bearing a bust of Queen Elizabeth, the founder, with her motto, *Semper Eadem*, stand at the top of Northgate. This endowment claims amongst its distinguished scholars Dr. John Radcliffe, famed for his liberal endowments at Oxford University; John Potter, Archbishop of Canterbury (1737-47); Dr. Richard Bentley, the famous Master of Trinity College, Cambridge, during the period 1700-42; and Joseph Bingham (died 1728), author of "Origines Ecclesiasticæ," which notable work he completed in his rectory at Havant, near to Portsmouth. Possessing an income of over 3,000*l.* a year, this foundation was re-modelled under a scheme of the Charity Commissioners in 1875-6, and has lately been removed into premises erected for the West Riding Proprietary School, founded in 1832, and of which a view will be found in "Fullarton's Gazetteer."

**CONCERNING** the Passion Plays, which are to commence in June next at Oberammergau, we are informed that the construction of the theatre is already well in hand. The stage is 126 ft. wide; the arcades, the city gate, and the house of Pilate are finished; and 4,000 seats, partly under cover, partly in the open air, are being put up now.

**I**n the *Builder* for August 24 we published illustrations of the first and second premiated designs in the Richmond Municipal Buildings Competition, by Messrs. Elkington & Son and T. Verity respectively. The award of the premiums was made in accordance with the judgment of a competent pro-



professional assessor, Mr. Edmeston, who appears to have made the decision in a perfectly fair spirit, keeping in mind the important consideration of the relation of the designs to the specified cost, often overlooked in deciding competitions. However, the competition has ended, as we see from a newspaper report of the last meeting of the Richmond Vestry, as vestry competitions generally do end,—viz.: by the throwing over of the originally premiated candidate, and selecting a design which was not placed at first, that by Mr. Ancell, submitted originally under the motto "Bon Espoir." What (if any) motives for this there may have been beneath the surface we cannot of course understand; the ways of Vestries are mysterious. On the face of it the reason seems to have been that a majority of the committee admired Mr. Ancell's elevations more than those of the premiated design, and we expressed an opinion in favour of his design and detail as one of the more interesting and picturesque among a very poor set of designs architecturally; but we also said that "the plans were terribly cut up and wanting in architectural simplicity and directness," and we characterised the plans of the first premiated design as being "excellent, and the elevations not so very much worse than some of the others." It appears that in the first instance there was a recommendation brought forward that Mr. Edmeston should be invited to examine the first premiated design along with that of Mr. Ancell, but an amendment to adopt the latter at once was carried by a majority. No statement is given in the report before us as to the reason for the first proposal; the reason against it seems to have been that it would have involved a special fee to the assessor, and that the Vestry were competent to judge for themselves between two plans, though (as seems to be implied) a greater number would have bewildered them. We do not see the logic of this; and certainly the result is that they have selected an inferior plan, though a more pleasing design. The Rev. C. F. Coutts moved, and spoke in favour of, an amendment that the matter should be adjourned until they had Mr. Edmeston's opinion on these two plans. This, however, they had practically already had, as the assessor had all the plans before him originally. They would have been much wiser if, having had the benefit of the assessor's superior knowledge, they had adopted his decision. The unfairness about the thing is that the "Bon Espoir" design had been set aside in the first instance as being manifestly outside of the stipulated cost. In that case it ought to have been regarded as out of court. Public bodies have no moral right to advertise for designs at a certain cost, and then to take one which was over the stipulated cost, because they have subsequently resolved to spend more money. That is deluding the competitors. The Vestry had a right to decline the assessor's decision, if there were good and reasonable grounds for doing so; but they had no moral right to set against his choice a design which contravened their own original conditions. But it is just what may be expected in this class of competitions. People are said to need a long spoon who eat with the devil; and architects who go in for Vestry competitions are in much the same case.

**Royal Institution.**—The Christmas lectures (adapted to a juvenile auditory) will this year be given by Professor A. W. Ricker, F.R.S. (Professor of Physics in the Normal School of Science and Royal School of Mines), on "Electricity." They commence on Saturday, Dec. 28.

**The Sanitary Institute.**—At an Examination held for Inspectors of Nuisances, on Nov. 21 and 22, sixty-nine candidates presented themselves. Questions were set to be answered in writing on the 21st, and the candidates were examined *visu voce* on the 22nd. Thirty-nine of the candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspector of Nuisances.

#### THE ANNUAL REPORT OF THE LOCAL GOVERNMENT BOARD.

THE "Eighteenth Annual Report of the Local Government Board, 1888-89," just issued,\* was presented to Parliament in June last, and covers the twelve months from April 1, 1888, to March 31, 1889. As was to have been expected, the Report devotes a considerable number of pages to what it justly characterises as the most important event of the year in connexion with local government, viz., the passing of the Local Government Act of 1888, which constituted the new County Councils. This part of the Report, in fact, is an official commentary, by the President of the Board, on the scope of that important measure, not only in the form in which it passed through Parliament, but in the form in which it was introduced. "The provisions as to District Councils were not proceeded with owing to want of time," we are told, but we do not find in the Report any promise that the Government intend to proceed at once with a measure for establishing these District Councils. Until these District Councils are established it cannot be said that the latest instalment of Local Government reform is complete.

The second section of the Report deals with questions relating to the relief of the poor and the amount of the poor rate. The statistics of pauperism show that on the 1st of January last the total number of paupers of all classes in England and Wales in receipt of relief was 817,190, of whom 204,768 were indoor and 612,287 outdoor paupers, while 145 received both indoor and outdoor relief. As compared with those of Jan. 1, 1888, these figures show a decrease of 1,376 indoor and 12,780 outdoor paupers, and a decrease of 7 in the number of those receiving both indoor and outdoor relief. The population of England and Wales, as estimated by the Registrar-General, was, the Report tells us, 28,247,151 in the middle of the year 1887, and 28,628,804 in the middle of 1888. Taking these figures as the basis of calculation for the purpose of ascertaining the proportion to the population of the paupers relieved on the 1st of January of the two years 1888 and 1889 respectively, it appears that the total number of paupers amounted approximately in the former year to 1 in every 35 persons, and in the latter year to 1 in every 35 persons. This slight diminution in the number of paupers, taken in conjunction with the signs of a revival of trade, some of which are mentioned in the Report, while others are apparent to outside observers, is of hopeful augury. We cannot go at any length into the voluminous statistics of pauperism which the Report contains, but we may give one or two figures which are full of suggestiveness. "The county which contained the largest proportion of paupers on the 1st of January last was Dorset, in which no less than 48.4 out of every 1,000 of the population were in receipt of relief. The county in which there were fewest paupers on that day in proportion to the population was Lancashire, where they amounted to only 19.3 per 1,000." In the metropolis the proportion which the number of indoor paupers bore to the population was 14.4 per 1,000. In Wales it was 4.0. The cost of the relief of the poor for the year ended on March 25, 1888, was 8,440,821. This amount represented an average charge of 6s. 11½d. per head on the estimated population for that year (being 1½d. per head more than in the preceding year), and an average rate of 1s. 1.6d. in the pound on the rateable value of the property liable to contribute to the poor rate.

"Public Health and Local Administration" is the subject of the third section of the Report. From it we learn that since the constitution of the Local Government Board in 1871 it has sanctioned the borrowing by Urban and Rural Sanitary Authorities, of no less a sum than 41,114,990. By far the greater proportion of this expenditure, or upwards of 35,000,000, has been sanctioned for the purpose of sanitary improvements in Urban districts, to be executed under the provisions of the Sanitary Acts, the Public Health Act 1875, and local Acts and Provisional Orders. During the year covered by the Report, the Board directed local inquiries to be held by its Engineering Inspectors in 552 cases. After several pages, summarising a great deal of the administrative work of the Board in

this connexion, we come upon the following paragraph:—

"Section 156 of the Public Health Act, 1875, provided that it should not be lawful in any Urban District, without the written consent of the Urban Authority, to bring forward any house or building forming part of any street, or any part thereof, beyond the front wall of the house or building on either side thereof. In the case of Williams, App., v. The Waterworks Local Board, Rees, 16 Q.B.D. 718, it was held by the Queen's Bench Division that this section did not apply to new buildings in course of erection upon land never before built upon. In consequence of this decision, an Act called the Public Health (Buildings in Streets) Act, 1888 (51 & 52 Vict., c. 52), was passed during the last session, by which Section 156 of the Act of 1875 was repealed, and its provisions were in substance re-enacted in such a form as to render them applicable not only to the bringing forward but also to the erection of any building in a street."

After giving further details of administrative work, this section of the Report touches on the metropolitan water supply, to which we are informed, on the authority of reports by the Examiner under the Metropolitan Water Act, 1871 (Major-General A. de C. Scott, R.E.), and the Analyst (Professor Frankland, F.R.S.), that the high standard of purity attained in recent years was generally maintained in the year under review. General Scott, in his Annual Report (which forms one of the appendices to the Local Government Board's Report), not only gives full particulars of the present supply, but some forecast of the future requirements of the metropolis. The average daily supply per head of the population during the year for domestic purposes was (according to the Report) nearly twenty-four gallons, a quantity which is, the Board remark, without doubt largely in excess of actual use, and suggesting that, "as is, in fact, the case," the waste must be very great. The average annual increase of population in the districts of the eight water companies is 149,146, nearly a quarter of this increase being in the district of the East London Company. General Scott pointed out in his last Annual Report† that the water supply of the north and east of London was entering into a critical stage, and he now calls attention to the fact that practically the whole of the volume of the River Lea is absorbed by the New River and East London companies for the supply of their districts; that, in addition, they derive about 15,000,000 gallons daily from wells, and the East London Company not more than 10,000,000 gallons from the Thames. Under these circumstances, to which we last year directed the attention of our readers, it is not difficult to see that, as the Report of the Local Government Board points out,—

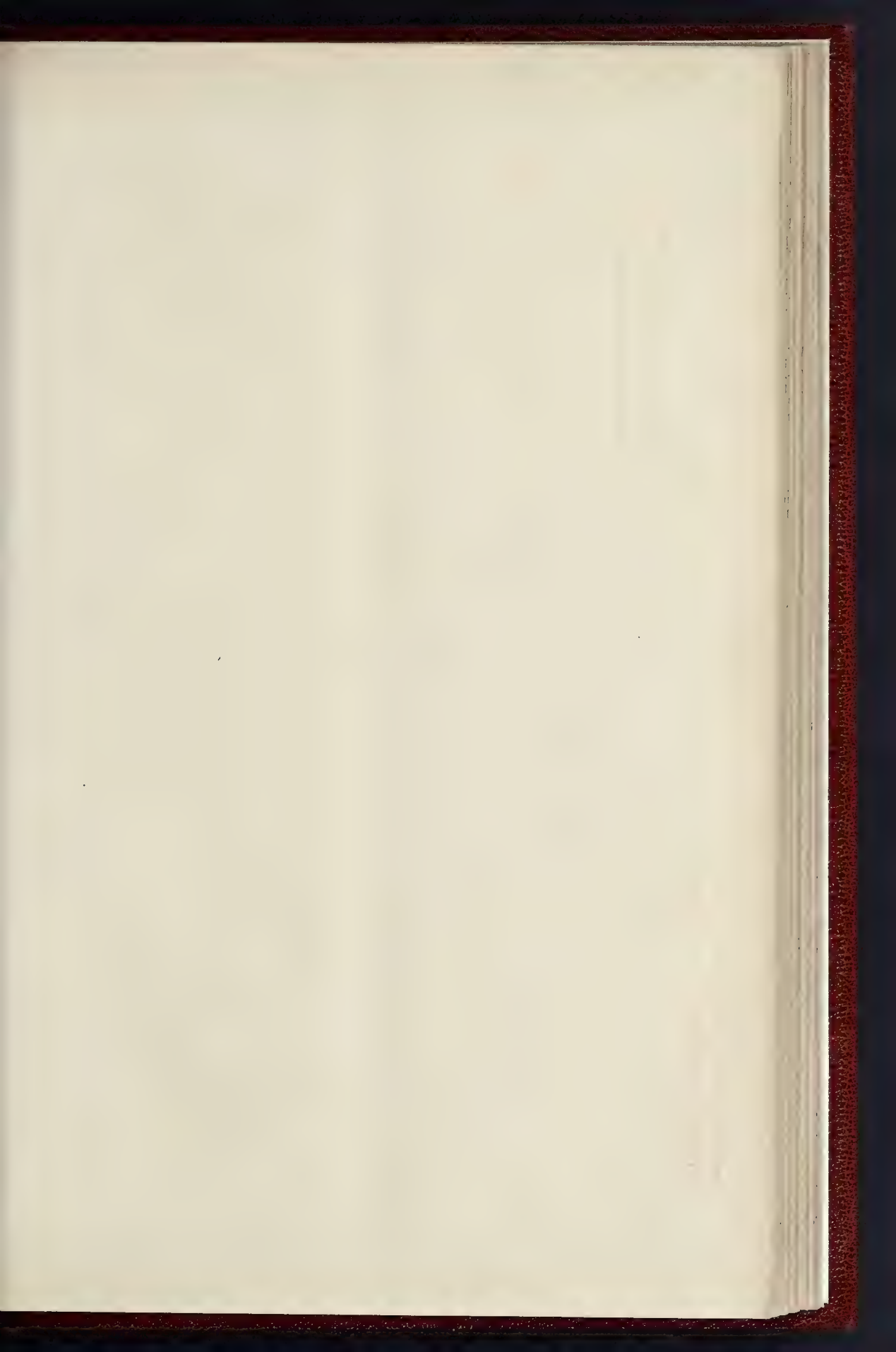
"When the needs of North and East London have to be met a few years hence, the large additional strain will fall on the supply derivable from wells, unless the Thames be still further drawn upon, or unless resort can be had to sources outside the Thames and Lea valleys; and it necessarily becomes a more important question of year by year, whether the wells will long continue to be equal to the growing demands upon them. As General Scott indicates, it must not be forgotten that to abstract underground water by means of wells tends to impoverish the river that is fed from water-bearing strata, and, consequently, as the existing underground supplies are more and more drawn upon, the question of finding new gathering grounds becomes more urgent. General Scott calculates that within the next five years the New River and East London Companies may have to double their present daily supply from wells in order to meet the maximum demand that may be made upon them. The feasibility of finding a sufficient supply from this source is in course of being ascertained, as regards the populous district of the East London Company, by the construction, on a considerable scale, of new works designed to tap the water-bearing strata to which the company have the right of access in the Lea Valley, and it is to be hoped that the result of these works will be to make it clear whether there is a prospect of obtaining water in this locality when the actual need arises. It would seem that there is no necessity to anticipate within an equally short period a similar difficulty as regards those districts in the east of the metropolis which are supplied from the Thames, but, sooner or later, the problem of the whole water supply arising from the Thames basin must evidently come prominently forward. At the date, four years hence, to which General Scott's forecast relates, the minimum discharge of the Thames, even in a dry season, may be expected to afford the means of satisfying the greatest possible requirements of the water companies without unduly

\* London: Eyre & Spottiswoode; Edinburgh: A. & C. Black; Dublin: Hodges, Figgis, & Co.

† See *Builder* for Dec. 1, 1888, p. 394.

‡ Described in the *Builder* for July 13 last, p. 30.



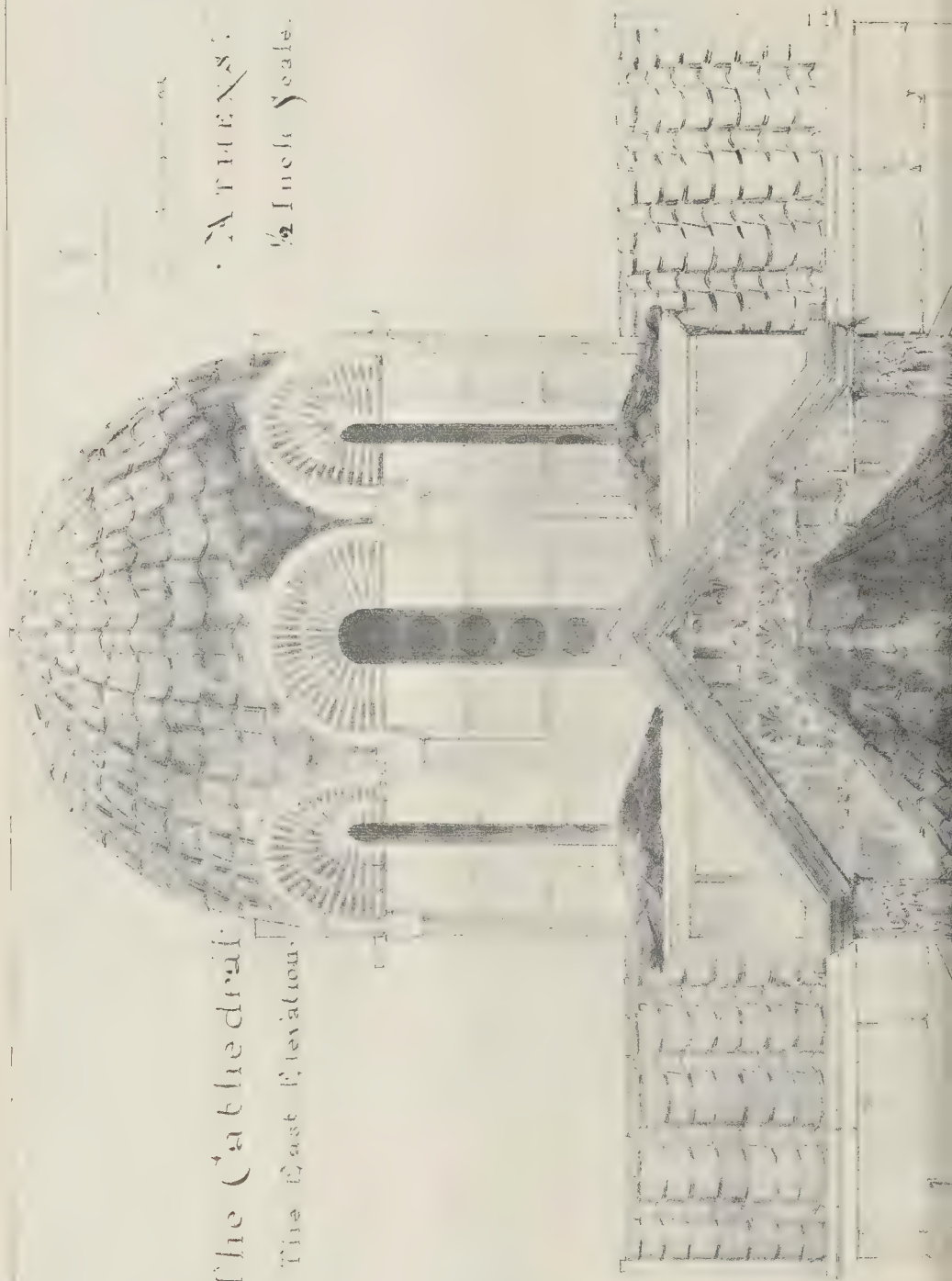


# The Cathedral

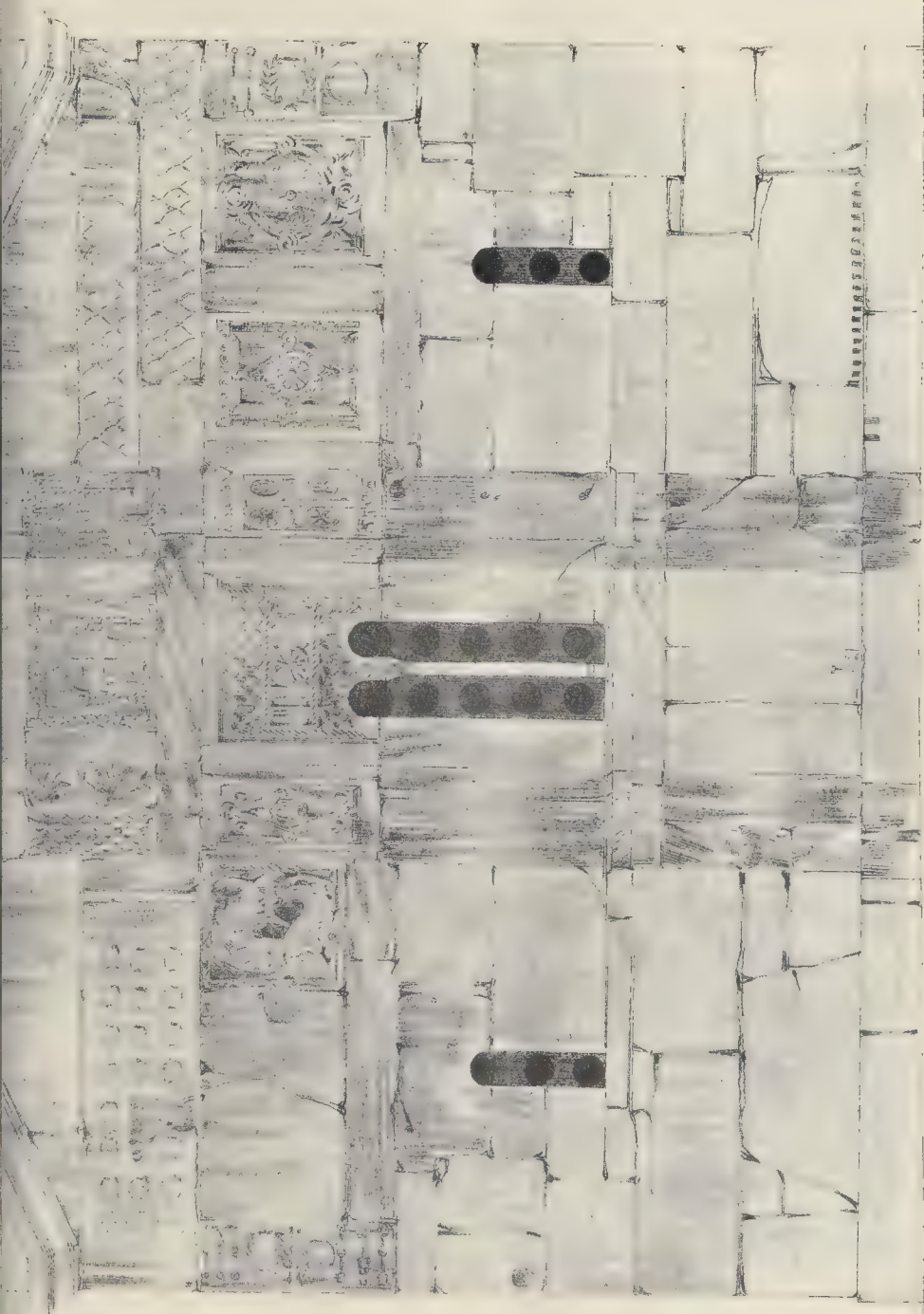
The East Elevation.

Architects.

1/2 Inch Scale.







Architectural Drawing of a Building

Architectural Drawing of a Building





weaving the river; but at the same time the total supply of the metropolis will then approach four-fifths of the amount which, according to the estimate of the Royal Commission of 1867, could reasonably be expected from the entire basin of the hamos."

As we have pointed out on a former occasion, this is a somewhat alarming prospect, and we trust that the London County Council is not being sight of the matter, which involves a problem the timely and adequate solution of which is of the utmost importance. Meanwhile, it is satisfactory to find that the number of houses receiving a constant supply is continually on the increase, for the intermittent system is attended by sanitary dangers from which the constant system is free. As to the question of waste, the East London Company and that the effect of inspection in the suppression of waste, detected by a Deacon's meter, is very transient, and that such waste is renewed to its full extent within a few weeks. On the other hand, it was ascertained by the Southwark and Vauxhall Company that, although the provision of a constant supply was followed by a temporary increase in the consumption of water, in a short time a permanent diminution took place. This was proved as regards their district by a series of carefully-conducted observations continued for a considerable period, and it seems to show that, with due attention to fittings and proper arrangements for supervision, the extension of constant supply is not open to serious objection on the ground that it favours waste. General Scott sums up in favour of the constant system, under proper conditions.

With regard to the question of the purity of the water, we may quote one paragraph from the Report:—

"Dr. Percy Frankland, who has for some time been so good as to furnish us with periodical reports of his interesting experiments in bacteriology in connection with the London water-supply, has now left London, and consequently his investigations into this subject will cease. They consisted of the development in a peptone-peptone medium of the micro-organisms found in samples of water taken before and after filtration, and a calculation of the comparative amount of such organisms in the two samples. The results indicate the effect of filtration in ridding the water of certain forms of organic life; but it is impossible to be confident that all the organisms which constitute dangerous pollutions of water can be cultivated in the manner employed, or can be eliminated by ordinary methods of filtration. General Scott refers to the desirability of such modes of inquiry being continued and amplified. He points out that, even if the process as hitherto conducted cannot be trusted to give the material for valid inference as to the whole of the organisms present in water, it is desirable in the interests both of the consumers and the companies that the inquiry should be modified and extended in the hope of reaching a trustworthy test of purity. For such a test the power actually to measure the number and characterise the forms of life in water would be invaluable if it could be gained."

The fourth and concluding section of the Report deals with the subject of "Local Taxation and Valuation." From this part of the Report we learn that the outstanding loans of the 28,359 local authorities which come in some way or other under the control of the Local Government Board amounted, at the end of the year dealt with by the Report, to no less a sum than 186,821,642. Of this grand total, 32,427,279 have been expended on water-works; 29,901,617 on harbours, docks, and piers; 29,021,594 on highways, street improvements, and turnpike roads; 18,389,376 on sewerage and sewerage disposal; 16,812,398 on schools; and 14,699,015 for Poor-Law purposes. These amounts, of course, extend over a series of years, and are supplemental to the amounts raised by rates and directly appropriated to these and kindred purposes.

In conclusion, we may mention that the Report of 186 pages is supplemented by 554 pages of appendices in the shape of reports and returns, many of them of great interest to the sanitarian, and all of them important to local administrators and the public.

**Sidcup Cottage Hospital.**—We are informed that sixty-eight designs were received in competition for the Sidcup Cottage Hospital. A member of the Institute was called in to assist the committee in selecting the most suitable design. After several meetings, the drawings submitted by Mr. Sidney G. Goss, A.R.I.B.A., were selected. Mr. Goss has been instructed to prepare working drawings and to obtain tenders for the work forthwith.

#### THE LONDON COUNTY COUNCIL.

The ordinary weekly meeting of the London County Council was held in the Council Chamber, Guildhall, on Tuesday afternoon last, Lord Rosebery presiding.

**The Late Engineer.**—The Standing Committee reported as follows:—"In accordance with the resolution of the Council on the 12th instant, your Committee have considered the question whether it is possible for the Council to make any provision for the widow or family of Mr. Gordon, the late Chief Engineer. We are advised that the late Metropolitan Board of Works had no power to make any grant of money to the widows or families of officials who died in its service, and that the Council has no more power than the Board had in this respect. This being the case, your Committee can only report that the Council has no power to make any provision for the widow or family of the late Chief Engineer." This was agreed to without discussion.

**Checks on "Jerry" Building.**—The first paragraph of the Building Act Committee's Report was as follows:—"Your Committee have proceeded upon the reference by the Council of the 12th instant that the Committee be asked to report (1) whether, in their opinion, the statutory provisions and the existing by-laws, as to the solidly putting together of the walls of new houses with mortar or cement, and as to the description and quality of the substances of which walls are authorised to be constructed, are carefully and fully carried out, under the supervision of the District Surveyors, by builders in all parts of the metropolis; (2) whether any fresh by-laws or instructions to the District Surveyors are necessary with a view of checking what is known as 'Jerry building.' Your Committee had already referred to a Sub-Committee the questions which are the subject of this reference, and they have also made representations to the Parliamentary Committee with a view to the amendment of the existing law in certain respects." This was received without discussion.

**Charing Cross-road and the Site of the National Portrait Gallery.**—The Corporate Property, Charities, and Endowments Committee submitted a report on the subject of the vacant land in Charing Cross-road opposite the site of the proposed National Portrait Gallery. The report referred to former proceedings of the Council on August 2 last, with reference to the matter, and proceeded to say that some oral communications passed in October between the Chairman and the Office of Works, resulting in the conclusion that each party was to act on the footing of the negotiations being at an end. The Report then went on as follows:—

"2. On the 1st instant the Council referred to this Committee and to the Improvements Committee to consider and report on the advisability of widening the approach to Leicester-square from Shaftesbury-avenue, by way of Green-street; widening the entrance to Charing Cross-road from St. Martin's-place; closing Hemming's-row, and adding the ground thus gained to the open space to the north of Hemming's-row."

3. The Improvements Committee desire to take a strip of the vacant plot, about 900 square feet, for the purpose of widening Charing Cross-road, but this Committee have not seen their way to recommend the Council to depart from the conclusion expressed first on May 14, and again on August 2.

4. On the 1st instant the Vestry of St. Martin's addressed us with the view of making an arrangement by which the Council should acquire much of Hemming's-row as abuts on the south side of the vacant plot, and should throw the strip of about 900 square feet into Charing Cross-road, and should do its best to help the Vestry to acquire a strip of Crown land abutting on St. Martin's-place. This proposal appeared to us to be beneficial, if the Vestry could make a title to Hemming's-row, and on the 5th instant we returned them an answer to that effect. But, before any further step was taken, we sent to the Vestry information which effectually suspends their negotiations with us.

5. The information was that the Office of Works had made a fresh overture to us. On the 7th instant the First Commissioner wrote to the Chairman of the Council saying that if the Council will agree to accept 7,000*l.* for the land the Lords of the Treasury will submit a vote for that amount to Parliament. That offer entirely alters our position.

6. The view which has prevailed in our Committee may be thus stated. We are not actually bound by anything that has passed between us and the Office of Works, because negotiations never were finally concluded, and indeed were broken off some time in October. But we can hardly doubt that if the Treasury had been prepared to pay 7,000*l.* in August, the Council would have sold the plot to the Crown. They have, in fact, made the offer very soon afterwards, and before anything has occurred to alter the position of affairs, except the proposals of the Vestry, which are necessarily dependent on conditions that may never be performed. We, therefore, think it would be a becoming course for the Council to treat the matter as it would have treated it in August last.

7. Moreover, we think that the arrangement is beneficial to the London public. We should be glad to see the plot pass to the Crown, in whose hands it will be kept as an open space. The price of 7,000*l.* was the estimate of value made by our Architect about eighteen months ago, and given to us in June last, for the purpose of negotiation with the Office of Works. By selling to the Crown at 7,000*l.*, the Council will forego the chance of getting more at a auction, and our Architect advises that the progress of building in that quarter makes it probable that more can be obtained. But if the land is sold at extreme auction price, it must be used for such purposes as a builder can turn it to. And it seems to us more beneficial to the public to secure a more agreeable treatment of the plot, while obtaining the price which a few months ago we considered a fair one.

8. The Improvements Committee have proposed that a deputation, consisting of members of that Committee and of ours, should wait upon the First Commissioner of Works, with the object of submitting to him a plan to the following effect: That the above-mentioned strip of 900 feet shall be thrown into Charing Cross-road; that the Crown shall buy the remaining portion; that it shall have the prospect of acquiring the above-mentioned portion of Hemming's-row; and that it shall give up about 1,560 square feet of Crown land at the north-east of the National Gallery, to widen Charing Cross-road.

9. We agree that such an arrangement would be a good one, but we are reluctant to propose it to the Crown at the present juncture. We have no reason to believe that the Crown will part with any of the land attached to the National Gallery. We have no power to settle the destination of Hemming's-row. We hesitate to open the question of price, which was the difficulty in August last, and on which the Crown has now made a concession to us. We are afraid that if we do so, and if we also import into negotiations new terms, part onerous to the Crown, and part depending on the action of other authorities, we may lose altogether the advantageous position we have now got. We prefer the simple course of closing on the bargain which we originally contemplated, now that it is in our power, to an alteration of our plans for the purpose of obtaining a better bargain, which is not in our power now, and which may prove illusory.

10. For these reasons we have respectfully declined to take part in the proposed deputation. And, owing to this difference of opinion, it will be necessary for the Council to consider the matter, and to make an order on it. If it should think that the views of the Improvements Committee are to be preferred, we would suggest that the business will be facilitated by placing the matter wholly in the hands of that Committee. We now put the question into formal shape for decision by recommending:—

(a) That the land be transferred to the Crown for the sum of 7,000*l.*, under conditions prohibiting building except with the consent of the Council.

(b) That this Committee be authorised to take all proper steps to carry the sale into effect."

The Finance Committee raise no objection to the proposed transfer."

The consideration of this report was, by consent, postponed. The Report of the Improvements Committee on the same subject was as follows:—

"On 31st May last the Council passed the following resolution:—

"That it be referred to the Improvements Committee to consider and report on the advisability of widening the approach to Leicester-square from Shaftesbury-avenue, by way of Green-street; widening the entrance to Charing Cross-road from St. Martin's-place; closing Hemming's-row, and adding the ground thus gained to the open space to the north of Hemming's-row."



In proceeding upon this reference, your Committee instructed the Architect to confer with the Architect of H.M. Office of Works, in order to ascertain whether the Government would be prepared to assent to the proposed widening, and upon what terms they would give up the required land; but on August 2 last, and before the Architect had had time to carry out these instructions, the Council authorised the Corporate Property Committee to deal with the plot of ground which lies to the north-east of the National Gallery, and a portion of which would be required for the improvement specified in the reference. On October 1 last your Committee, reporting upon the question of the improvement, expressed the opinion that it was a desirable one, and upon their recommendation the matter was referred to the Corporate Property Committee and to your Committee for consideration and report. The subject has accordingly engaged the attention of your Committee, and they have placed themselves in communication with the Corporate Property Committee. They have communicated to that Committee the suggestions which appeared to them best calculated to secure the desired object, and which are shown upon the plan submitted herewith. But your Committee are informed that the Corporate Property Committee have decided to recommend the Council to give its sanction to the sale to the Government, for the sum of 7,000*l.*, of the whole of the plot of land. Your Committee, however, are still of opinion that the improvement would be very desirable, and as their proposition is a very favourable one for the Government, they are of opinion that the actual sum to be paid by the Office of Works would be scarcely, if at all, less than that which they now offer, because since the proposition was made to the Government by the Corporate Property Committee, your Committee have suggested the absorption of a portion of Hemming's-row, which greatly enhances the value of the vacant land. Your Committee think it right to add also that the Valuer supports the opinion of your Committee as to the value of the plot. Your Committee have therefore to recommend,—

"That the Architect be instructed to confer with the Architect of H.M. Office of Works in order to ascertain whether they would be prepared to purchase, and if so upon what terms, the vacant plot of land at the southern end of Charing Cross-road, diminished by the small strip containing about 800 square feet, which it is proposed to throw into the public way, but with the prospect of their obtaining possession of the portion of Hemming's-row which it is intended to close, and subject to the Government giving up a strip of their land (about 1,550 square feet) situate at the north-east of the National Gallery, which strip it is proposed to throw into Charing Cross-road; and that the Architect be instructed to report the result of his negotiations to the Corporate Property Committee and the Improvements Committee."

This report and recommendation, it was understood, would be considered *pari passu* with that of the Corporate Property Committee at the next meeting of the Council.

**Disposal of the Surplus Lands of the Council.**—The Corporate Property, Charities, and Endowments Committee brought up an important report, signed by their Chairman, Lord Hobhouse, on the question of the manner of dealing with land which came into the possession of the London County Council, as surplus land after the execution of street improvements. After discussing the question in its varied aspects, the Committee concluded by making the following recommendations:—

"I. That the Council should instruct the Committee to sell the land of the Council in preference to leasing it for ninety-nine years, in cases where there does not exist any special reason for leasing it.

"II. That the Council should acquire power to keep superfluous land as open space whenever expedient.

"III. That the Council should acquire power to apply to the purposes of Artisans' Dwellings land acquired under Improvement Acts.

"IV. That the Council should acquire power to sell land, or demise it for any term of years for a fixed rent."

The consideration of the report was postponed for a fortnight.

**Improvements in the City.**—The Improvements Committee recommended,—

"(a) That all outstanding applications of the City Commissioners of Sewers for contributions be disposed of by the Council declining to contribute unless exceptional circumstances can be shown for any particular improvement having been carried out without the specific consent of the L.C.C. Board, in which circumstance the improvement shall be considered on its merits.

"(b) That all future contributions towards the cost of improvements in the City of London be upon the same footing, and be made in the same manner as contributions to improvements in other parts of the county.

"(c) That a letter be addressed to the City Commissioners of Sewers accordingly."

This gave rise to a long discussion. Councillors representing the City, directly or in-

directly, spoke in favour of an amendment to refer the matter back for further consideration, but this proposal was strongly combated by many of the Councillors representing London outside the City, mainly on the ground that the City had obtained an extension of the Coal-tax, to which the whole of the County Council area would have to contribute. Ultimately the amendment was lost by sixty-six against to twenty-two for. One or two further amendments having been defeated, the report was agreed to.

**Waterlow Park, Highgate.**—The Parks and Open Spaces Committee reported, with reference to the new park at Highgate, which has been presented by Sir Sydney Waterlow, that they had made arrangements for the execution of the deed of transfer of the property on Dec. 16. In the meantime, they were considering what steps should be taken with regard to the ground. Their idea was to preserve as much as possible the present features of the property, and particularly all points of historical interest, of which there were many in connexion with the Landerdale House section of the property. The Committee reserved their full report until they had made further inquiries on the ground, and the only recommendation they had at present to make was, "That the park be called 'Waterlow Park.'" This was unanimously agreed to.

**North Woolwich Gardens.**—On the recommendation of the same Committee it was also agreed,—

"That it be referred to the Parliamentary Committee to consider and report what arrangements could be made for obtaining Parliamentary powers, either in the present or some future Bill promoted by the Council, for acquiring and maintaining North Woolwich Gardens as a public recreation ground."

**The Charges against Messrs. Brass & Sons.**—On the motion of Mr. Torrance, it was resolved, after considerable discussion:—

"That, having regard to the grave and serious accusations made at the meeting of the Council on Oct. 22 last, affecting the position and standing of Messrs. Brass & Sons, and they having urged that they should be heard in defence, it is resolved that the matter be referred to a special committee to investigate and report."

Mr. Torrance said that Messrs. Brass had a complete answer to make to Mr. Burns's charges, and they sought inquiry. He regretted very much to say, however, that the senior partner of the firm had been for the last five weeks ill with typhoid fever, and it was still doubtful whether he would recover. Of course, he knew nothing of the charges yet. Asked to nominate his committee, Mr. Torrance begged to be allowed to postpone that duty to the next meeting, and this was agreed to.

**Essex-street, Strand.**—On the motion of Mr. Alderman Taylor it was resolved,—

"That it be referred to the Improvements Committee to put themselves in communication with the School Board for London, and to ascertain how far it may be desirable to secure some portion of the land lately in the occupation of Messrs. Woodfall & Kinder, on a portion of which the School Board for London are preparing to erect extended offices, for the purpose of widening the river approach to Essex-street, Strand."

After discussing some further business, the Council adjourned.

## Illustrations.

### ST. PAUL'S CHURCH, KENSINGTON.

**T**HE new church of St. Paul, Kensington, takes the place of the iron church erected by the Ven. Archdeacon Sinclair in his vicarage garden about thirty years ago.

The arrangement of the plan provides for the grouping of the larger proportion of the congregation around the pulpit, by which the number of those who are unable to see the preacher is reduced to 6 per cent, the number who are shut off in the ordinary type of nave and aisled church being about 17 per cent.

Special provision is made for ventilation,—fresh air, warmed in winter, being admitted through inlets in the wall, and the foul air drawn through tanks over the ceilings by a gas-fan on the flèche.

The church is built almost entirely of red brick, the only stone used being in the caps and bases of the pillars and the gables of the buttresses.

Accommodation is provided for 1,000 worshippers, at a cost of 10,600*l.*, including heating, lighting, draining, ventilation, fences,

\* See *Builder* for Oct. 26, p. 294, and for Nov. 9, p. 335.

chairs, architect's commission, and clerk of works' salary. The superficial area of the church is 10,700 ft., and its cubical contents 431,000 ft.

The design, by Mr. Arthur Baker, F.R.I.B.A., was selected in a limited competition. The contract was executed by Messrs. Howell & Sons. The wrought-ironwork was carried out by Messrs. Newman & Co.; and the pulpit and font were executed by Mr. Bridgeman, of Lichfield. The altar-table, the gift of Mr. J. France, was made by Messrs. Farmer & Brindley; the gas-fittings by Messrs. Potter & Sons; and the vestry stoves by Mr. Shorland.

### ATHENS CATHEDRAL.

THIS drawing of the façade of the Byzantine Cathedral at Athens is published in connexion with the first article in this number, on Byzantine architecture in Greece, to which it forms one of the illustrations.

### COMPETITION DESIGN FOR NEW SCHOOLS, COVENTRY.

UNDER a scheme for the amalgamation of three of the Boys' Charities in Coventry, competitive plans for new school buildings were advertised for which should provide the following accommodation:—Chemical laboratory for fifty, two workshops, eight class-rooms, large hall to seat 400, dining-room to seat 100, boarding-house for forty boarders, rooms for matron and assistants, masters, &c., also a head-master's house.

As the boarders would be required to do house duty, their workshop is provided in close proximity to the kitchens, and the culinary offices, with the matron's room, are detached, though easy of access from the dining-hall. The dining-hall is placed against the assembly hall, so that they may be thrown together if required, and advantage is taken of their position for arranging the dormitory over them in the roof, the floor being at the tie-beam level. The aspects of the different departments are carefully studied.

The design was submitted by Mr. C. E. Bateman, of Birmingham, and Mr. H. R. Appelbee, of London, and was favourably reported upon to the Building Committee by the Assessor. It is to be regretted that the Committee have not adopted Mr. John O. Scott's award, and placed the commission for carrying out the work with Mr. Reginald T. Blomfield, whose design received the first premium.

C. E. B. AND H. R. A.

### CROSBY CONGREGATIONAL CHURCH AND SCHOOLS.

THE northern portion of this building, consisting of the meeting-hall and schoolroom, with class-rooms, vestries, infants' schools, kitchen, &c., was erected in 1884, upon a fine site at the corner of Mersey and Eske-roads, at Crosby, near Liverpool.

The meeting-hall is used as a church until the remaining portion of the building is completed, and a large congregation has already been gathered there.

Accommodation will be provided in the church for about 750 on the ground floor and in end gallery.

The great width given to the church by the double-nave arrangement adopted will enable the whole of the congregation to come within a comparatively short radius of the preacher.

The plan shows the general arrangement of church, vestries, school and class rooms, which are carefully adapted to the requirements of the Congregational form of worship and for Sunday-school purposes.

The external walls are of local red stone, and the roofs of slates in coloured bands, except that of tower, which will be of copper or ship's metal. Hot-water pipes are used for heating, and special attention is given to the ventilation of the church and schools.

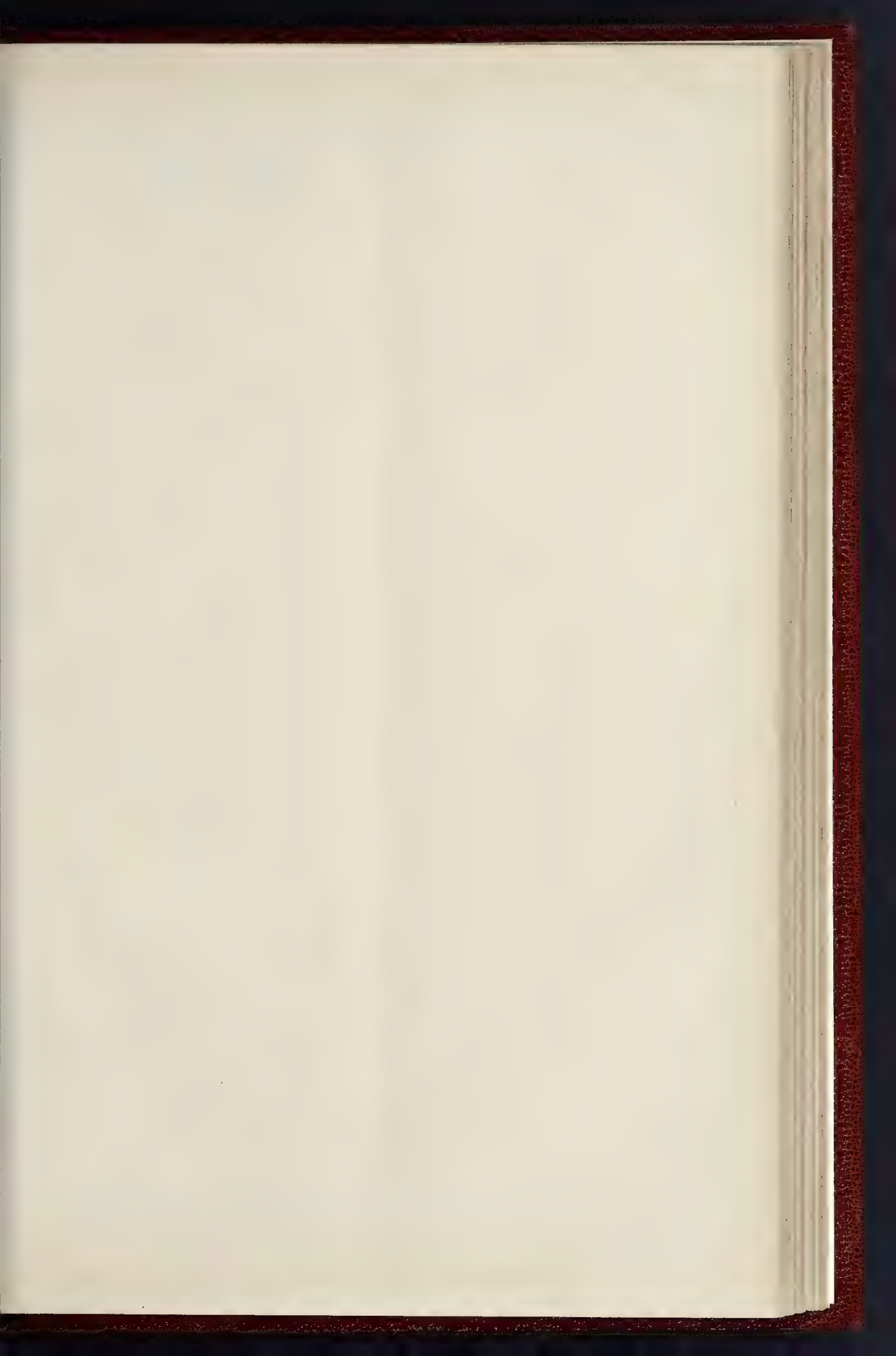
The architects for the building are Messrs. F. & G. Holmes, of Liverpool, whose plans were selected in a limited competition; and the schools were erected by Mr. Thomas Urmon, of Sobro-street, Liverpool.

### PLANS AND SECTION OF EXETER THEATRE.

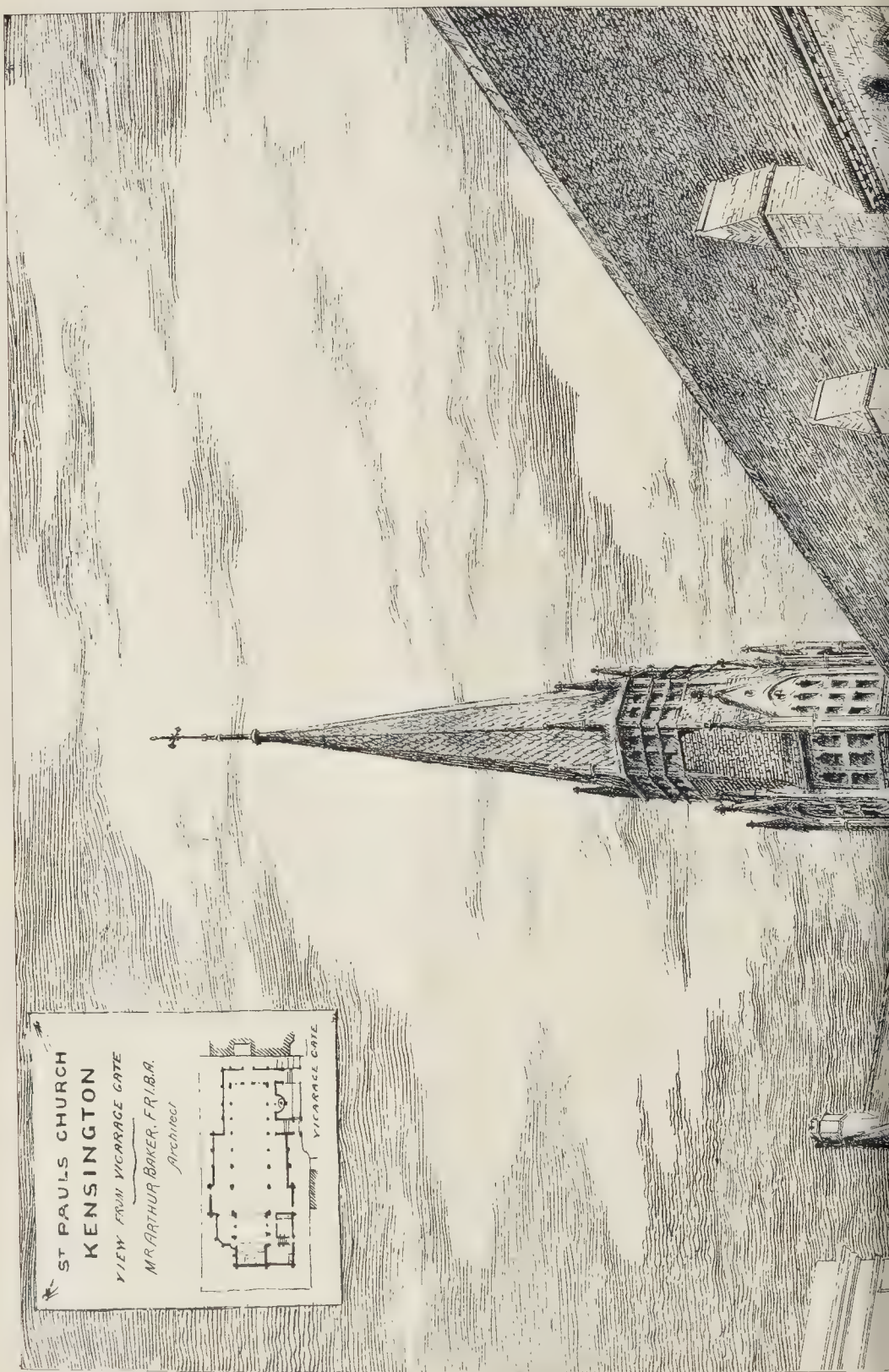
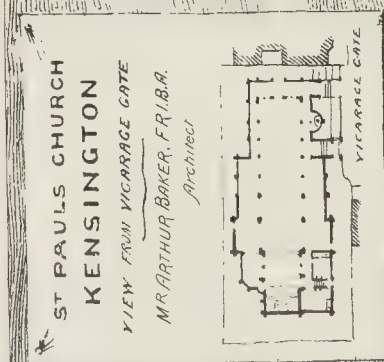
THESE illustrations show the manner in which the Exeter Theatre has been rebuilt internally since the terrible calamity of the fire; the old *façade* being retained, but modified.

The system is a working out by the architects,

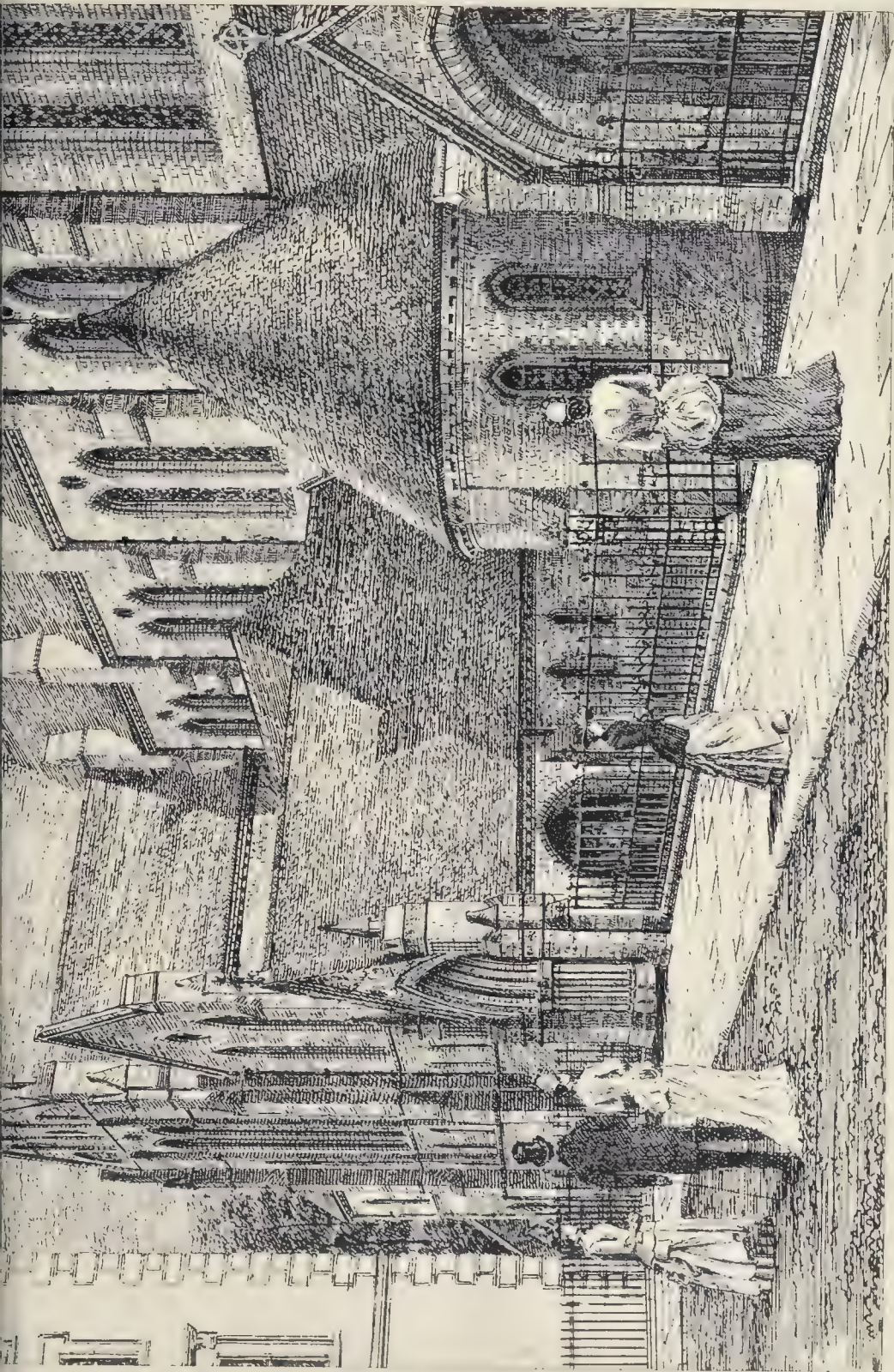




THE BUILDER, NOVEMBER 30, 1889

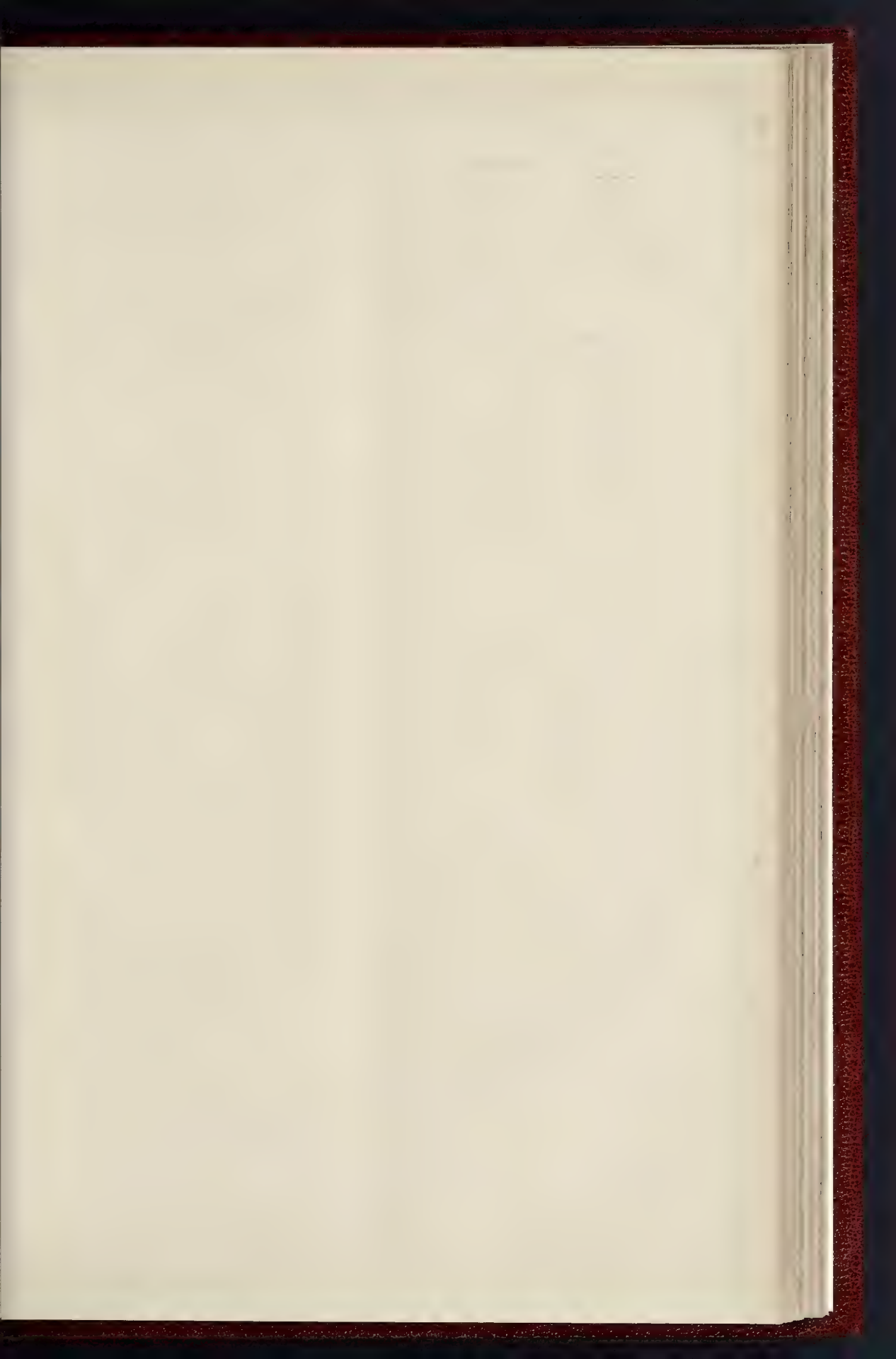






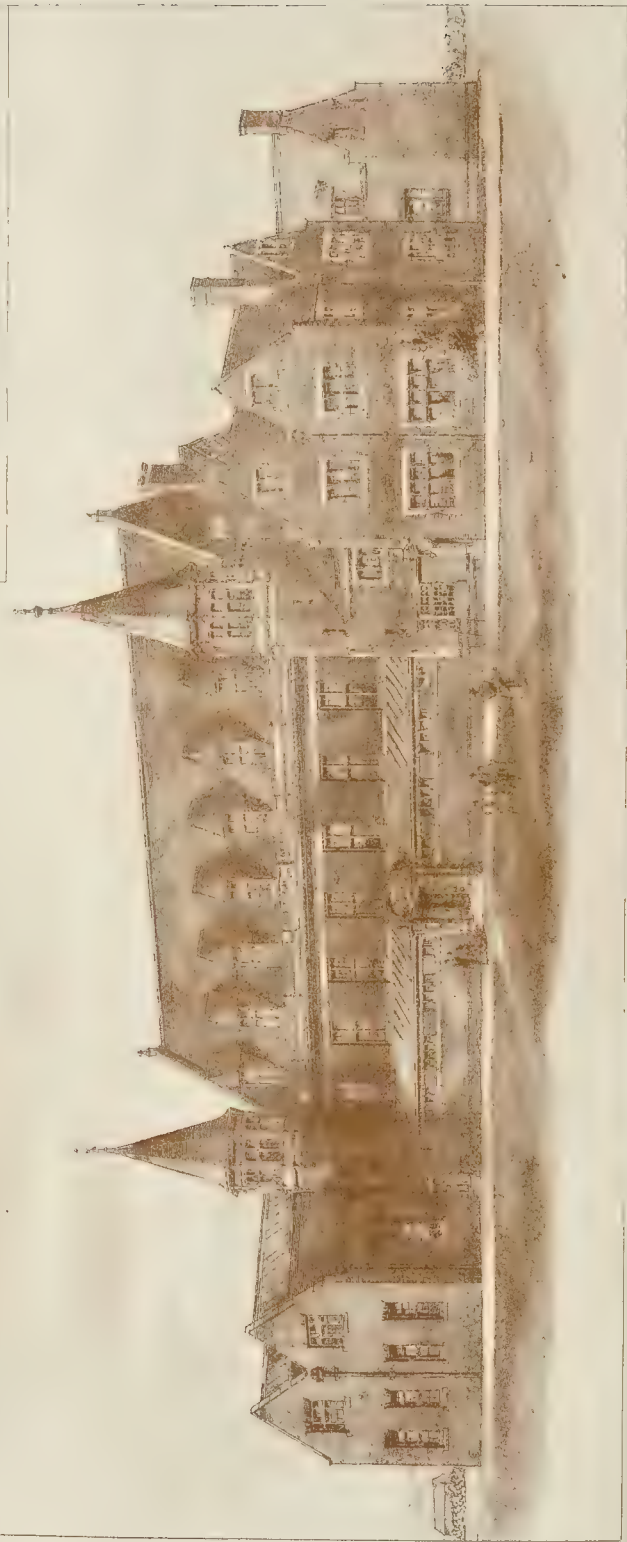
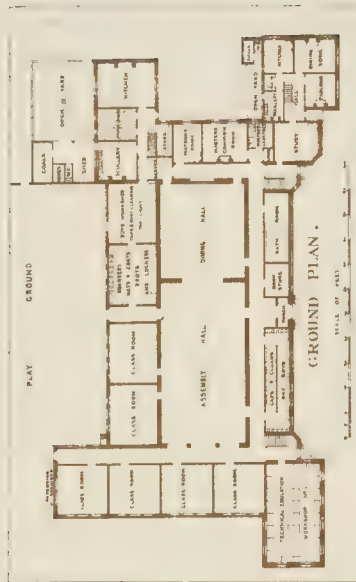






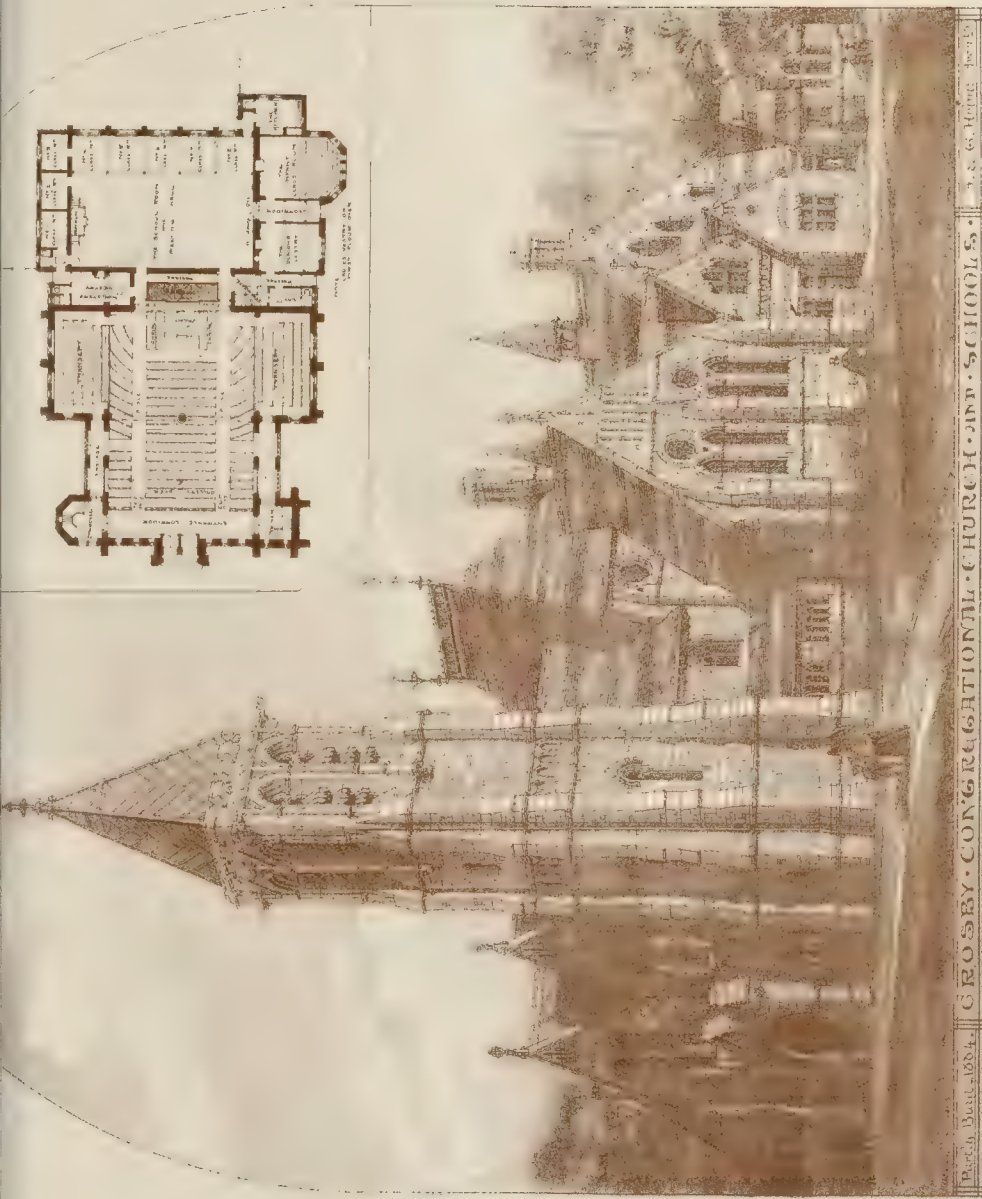
NEW BABLAKE SCHOOL,  
MULNUM CONVENTRY.  
1860.

THE BUILDER, NOVEMBER 30, 1889



COMPETITION DESIGN FOR BABLAKE SCHOOLS, COVENTRY.—MR. C. E. BATEMAN AND MR. H. R. APPELBEER, ARCHITECTS.

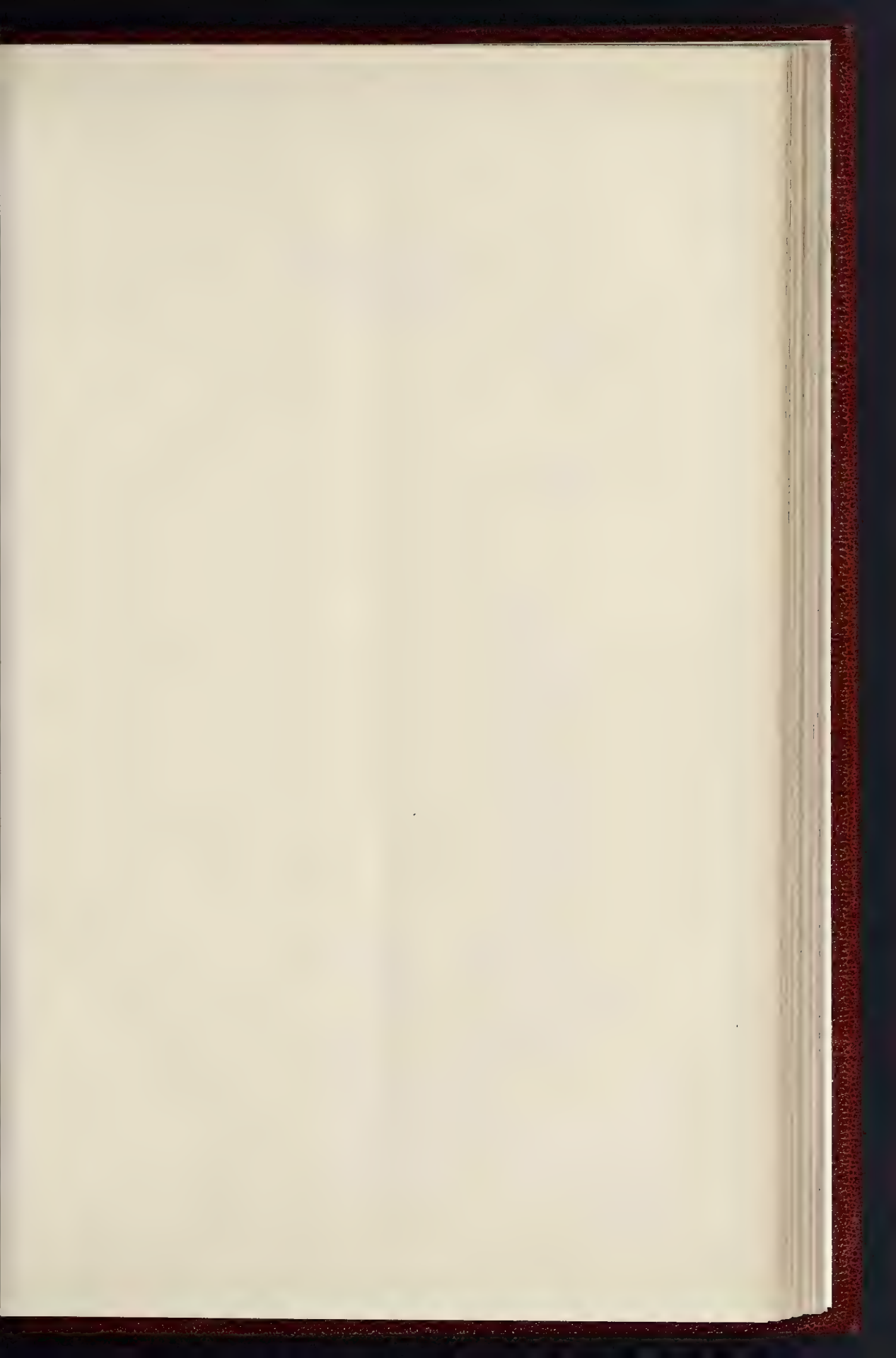




Geosby Congregational Church and Schools. J. S. G. H. 1884. P. 10. B. 10. 1884.

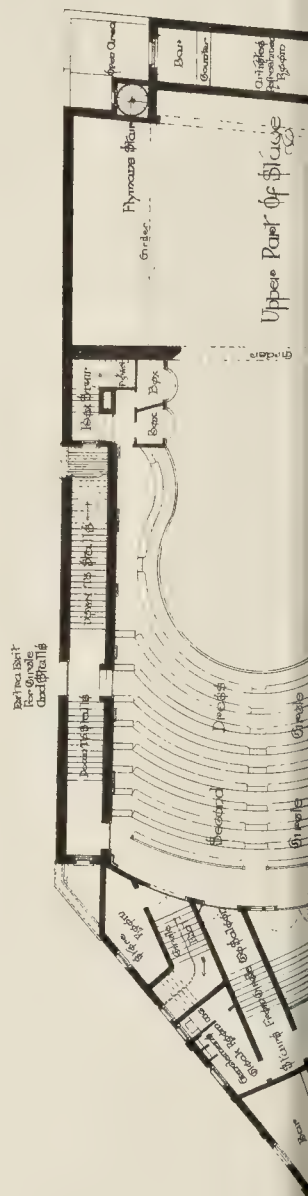






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LONGITUDINAL SECTION ON LINE DD











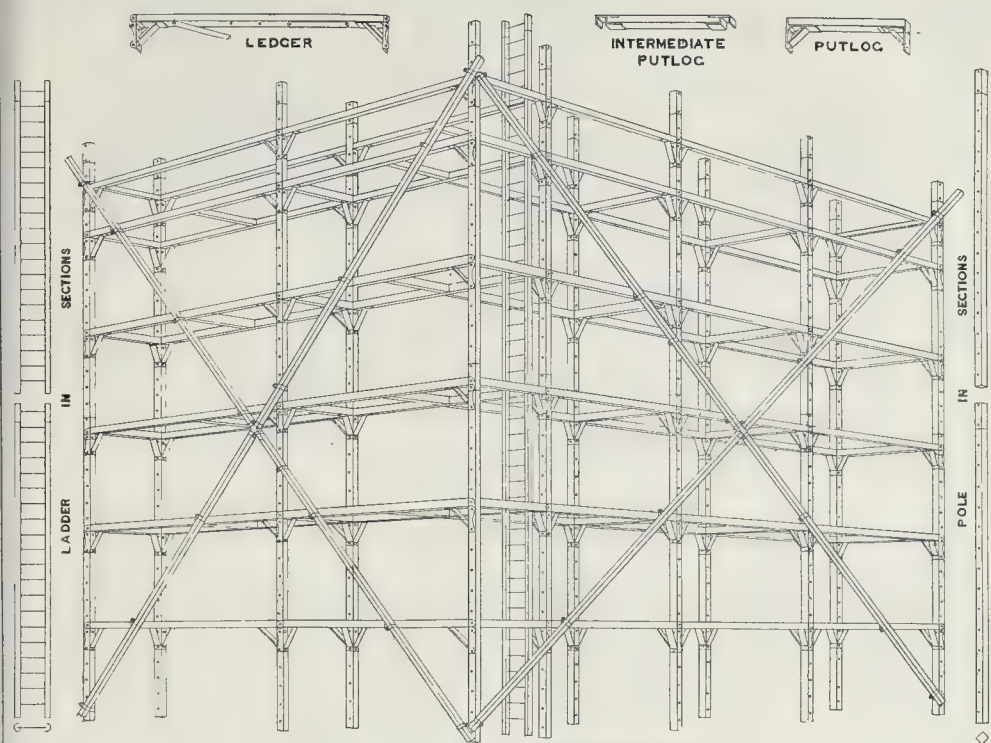


Diagram of Mr. G. Beck's Method of Constructing Scaffolding.

Messrs. Darbyshire & Smith, of the idea for a model theatre propounded by Mr. Henry Irving, and as the only instance so far in which this idea of theatre-planning has been carried out, considerable interest attaches to it.

It is much easier to erect a new building than to alter and adapt the ruins of an old fabric to the requirements of a new order of things, and the architects of the new theatre have had a task before them which has caused an infinite amount of trouble to all concerned, and no little anxiety to all interested. The result of this bold experiment in theatre planning and construction is now apparent, and the public have now an opportunity of expressing an opinion on so important an event in theatrical history.

It will be well to state briefly some of the main principles upon which the "Irving Safety Theatre" is constructed. First: The complete isolation of the edifice from surrounding property is a *sine qua non*; this is achieved at the new theatre. Secondly: The different divisions of the theatre—namely, the stage, auditorium, and artists' section—are separated from each other, and can be isolated at a moment's notice. Thirdly: Every portion of the house is provided with an exit and entrance, which, in case of panic, constitutes two exits communicating direct with the streets, and shut off from any other portion of the theatre. The grand principle of the scheme is the bringing down of the audience (so to speak) to within a few feet of the ground. The highest point which can be reached by the audience at Exeter is only about 8 ft. from the ground. This is arrived at by sinking the pit below ground and increasing the size of the auditorium so as to accommodate the old gallery people on the same level as the pit; this arrangement, it will be seen, necessitates only one grand circle, on which are located both the dress circle and upper circle audience.

It is claimed by the architects that in realising this new order of things at Exeter, there is not a point in the theatre from which the stage cannot be well seen and from which the actors' voices cannot be comfortably and easily heard.

The construction of the theatre is on the noncombustible system which has been adopted in several recent theatres. As in these, the

proscenium wall has no opening in it but the stage opening, and this is closed in ten seconds by the fireproof curtain which passes through the stage, and closes on the solid brick wall underneath. Should it be impossible to quench a fire on the stage, all smoke and heat will ascend to the huge funnel in the roof, which is constructed of concrete, with glass louvres and roof; these would be instantly broken with the heat, and the fly-men would escape by their outside staircases; the door to the artists' department would close out the stage, and the occupants of this part of the theatre have two escape staircases direct into the street. Every staircase is fireproof, with treads 12 in. wide, and risers 6½ in. in height, and all passages or lobbies where the human foot has to be planted when escaping are absolutely unburnable. The pit-floor and the grand circus are of titancrete, and are directly connected with the exit stairs, which are of concrete.

Externally, the original character of the old elevations has been considerably changed, and an escape portico has been added to the angle of the building formed by the junction of Long-brooke-street and New North-road.

The building will seat 500 persons. Saloons and retiring-rooms are attached to the different portions of the auditorium, and the comfort of the public has been everywhere considered.

#### A NEW METHOD OF CONSTRUCTING SCAFFOLDING.\*

THE subject of the paper which I have the honour of placing before you is scaffolding, and although scaffolding is neither food nor physic, yet, as it contributes to the preservation or destruction of life and limb, it has something to do with Sanitary science.

It will hardly be disputed that to no other building appliance is attached such grave responsibilities. Scaffolding should be safe, beyond all doubt, and suitable for the particular purpose to which it is applied; yet, strangely, no appliance, among a large class of builders,

receives so little attention, the common method being a rough-and-ready mode of placing together anything to hand, and using it as scaffolding. Accidents frequently arise from such improper constructions, the not unfrequent reports of which in the newspapers impressed me, and induced me to construct a cheap safety scaffolding that would not only be a protection to life and limb, but would also effect a saving in wear, tear, and maintenance. Pursuing this idea to a practical issue has resulted in an invention which, carried through many modifications, and, with the valuable assistance and advice of some of the largest builders and most practical men in this district, I now believe to be in principle practically perfect.

In dealing with this invention I have kept before me:—

First. To make a structure safe, adjustable, portable, and in itself independent. Second. To construct it so as to adapt it to a variety of purposes and uses. Third. That the cost of its production and maintenance should be moderate, and if possible relatively cheaper than good ordinary scaffolding.

For scaffolding I use vertical poles, advantageously of square wood, having holes or slots formed therein at equal distances apart. These holes or slots serve to regulate the height of each tier or platform. Each pole is fitted at one end with a metal socket or shoe, into which another pole is inserted to increase the height of the standards or poles supporting the remainder of the scaffolding. I provide, also, horizontal putlogs (square by preference), fitted at each end with metal brackets, having holes or slots formed therein to correspond with and fit over the pole holes, to which they are secured by screws or bolts. Square section ledgers, fitted at each end with metal brackets, similar to those on the putlogs, with the addition of two or more ears to each, and with a swivel plate at the head of the bracket, to use when required to secure returned scaffolding.

All holes in the structure correspond, so that all pins or bolts used to connect the parts are interchangeable.

To effect a return portion of scaffolding, one hole is made in the centre of each ledger to correspond with and fit the hole in the swivel-

\* From a paper by Mr. G. Beck, read at the Congress of the Sanitary Institute held at Worcester, and referred to in the *Builder* for Sept. 28, p. 222.



plate before mentioned at the head of the bracket. Other holes are made in the ledgers adapted to fit swivel angel plates, secured by screws or bolts.

An adjustable ladder in short lengths fitted with sockets to lengthen it out as required by the height of the scaffolding, is also applied. The ladder, or sections thereof, is secured to the putlogs or ledgers with metal clips.

The putlogs or ledgers can be used at convenient heights on any or every tier, to guard workmen from falling off the platform or stages.

The ladder can be used inside the scaffolding when the whole is self contained. The scaffold may be either single or double, and is absolutely rigid. It has also a further adjustment, so that, when extra bearing power is required at a given point, the interchangeable parts will discharge this service, and this, joined with its capacity of standing firmly and independently of the building, renders it specially adapted for the erection of stone-faced buildings, church spires, and the like. It is also very suitable for large interiors, its short length poles enabling workmen to take it easily in and out of small or cramped openings.

It is applicable also for the construction of shedding, shopping platforms, or fixtures, movable buildings, colonial houses, or the like.

It can be stowed away into limited space, or even into itself, thus forming its own storage shed.

No skilled labour is required for its erection or removal; ordinary intelligence can perform the operation.

Its wear, tear, and maintenance would compare very favourably with the present mode. Rope, a costly item, which soon decays, and being of marketable value is liable to be stolen (which applies also to chains), is not used in this scaffold.

Cost of production can at present be only approximately arrived at. From information obtained from a reliable firm in the timber trade, I learn that suitable timber ready for use may be bought as cheap as, or cheaper than, good poles. The ironwork can be made in malleable cast steel (annealed) very cheaply, and, considering the matter all round, including wear and tear, it may be estimated at about two-thirds that of the present scaffolding when properly erected.

#### THE SCHOOL BOARD FOR LONDON AND ITS BUILDINGS.

At the meeting of the School Board for London, on the 14th inst., Mr. Lobbs put the following question to the Chairman of the Finance Committee (Sir R. Temple):—

"Whether it is a fact that thirteen builders (as per list supplied) have received, for contracts carried out by them, the following amounts respectively:—

£259,360 16 6	£89,483 2 8	£123,186 19 6
116,349 7 1	313,620 1 2	137,331 14 10
127,122 11 6	98,699 10 4	225,105 1 9
72,979 6 8	192,940 15 0	325,795 9 10
93,890 11 8		

Making a total of 2,153,345l. 6s. 6d."

Sir R. Temple said, in reply, the figures were quite correct, and he could only answer in the affirmative.

Mr. Lobbs asked Mr. Helby:—

"Whether it is not a fact that grave irregularities have taken place, and that inferior materials have been used in the construction of some schools, and the firms who have received upwards of 2,000,000l. sterling in payment of their contracts."

Mr. Helby said: Grave irregularities have taken place, and inferior materials have been used in the construction of some schools, and indications of these things are frequently brought before the Works Committee. As to the second part of the question, I have no specific information.

At the meeting of the Board on the 21st inst., the Works Committee reported as follows:—

"The Committee have had under consideration the following report of the Superior Officer for Repairs, dated November 8, 1889, with reference to the Salter's-hill School, West Norwood (West Lambeth, AW):—

"The Clerk of Works having reported serious cracks and settlements in the lofty gable walls of the new portion of this school, the Architect and myself have made an examination, and deemed it necessary to take prompt measures to ascertain the cause and prevent further mischief. The ground has been opened, and the foundations exposed. Immediately under the concrete foundation a 6-in. drain-pipe is found running along the whole length of the wall; this has given way under the weight of the wall; some of the pipes are broken and the drain is choked; the water has consequently been soaking into the clay upon which

the wall stands; this, together with the roots of an old tree which were left in the ground, has caused the wall to give way. I append an explanatory sketch.

It will be necessary to shore up this wall, and underpin same with Portland cement concrete down to a good foundation.

The old drain will have to be diverted. As an estimate cannot be formed with any degree of accuracy of the cost of this work, but approximately I should say about 60l."

Steps are now being taken with the view to rendering the building secure, and the Committee are making further inquiries in reference to the manner in which this school was erected, and also in reference to the responsibility to be attached to the Clerk of the Works who supervised the enlargement of the school."

The Committee also recommend:—"That the Committee be authorised to incur the requisite expenditure for carrying out the necessary works to the Salter's-hill School, West Norwood (West Lambeth AW), in order to render the building safe."

"The Committee have also had under consideration the following report of the Superior Officer for Repairs, dated November 5, 1889, with reference to the Woodland-road School, Upper Norwood (West Lambeth AY):—

"As requested, I have this day made a careful examination of these buildings, which were erected about three years since. The following is my report:—

**Brickwork.**—The whole of the brickwork throughout the school, including the bounding walls of the school house, is built with mortar of the worst description. It has no binding or adhesive properties and no grit. There is evidence that a large amount of half-burnt clay was used in the place of sand, and there are many hollow joints in the walls. The mortar, on being disturbed, crumbles to a very fine powder, and does not in any way adhere to the bricks. This is a serious matter, as any disturbance of the clay upon which the buildings are erected may produce serious results.

Rain penetrates the walls of the schoolkeeper's house. An unfinished chimney-stack and a coped wall on the school roof must be rebuilt; the mortar has washed out and the bricks are loose.

The boundary-walls and chimney-stacks need repointing to protect them from the weather, and the repointing of the whole of the buildings will soon be necessary.

I have taken samples of the mortar from various parts of the building and have them in my room.

**Portland Stone.**—Some of the external stone is of the most inferior description, and contains shakes and sand-holes, fractures and broken edges, and is from the outside beds of the quarry. The rule of setting the stones upon their natural beds has not been strictly adhered to. Want of skill is shown in setting out the work, as well as in the workmanship.

The following stones should be taken out at once and replaced with others of the proper description:—

Four sills to large windows.

Four jamb-stones at infants' entrance to building.

Two curb-stones under railing in infants' playground.

All curb-stones under railing along George-street.

The stone jambs of children's entrance in the boundary walls appear to be without dowels. Some of the stones have moved upon their beds, and several inferior stones require renewing.

Most of the stones are of large scantling.

Two new wood-sills are necessary to windows overlooking infants' playground. One is broken, the other is warped.

**Roof.**—The valley tiles slide badly.

The large zinc flat over the schoolroom has sagged in the centre and around the skylights, and holds pools of water. This will have to be taken up and reconstructed.

**Schoolkeeper's House.**—Owing to the damp course being below the level of the surrounding tar-paving, damp rises in the walls. There are only two small air-bricks for ventilation in the space under boarded floors, and these are half buried in the tar-paving. There is no concrete under the boarded floors to cover the wet clay.

The result of all this is that water has set in; there are already some holes through the boarded floors. These floors will have to be taken up, 6 in. of concrete laid over the clay, additional air-bricks inserted in the walls, and partly new floors provided.

The setting coat of plaster is falling from the walls throughout the house, partly on account of the damp, but principally on account of the undercoat not being properly "scored" or keyed. The wall-paper is hanging from the walls in several places, and there are numerous cracks in the plaster."

Into this case also, the Committee are making further inquiries; and as four years have not expired since the completion of this school, they propose to call upon the contractors to make good the defects at their own expense.

They further have to report that the Committee propose to call upon the contractors for the Woodland-road School, Upper Norwood (West Lambeth A.Y.), to make good the defects in the building."

Mr. Helby having moved the adoption of the recommendations,

Mr. Lobbs said these reports of the Superior Officer for Repairs were but a sample of what had been going on up to a recent date in connexion with the Works Department.

The recommendations were adopted.

**The Right Hon. the Speaker on Saturday last entertained nearly eighty of the employees of Mr. John Thompson, of Peterborough, who had been engaged on works at Sandy.**

#### ARCHITECTURAL SOCIETIES.

**Leeds and Yorkshire Architectural Society.**—The Leeds and Yorkshire Architectural Society held their usual dinner on Monday night at the Queen's Hotel, Leeds. The President (Mr. Henry Perkin) occupied the chair, and there were about seventy gentlemen present, including the following guests:—Mr. W. L. Jackson, M.P., Financial Secretary to the Treasury; Mr. T. C. Hope, President of the Bradford Society of Architects; Mr. J. J. Wilson, President of the Fine Arts Club; Colonel Harding, chairman of the Fine Art Gallery Committee; Mr. B. G. Wilkinson, chairman of the Leeds School Board; Mr. F. Suddards, Art Master, Yorkshire College; Professor Ransome and Professor McGill, Yorkshire College; Mr. E. C. Arnold Foster, Mr. Leonard Cooper, Mr. J. W. Orley, Mr. Talbot Baines, Mr. W. H. Herbert Martin, F.R.I.B.A., Bradford, and others. Mr. E. F. H. Wigfall, United States Consul, gave the toast of "The Leeds and Yorkshire Architectural Society." The President, having returned thanks, said that on entering upon the second session of his term, he hoped during the period remaining to do his best to increase the membership of the Society, both as regards practising members and also honorary members. Hitherto they had had from the honorary members ungrudging support, for which they were very grateful; but they looked for a further extension of that membership in order that they might eventually form a Board of architects and laymen powerful enough to bring influence to bear in the direction of the artistic development of the town. Some such power was sadly needed in all their large towns, where handsome buildings were often erected without regard to the advantages to be obtained by suitability of site and effect as regarded surroundings. During the last year they had increased the membership of architects in practice in their neighbourhood, and they hoped for further assistance of this kind. Local societies were being allied to the central body, the Royal Institute of British Architects, in order to bring about those various reforms which the experience of many years had shown to be useful in the profession. And from an improved and well-regulated practice the public would derive benefit. In his opening address last session he pointed out the great need of a diploma to practice. The remarks which he then made on the question were somewhat adversely criticised in the architectural press; but he was afraid his exact intention was not clearly understood. At that time they did not propose to join the Institute, because its programme was not sufficiently advanced. During the year, however, steps had been taken which met their wishes. In the new Charter was incorporated an efficient scheme of registration, and the Council of the Society had now decided to support the Institute. Registration was to be effected by progressive examinations, three in number. Diplomas or certificates would be granted to all passed candidates in the various examinations.

**Manchester Society of Architects.**—At the annual dinner of this Society, held at the Queen's Hotel, the following guests were present:—The Mayor of Manchester; Mr. A. Waterhouse, R.A., President of the Royal Institute of British Architects; Sir Charles Hallé; Mr. J. H. Woodhouse, President of the Manchester Architectural Association; and Mr. J. H. P. Leresche, J.P., Hon. Legal Adviser to the Society. The members of the Council elected for the year 1890 are:—President, Mr. R. K. Freeman, F.R.I.B.A.; Vice-President, Mr. J. Medland Taylor, with Mr. E. Salomons, F.R.I.B.A., Mr. W. A. Royle, F.R.I.B.A., Mr. T. Worthington, F.R.I.B.A., Mr. Murgatroyd, F.R.I.B.A., and Mr. J. G. Elgood, A.R.I.B.A.; and Mr. John Ely, F.R.I.B.A., and Mr. Paul Ogden, A.R.I.B.A., Hon. Secretaries.

#### OBITUARY.

**Mr. Harry R. Newton, F.R.I.B.A.**—The late Mr. Harry Robert Newton, who was elected an Associate in 1853 and a Fellow in 1860, and whose death occurred suddenly in Bedford-street, Strand, on the 14th inst., was the son of Sir William John Newton, the miniature-painter, and the grandson of James Newton, engraver. He is described in the *Times* of the 20th inst. as being also a collateral descendant of Sir Isaac Newton. Mr. H. R. Newton was undoubtedly eccentric, and a short time before his death caused some books and papers of family



Section of Regulating Sewer  
Between A and B

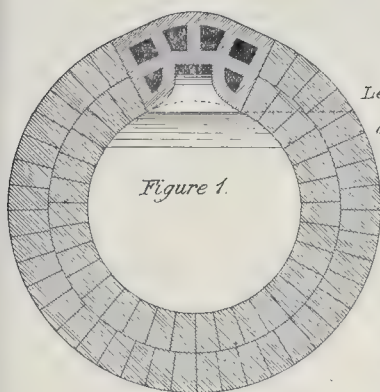


Figure 2.

## Plan

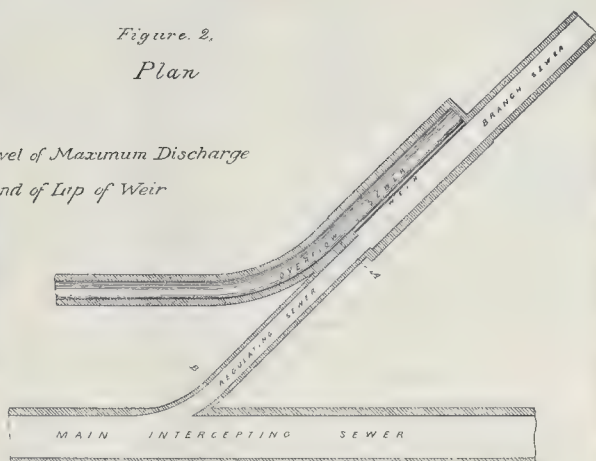


Diagram illustrating Mr. Henry Law's Paper on the Discharge of Sewers.

interest to be sold for a few shillings, among them being a large packet of original drawings and memoranda, which had evidently belonged to his granduncle, William Newton, who translated "Vitruvius," and had a great deal to do with the second volume of "Stuart and Revett." Happily, the packet was knocked down to Mr. Andrew Oliver, Associate, who has presented it to the Library, and it will shortly be reported on by the Literature Standing Committee, a few members of which have been appointed to consider the miscellaneous collection of curious relics it contains—*R.I.B.A. Journal*.

Mr. T. A. Walker.—We regret to have to record the death of Mr. Thomas A. Walker, the contractor for the Manchester Ship Canal. He died on Monday last, at his residence, Mount Ballan, near Chepstow, at the age of 62. A Cardiff paper (the *Western Mail*) gives an interesting biographical sketch of the deceased, who will be remembered for the great dock and railway works which he carried out. Perhaps the most notable of these was the Severn Tunnel, about which he wrote an interesting book. He seems to have been much esteemed by his employees, who numbered, at the time of his death, so it is estimated, no fewer than 22,000.

# ON A METHOD OF REGULATING THE MAXIMUM DISCHARGE OF SEWERS.\*

IN designing a system of drainage it is frequently required to limit the quantity which one or more of the sewers shall be capable of discharging at their outfall.

In the case of the formation of joint boards, for dealing with the sewage of several separate districts, it is usual for the Local Government Board to prescribe 250 gallons per house per diem as the quantity which the joint board shall make provision for receiving into the main intercepting sewer from each branch or district sewer.

Also, in the case of the drainage of only one district, it becomes necessary to limit the quantity which the sewers shall discharge at their outfall or junction with the main sewer, as the case may be; not only because in the treatment of the sewage, whether on land or by chemical process, it would be impossible to deal with the whole of the discharge from the several tributary sewers in times of heavy falls of rain, but further, because the main intercepting sewer would become of inconvenient dimensions if made capable of receiving the aggregate maximum discharge of all the sewers which is intercepted.

It is proposed to fulfil this requirement in the following manner:—

The discharging capacity of a sewer is always proportional to the cube of the transverse sectional area filled by the sewage, divided by the wetted perimeter. This quotient gradually in-

creases as the depth of the stream in the sewer increases, until it reaches a certain height (which, in the case of a circular sewer, is equal to 0.9496, the whole diameter being unity), after which, as the sewer becomes further filled, this quotient diminishes, and the quantity discharged becomes less.

If, however, the form of the sewer above the line of the maximum discharge is modified in such a manner that, as the sewage continues to rise in the sewer, the quotient obtained by dividing the cube of the area filled by the wetted perimeter remains constant, then the quantity discharged by the sewer will also be constant—neither increasing nor decreasing—although the height of the sewage may vary between certain limits.

In the accompanying diagram, fig. 1 exhibits the form to be given to a circular sewer above the line of maximum discharge in order to render the discharge equal in quantity, although the sewage may rise above that level; and the following table gives the width of the sewer at each successive hundredth of the diameter above the line of maximum discharge, the diameter of the sewer being unity, namely:—

Width at the line of maximum discharge .....	0.4376
" 1 hundredth of dia. above the same .....	0.3984
" 2 hundredths .....	0.3632
" 3 .....	0.3317
" 4 .....	0.3037
" 5 .....	0.2790
" 6 .....	0.2574
" 7 .....	0.2388
" 8 .....	0.2225
" 9 .....	0.2090
" 10 .....	0.1979
" 11 .....	0.1891
" 12 .....	0.1824
" 13 .....	0.1777
" 14 .....	0.1745
" 15 .....	0.1724
" 16 .....	0.1714
" 17 .....	0.1706
" 18 .....	0.1699
" 19 .....	0.1693
" 20 .....	0.1688

Having determined the maximum quantity which it is required for the sewer to discharge at its outfall, such dimensions must be adopted for the sewer, for a certain length from such outfall, as shall enable it to discharge that quantity when the sewer is filled to the line of maximum discharge, and above that level the sides of the sewer must be made of the form shown in the diagram.

At the upper end of this length of sewer, an opening is made in the side of the sewer forming an overflow weir, the level of the lip of which is the same as that of the line of maximum discharge, that is to say, the same as the lower limit of the height of the stream having the constant rate of discharge; and this sewer is made of such a length that, when the stream rises to the upper limit of such constant rate of discharge, the quantity which will flow away over the weir shall be equal to the maximum quantity which the upper portion of the sewer can bring down, after deducting from the same the constant quantity which can be conveyed away by the lower length of the sewer with

the modified form of section. The discharge from the weir is conveyed away by an independent channel provided for that purpose.

Fig. 2 illustrates the practical application of the method. If, for example, the diameter of the lower or regulating length of the sewer is 2 ft., with a fall of 1 in 500, its maximum discharging capacity would be 590 cubic feet per minute; and if the diameter of the upper portion of the sewer above the weir is 3 ft., with the same fall, its maximum discharging capacity would be 1,643 cubic feet per minute; consequently, 1,053 cubic feet per minute would require to be discharged over the weir; and if the length of the weir is 22 ft., this quantity would be discharged with a depth of 4 1/2 inches flowing over the lip of the weir. Therefore, with the maximum quantity which the upper sewer could bring down, the sewage could never rise in the regulating sewer above the upper limit of constant discharge.

If the upper or regulating portion of the sewer were made in stoneware, moulded to the required form, as shown in the diagrams, no special skill or care would be required in the construction of the sewer.

## MUSEUMS AND GALLERIES IN CONNEXION WITH POPULATION.

SIR,—Perhaps you would allow me to supplement my letter in your issue of October 19 by pointing out that the Gallery at Trafalgar-square is not the only one where the statistical movement is retrograde.

In the *St. James's Gazette* of March 6 and November 7, 1888, it was noticed that a similar state of things has been for some years manifesting itself at the South Kensington and Bethnal-green Museums. If the yearly visitors of these three be added together and then dealt with as were those of the National Gallery we have a very suggestive table. (It will, of course, be remembered by your readers that before 1888 there were no turnstiles at the National Gallery.)

Visitors to the National Gallery, together with those to South Kensington and Bethnal-green:

Years.	Visitors.	Years.	Visitors.
1877	100	1883	82.0
1878	78.4	1884	72.0
1879	75.2	1885	74.8
1880	83.7	1886	72.4
1881	83.2	1887	68.1
1882	78.9	1888	80.9

So large was the increased attendance caused at Bethnal-green Museum by the exhibition there of the Queen's Jubilee presents that it raised the gross total. But this very fact is hardly encouraging if the special point of permanent attractiveness be considered.

Now, South Kensington and Bethnal-green are not, of course, localities where the popula-

\* A paper by Mr. Henry Law, M.Inst.C.E., F.R.M.S., read at the recent Congress of the Sanitary Institute held at Worcester.



tion is diminishing, but the reverse. Hence I spoke of being puzzled. Nor do I feel that turning to the statistics of the Salford Museum and Art Galleries (1850-87), or those of the Liverpool Walker Art Gallery at Liverpool (Autumn Exhibitions, 1871-87), serves to solve the problem completely. Certainly, in both cases, the figures show the same tendency as those of the southern galleries (and I might add the Guildhall Library), but for this there may, of course, be good local reasons.

These matters, I must confess, seem to me peculiarly suitable for the new Art Association to seriously grapple with, more especially as the facts would appear to have been hardly noticed. Indeed, the statements that are sometimes made on these points are quite misleading, notably those in Greenwood's "Museums and Art Galleries" or Mrs. Besant's sketch of "Modern Socialism." Should investigation prove that a series of branches is better than a central institution the equanimity of architects and builders would, I apprehend, not be greatly disturbed.

PERCENTAGE.

## REGISTRATION OF FITTERS.

SIR,—As sanitarians find that it is necessary for the preservation of health that plumbers should be registered as a security against bad workmanship, I, as a fitter, consider that, for the same reason also, for the protection of life and property, that all gas and hot-water fitters should be registered or not, according to ability.

The danger arising from incompetent fitters' work is constantly brought before us in the newspaper accounts of explosions, not to speak of the many persons partially poisoned by slight leaks of gas all over the house,—an inconvenience which has to be paid for in more ways than one.

This subject is well worth consideration. Gas has a long life before it, notwithstanding the electric light, and hot-water and boiler-fitting is illimitable. As one who was bound apprentice and really learnt my trade, I should be very glad to see something done.

J. R.

## VENTILATION OF STREET SEWERS.

SIR,—There are various ways of ventilating the street sewers being promulgated just now, and which involve continuous attention and expense, that I beg to condemn, and especially if those styles are intended for general use. One style recommended is the burning of gas in specially constructed street lamps, so that the lamp might act as an outlet ventilator or air-pipe for the sewer, the sewage-gas or air from the sewer having to pass through or near the gas-flame so as to be burnt. Now, to be of any real value this would need a very large amount of gas to be continuously used, and I do not think this expense is necessary. I remember seeing a street lamp used in the way spoken of near a range of buildings where complaints of bad air from the sewer occurred; but an old horse-shoe hung on the lamp would, in my opinion, have done as much good. What I understand was really needed in this case was the leaking drains, &c., repaired, and disconnecting traps put on between the houses and the sewer.

When the fire of an asphaltic boiler is lighted on the street, the smoke from it at this low level is a nuisance. We put up with it because it is only temporary; but, were in continuous, the chimney would have to be raised above the neighbouring houses. So with the ventilating outlets of street sewers. Let them be raised up by means of proper pipes to above the roofs of the houses, with fixed exhaust ventilators on them, and then the sewer gases would get exit continuously, and cause no annoyance, while they would be freely disinfected by the sulphur in the smoke from the chimneys, and be also blown very high up in the air.

Generally speaking, it is all nonsense to speak of the sewer air being "forced" into our houses. It is generally sucked in, especially if the house is inhabited and the drains bad, and not properly trapped. I am not aware of the air in the sewers having sufficient pressure to force properly set traps. No such pressure can occur, if the sewers are at all ventilated, to speak of. In the case of a tidal sewer, special attention may have to be given to the ventilation.

Another cure for sewer gases is to be putting chemicals continually into the sewers, but this also means never-ending expense and attention, and the recommendation is made in entire oblivion of the fact that upon proper application to the atmosphere, the wind, and it will give a continuous supply of oxygen for nothing. Properly constructed and ventilated sewers do not need chemical disinfectants continually any more than healthy men need medicines daily. Gully gratings at the edge of pavements should be trapped, and where the sewer gratings in the middle of the streets do not give satisfaction, then use the high-level pipes coated inside so as not to rust up.

W. P. BUCHAN.

Glasgow.

## PROPOSED ARCHITECTURAL ASSOCIATION FOR SUNDERLAND.

SIR,—At a meeting of architectural students held here to-night, it was resolved to form an association for the furtherance of the study of architecture.

The secretary, Mr. Geo. T. Brown, will be very glad to receive a copy of the rules of any other such association.

GEO. T. BROWN.

35, West Sunnyside, Sunderland, Nov. 27.

## CHURCH BUILDING NEWS.

**Bridgeville.**—The tower of St. Bridget's Church, Bridgeville, Devon, which was struck by lightning last November, has been restored by Mr. Prower, of Week St. Mary, from specifications of Mr. J. Hine, architect (of the firm of Hine & Odgers, Plymouth).

**Darlington.**—On the 6th inst. the chancel of St. Luke's Church, Darlington, was dedicated and opened. The additions to the church, which provide accommodation for ninety more seats, consist of a chancel, organ-chamber, and commodious vestry, erected in a solid and severe type of Early English. The walls, which are of great thickness, are faced externally with Tow Law blockers and Dunhouse dressed stone. Internally, to a considerable height, the walls are lined with a moulded panelled dado, surmounted with moulded and embattled capping. Above this dado and up to the ceiling cornice the walls are plastered, finished "rough"—the plastering being broken at intervals by internal stone dressings of windows and arches. The ceiling is a lofty one, of woodwork, seven sided and formed into panels by moulded longitudinal and transverse ribs, the whole springing from a handsome, well moulded, carved, and embattled cornice. The chancel is lighted by two north windows of two lights and a large five-light east window, formed both on inside and outside in dressed stonework, and cased with rolled cathedral glass. The chancel seating and reading-desks (both of which are moulded and carved), and all internal woodwork, is of pitch-pine and "dull" polished. The floors are paved with encaustic tiles and Yorkshire stone on concrete foundations. Artificial lighting is by brass pendants, made by Messrs. W. Russell & Son. Inlet and outlet ventilators are provided. The stonework has been carefully done by Mr. S. Allanson, Darlington, and the woodwork by Mr. W. W. Franks, the other contractors being Messrs. Wharton & Son for slating, Messrs. W. Russell & Son for plumbing, and Mr. T. Metcalfe for painter's work. The additions have been made from the designs of, and have been carried out under the personal supervision of, Messrs. Clark & Moscrop, architects, Darlington.

## ROMAN CATHOLIC CHURCH-BUILDING NEWS.

**Highbate.**—The new Church of the Passionists, Highbate-hill, was dedicated on the 21st inst. The church replaces one which was built some twenty-five or thirty years ago. The foundation-stone of the new building was laid on May 24, 1888, by Bishop Hedley, of the Catholic Diocese of Newport and Menevia. To speak of the structure itself, it may be stated that the church is dedicated to St. Joseph, and is the only memorial church of the Sacred Jubilee of Leo XIII., erected in England by his special permission. According to the *Daily Chronicle*, the design is Romanesque, freely treated to harmonise with the old "Retreat," so far as the exterior is concerned. The interior, including ceiling and dome, which latter surmounts the whole sanctuary, and the panels to the walls, have been elaborately finished with colour decorations and paintings, executed by Mr. N. H. J. Westlake. The new church, having seating accommodation for about 1,000 persons in the nave and Lady-chapel, the latter seating about 100 people. On each side of the nave there is a processional aisle, about 6 ft. wide, the Lady-chapel being divided from the north aisle by an arcade of six bays, equal to three of the bays of the nave. The total internal length of the church is 146 ft., and the width, including aisles, about 55 ft. The panelled ceiling, which is of elaborate design, is 53 ft. high, from the floor to the internal apex. The tower over the baptistery is carried to a height of 100 ft., and the dome, 140 ft. high, is constructed of steel. The tower, dome, and cupola are covered with copper, and form a con-

spicuous feature from all parts of the surrounding neighbourhood. The altars are at present only temporary, with the exception of the one dedicated to the Archbishop Michael, the principal patron of the order, by the Very Rev. F. Michael Watts Russell, in memory of his father. This altar was recently exhibited in the Paris Exhibition, and over it, for the present, is fixed a painting of the death of St. Joseph, by M. Laby. There are six other chapels; the Epistle side is dedicated to the Sacred Heart, and the Gospel side to St. Paul of the Cross, the founder of the Passionist order. Six exit doors are provided, and the sacristies are commodious. The organ-gallery over the porches is 38 ft. by 16 ft. The architect is Mr. Albert Vicars, but what is unique in the erection of this edifice is the fact that no general contractor has been employed, the work having been, under the supervision of the architect, carried out by Brother Alphonsus, who has given the most devoted attention to it, with the very successful result that the cost has been less than 17,000*l.*, whereas under the ordinary contract arrangements the expenditure, it is stated, would have been over 20,000*l.* This is accounted for by the fact that the lay brothers worked hard at their respective trades during the erection, and thus saved a great deal of money. The very beautiful carving has been executed by Mr. R. L. Boulton, of Cheltenham. So much for a brief description of the building. The wood block flooring has been executed by the Acme Wood Flooring Company, Limited.

**Wareham.**—The new R.C. Church of St. Michael, Wareham, Dorset, will be opened on the 19th inst. Mr. Albert Vicars is the architect.

## The Student's Column.

## WATER-SUPPLY.—XXII.

## TOWN SUPPLY.

THE sources of the supplies to Liverpool, Manchester, and Glasgow have incidentally been alluded to in the course of our observations on quality, gathering-grounds, &c.; and the history of the alimentation to these cities is well-known to any one familiar with the ordinary literature of the day. Therefore, we need only remind the student of a few leading particulars concerning this portion of the subject. The supply of Liverpool from the old gathering-ground of Runcorn having in dry seasons proved inadequate, both for the increasing wants of the inhabitants and the requisite amount of compensation water, engineers found another though distant source of supply in capturing the upper waters of the Yrnyw in North Wales, by erecting an embankment, and creating a vast artificial lake or reservoir behind it, from which, on completion of the works, the city will be served. Manchester, from almost the same causes, obtained another source of supply from Lake Thirlmere, particulars of which will be found in the late Mr. Bateman's work on the "Manchester Water-works." Glasgow has for many years been supplied from Loch Katrine, and, although at first it was feared that the softness of the water would be slightly detrimental to health, because of its known readiness to attack lead, thus producing lead-poisoning, &c., experience has shown that these apprehensions were practically groundless. The quality of the water supplied to this city is not inferior to that of any other city in the United Kingdom.

Let us now consider the water-supply of Edinburgh. The first scheme of any note embodying the alimentation of this city was brought forward in 1621, when an Act was passed by the Scottish Parliament, for the introduction of water from Comiston springs, which rise about three miles to the south of the capital; but sixty years were allowed to elapse before this source was actually utilised. Prior to this, the inhabitants were almost entirely dependent on wells for their wants. The Comiston springs yielded something like 135,000 gallons per day, and, this being found insufficient, other springs near the same source were brought into requisition. These additions were finished in 1720, and nothing more was done until 1755, when, after the inhabitants had suffered considerably from scarcity of water, the scheme was further extended to include other springs and streams on the north side of the Pentland Hills.



and from Bonaly, six miles south-west of Edinburgh. In 1811, Telford reported that a better supply could be obtained from certain springs on the Eastern portion of the Pentlands, and after the necessary preliminaries, the report of that eminent engineer was acted upon, and in 1822 water, amounting to about 2,700,000 gallons per day, was introduced into the city from the Crawley spring and part of the Logan burn in Glencorse valley. The water running into Glencorse, being largely drained from high hills covered with short grass, is naturally free from peat. The ground in the upper reaches, however, is mossy, and the water impounded at Loganlea is sometimes affected. The subsequent additions to the general supply were for many years derived solely from various parts of the Pentland Hills, and it may be useful to briefly explain the broad hydrogeological features of that region.

These hills lie to the south-west of the city, having a general trend in the same direction, and are about sixteen miles in length and five miles in width, their highest summits varying from 1,000 ft. to 1,900 ft. above the sea-level. The ground out of which they spring is itself considerably elevated, and has a useful slope towards the north-east. The configuration of the northern slopes of the hills does not permit of a gathering-ground scheme being conveniently adopted for the city, and if this were not so, the greater quantity of water derived would be so highly impregnated with peaty matter that it could not be used. Nearly all the water of the great extension works (presently to be described) on the Pentlands is obtained from springs, a circumstance of great importance, inasmuch as large storage reservoirs are thereby rendered unnecessary.

Geologically, highly-inclined Silurian rocks are found at the base, and these are covered by coarse conglomerates, grits and sandstones, and by felstones and volcanic ash of Old Red Sandstone age. According to the opinion of the officers of the Geological Survey, these old rocks form a rough anticlinal axis, with carboniferous strata folded over it. As a result of this disturbance, the whole is very much fractured and dislocated, a large number of important parallel faults being produced; and Mr. Alexander Leslie, M.Inst.C.E., in his excellent paper on the "Edinburgh Waterworks," shows that "it is to the existence of these faults that most of the copious yield of spring-water, which forms the bulk of the supply from this source, is due." An enormous fault, running along the south-east flank of the Pentlands, which brings the carboniferous against the felstone, produces large numbers of springs throughout its length. The same authority says that "some of them, namely, the Crawley springs, form part of the supply of Edinburgh, whilst many others are utilised for the supply of neighbouring towns and villages, or are appropriated for the use of the paper manufactories on the North Esk river, into which they naturally drain. . . . The springs, with the exception of those rising on the north side of the Blackhill, are remarkably steady."

The previously existing works having proved inadequate, in 1843 an Act was obtained for augmenting the supply from the Bavelaw, Listonsbield, and Black springs, on the northern slopes of the Pentlands. These were completed in 1848, and yielded about 2,000,000 gallons per day. In 1847 powers were also obtained to construct four other reservoirs and to enlarge the old one in Glencorse, but, as the demand increased, all these were found insufficient. In 1859 the Colzium springs, and in 1868 those of Crosswood, were introduced. We have now briefly sketched the water-supply of Edinburgh as derived from the Pentland Hills, and have seen that the sources whence it was obtained were gradually pushed farther and farther away from the city upon the increasing requirements of the population. The works in 1868 were capable of producing 8,000,000 gallons per day, or about 34 gallons per head per day.

In spite of all these additions, however, it became clear that something else must be done. Accordingly, in 1874, Parliamentary sanction was given to take a supply (supplementary to that of the Pentlands), from the Moorfoot Hills, situated a little to the east of south, and about twelve miles from the city. This is, essentially, a drainage-area scheme, as very few springs rise in the district, and in this respect it entirely differs from the older method. It

consists in draining about 14,500 acres of high ground, and constructing large storage reservoirs to hold the water. The capacity of one of these reservoirs, known as the "Gladhouse," is about 1,700,000,000 gallons, whilst that at Portmore Loch holds about 250,000,000 gallons. When the scheme was brought out, a higher rainfall was relied upon than, as experience proved, was actually available; and we may remark, *en passant*, that this is generally the case in regard to projects of a similar nature. Fortunately, in this instance, however, the diminished quantity of water found to be available did not materially affect the plans, and, indeed, the cheapness of the Portmore reservoir, constructed as it was on the site of an existing loch, enabled the engineers, amongst other things, to find an adequate supply. The total amount derived from the Moorfoot Hills at the conclusion of these important works was estimated at about 8,690,000 gallons per day, so we see that the water-supply of Edinburgh is obtained in almost equal proportions from the two high ranges of hills a few miles to the south of it, and there is much room for extension from either source.

Turning now to a supply of a totally different nature, and suitable for a large town, we may instance that of Southampton. This work, having only recently been completed, affords an excellent example of what can be done under very trying geological conditions, to successfully obtain something like 3,000,000 gallons per day from the chalk. In 1838 a very deep well was commenced on Southampton Common, and by February, 1851, it was sunk and bored to a depth of 1,317 ft. when the work was stopped in consequence of the yield only being 180,000 gallons per day, and of difficulties in boring. In 1882 it was resumed, but by reason of the obstruction caused by a broken tool left in it on the cessation of the last attempt, the continuation of the work was found impracticable. We believe, however (but we speak reservedly), that the little water available is now pumped and used for watering roads, &c.

In spite of this failure, which cost about 20,000*l.*, the authorities, guided by good geological opinion, were not deterred from still seeking an underground supply from the chalk. It was demonstrated\* that there was a remarkable convergence of the underground water-level towards a certain spot not far from Southampton, and this site was selected on which to commence operations. After trial-borings had further confirmed the hydrogeological report, two wells, each 6 ft. in diameter and only 11 ft. 6 in. apart, from centre to centre, were made to a depth of about 100 ft., and to strengthen the walls between, they were lined with iron cylinders. These are believed to be the largest bored wells yet sunk at one operation in this country. The chalk water being rather hard is, in this case, subjected to a softening process. We quote the Southampton works as a clear instance of the invaluable assistance which can be rendered by a careful hydrogeological survey in regard to well-sinking for town supplies. The failure of the first well shows the necessity of carefully considering the geological aspect of the subject.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

18,294, Smoke Extractors, Exhausters, Ventilators, &c. E. S. Strange and J. C. Austen.

The extractor or ventilator which is the subject of this patent is constructed with a central tube surrounded by a partially-perforated outer case, in which it is secured by transverse open frames or ribs. The outer case extends above and below the central tube, and, if desired, is provided with an overhanging open roof, supported by two or more arms attached to the side of the outer case to prevent rain or wind passing down the chimney. Above the top of the central tube the outer case is constructed with an inwardly-projecting shoulder; the wind or air, passing through the perforations in the outer case and rising therein, is deflected by this shoulder so as to pass across and above the outer edge of the central tube, and cause a suction of the smoke or vitiated air therein.

18,866, Lavatory and Wash Basins. T. W. Twyford.

The waste-pipe or pillar of these appliances is placed within a niche or recess formed within the inside back of the basin. A plug-valve strainer

\* "Report on the Water-supply of Southampton." By W. Whitaker, F.R.S.

grating and feet or inclines are also fitted, and the action of these combined effect the improvement claimed.

3,178, Apparatus for flushing w.c.s. J. Sharpley.

This invention proposes to provide a simple means by which the pans or vessels of water-closets may be flushed. It has also in view the disposal and further use of waste water which has already been employed for domestic purposes. The cavity of the pan is made to serve as a temporary cistern, into which waste water or other liquid may from time to time be run; it has a trapped overflow outlet to prevent the rise of fluid to an objectionable height. The main outlet is situated at the bottom of the vessel, preferably to one side, or it may be quite outside, and has sufficient area to permit a rapid discharge of the vessel's contents. If (the main outlet) is furnished with a valve operated either at will by means of a handle and suitable attachments, or automatically by connexions with a hinged seat.

9,898, Dampers or Draught Regulators. J. Keith.

The damper as fitted serves as an air-regulator and as a cleaning door for the removal of soot or for giving access to the flue.

14,421, Ornamental Tiles, &c. John Frazer.

This invention has reference to an improved substitute for ornamental tiles for hearths, window-boxes, flower-stands, &c., and is cheaper and unbreakable. Sheet-iron, steel, &c., is decorated and used in the place of tiles. They are fixed by screws or by beads at the edges.

14,648, Bakers' Ovens. G. E. Bailey.

The oven which is the subject of this patent is a kind of double chamber, one being the oven itself and the other an air-chamber heated by a furnace underneath. Escape flues are provided, and the arrangement is that the roof of the air-chamber is really the floor of the oven.

### NEW APPLICATIONS FOR PATENTS.

Nov. 11.—17,918, P. Knight and G. H. Hoyer, Door-knob.—17,928, W. Scott-Moncrieff, Valve Water-closets.—17,953, F. Hilton, Weather-boards for Doors.—17,961, J. Fell, Coating or Covering for exposed Wooden Structures or Timbers.

Nov. 12.—17,985, J. Stone, Tip Wagons and Carts.—18,041, A. Hughes, Protractor.—18,042, J. Martin, Pigments or Paints.—18,069, B. Stocks and W. Illingworth, Automatic Bolt for Doors, Windows, &c.—18,076, H. Lake, Whitelead.

Nov. 13.—18,086, J. Empson and Others, Syphon Flushing Cistern.—18,098, C. Hickton and J. Cleveley, Catch for Doors.—18,125, W. Newman, Sash or Window Fasteners.—18,126, H. King, Flush and Knob Bolts for Doors, &c.—18,132, E. and E. Evans, Sash-fasteners.—18,143, H. Nettelford and J. Sheldon, Screws.—18,154, W. Luther, Sheet Metal Astragals and Sash-bars.

Nov. 14.—18,174, G. Diggins, Fastenings for Windows, Casements, Doors, &c.

Nov. 15.—18,241, C. Callow and H. Eck, Removing Floor and other Fixed Boards.—18,242, J. Downes, Enamelled Metal Tile Hearth and Enamelled Metal Tiles for Walls and Ceilings.—18,251, W. Phillips, Rendering Windows, &c., Draught and Weather Proof.

Nov. 16.—18,339, J. Gingell and E. Stafford, Chimney-pots.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

13,531, J. Rodda, Leakage-detector for Water-pipes, &c.—14,018, B. Brown, Portable Rain-water Pipes.—15,111, W. Hassall, Joining Stoneware Pipes, &c.—15,858, F. Robinson, Flushing Cisterns and Water-waste Preventer.—16,579, W. Bradford, Flooring Material.—16,706, P. Bronner, Whitelead.—16,888, T. Sixsmith, Plank-supporting Frames for Builders, Painters, &c.—16,911, S. and S. Hill, Draught, &c., Excluders for Doors, Windows, &c.—17,260, L. Blumer and J. Tait, Limekilns.

### COMPLETE SPECIFICATIONS ACCEPTED.

#### Open to Opposition for Two Months.

18,457, E. & J. Brook, Regenerative Kilns.—638, G. Jennings, Valves for Water-closets, &c.—977, J. Harper, Portable Scaffold.—1,240, E. Cory and Others, Mortising Machines.—3,510, J. Young, Window Frames and Sashes.—13,807, W. Cusans, Fasteners, &c., for Windows, &c.—14,476, A. Robertson, Draught-excluder for Doors.—14,493, B. Meriam, Drain-tester.—14,899, A. Morrison and M. Ingram, Water-closet Apparatus.

## RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

Nov. 18.—By WALTON & LEE.  
St. James's—37 and 38, St. James's-pl., and 9 and 10, Little James's-st., u.t. 18 yrs., gr. £109. 3s. 1d., r. £805 ..... £8,700  
By J. & R. KEMP & CO.  
Edgware-rd.—No. 131, u.t. 31 yrs., gr. £12. 12s., r. £92 ..... 950

\* The term *anticline* indicates that the strata are disposed in an arch-shaped manner.  
† "Min. Proc. Inst. C.E.," Vol. lxxiv, (1883), p. 92.



Nov. 19.—By B. BROWN.	
Poplar—29, 31, and 33, Brunswick-rd., f., r.	£1,010
Stepney—78 and 80, Duckett-st., f., r. 299 p.s.	349
By ALEXANDER, DANIEL, SELVE, & CO.	
Wandsworth-rd.—No. 260, u.t. 49 yrs., g.r. 49	385
By MAHER & BENNETT.	
Bow—F.g.r. of 224, with reversion in 78 yrs.	569
F.g.r. of 211, with reversion in 78 yrs.	269
The Imperial Mineral Water Company in St. Stephen's-row, f., r. 2100	2,000
By J. & W. JOHNSON.	
City-rd.—22 and 24, Shepherdess-walk, and 4 and 5, Underwood-row, u.t. 10 yrs., g.r. 238, r. 2190.	463
By DEHNHAM, TEWSON, & CO.	
Kensal Green—F.g.r. of 247, with reversion in 85 yrs.	1,130
Shepherd's Bush—F.g.r. of 216, with reversion in 82 yrs.	390
Brixton—F.g.r. of 278, 15s., with reversion in 83 yrs.	710
Hastings—F.g.r. of 210, 10s., with reversion in 61 yrs.	310
Enfield Highway—F. and c. g.r. of 270, with reversion in 33 yrs.	1,820
Southgate—F.g.r. of 211, with reversion in 35 yrs.	320
Stoke Newington—L.g.r. of 272, u.t. 72 yrs., g.r. 42.	1,420
Holloway—L.g.r. of 2198, 10s., u.t. 87 yrs., g.r. 21, 3s.	2,810
L.g.r. of 2115, 10s., u.t. 78 yrs., g.r. 21, 6s.	2,300
Whitechapel—1 and 3, Alle-pl., u.t. 18 yrs., g.r. 259, r. 2123	443
Marylebone—5, Charlton-st., u.t. 12 yrs., g.r. 214, r. 280	400
Bloomsbury—63 to 69 (odd), Endell-st., u.t. 27 yrs., g.r. 2100	1,250
Bethnal-green—59, 91, and 93, Seabright-st., u.t. 28 yrs., g.r. 217, 10s.	490
Commercial-rd. E.—118 to 118 (even), Cornwell-rd., u.t. 301 yrs., g.r. 224	280
Bow—33 to 43 (odd), High-st., and 7 to 13, Bowden-pl., u.t. 15 yrs., g.r. 225	600
Commercial-rd. E.—Eighteen houses in Cannon-rd., u.t. 41 yrs., g.r. 2450	140
Old Kent-rd.—92 to 100 (even), Kinglake-st., u.t. 16 yrs., g.r. 22, 12s.	300
By WILKINSON, SON, & WELCH (at Brighton).	
Brighton—10, Sussex-sq., F.	2,000
20, Arundel-st., f., in cascade	185
8, Chichester-rd., f., r. 210 p.s.	1,700
3, Chichester-pl., f., r. 216	700
Nov. 20.—By INMAN, SHARP, HARRINGTON, & ROBERTS.	
Kensington—10, Kensington-cr., u.t. 32 yrs., g.r. 210	500
By ROGERS, CHAPMAN, & THOMAS.	
Fimco—10, Westmoreland-pl., u.t. 44 yrs., g.r. 29	470
Paddington—L.g.r. of 227, u.t. 63 yrs., g.r. 22 p.s.	510
L.g.r. of 229, u.t. 67 yrs., g.r. 22	370
Baywater—L.g.r. of 2374, u.t. 61 yrs., g.r. 226	4,370
L.g.r. of 2122, u.t. 61 yrs., g.r. 22	2,130
Nov. 21.—By MULLIST, BOOKER, & CO.	
Hyde Park—26, Gloucester-ter., u.t. 50 yrs., g.r. 230, r. 2149	1,450
80, Gloucester-ter., u.t. 53 yrs., g.r. 25, 6s., r. 2200	2,950
L.g.r. of 224, 12s., u.t. 49 yrs., g.r. 22	658
By BLISS & SONS.	
Bethnal Green—7 to 15 (odd), Church-row, f. and l.	700
By E. OWNERS.	
Kilburn—27, St. Julian's-rd., u.t. 59 yrs., g.r. 210	370
By NEWBORN & HARDING.	
Barnsbury—29, Belitha-villas, u.t. 25 yrs., g.r. 210	340
27, Barnsbury-v., u.t. 34 yrs., g.r. 210, r. 250	400
Holloway—1, Stanley-ter., u.t. 69 yrs., g.r. 25, 6s.	280
Stoke Newington—80, Oldfield-rd., u.t. 74 yrs., g.r. 26	230
Balls Pond—F.g.r. of 216, 1s., with reversion in 14 yrs.	945
Camberwell—69, Camberwell-grove, u.t. 8 yrs., g.r. 212, 10s., r. 280	100
67, Camberwell-grove, u.t. 9 yrs., g.r. 211	50
Nov. 22.—By DOLMAN & PRANCE.	
Haverstock-hill—113, Queen's-crescent, u.t. 62 yrs., g.r. 27	430
By G. A. WILKINSON.	
Hornsey, Rose-hill—Three houses, with stable, c., r. 289 18s.	750
Muswell-hill—Six f. and c. cottages, r. 274 15s. p.s.	710
Penge—A plot of f. land, 1s. 1r.	2,550
By W. & F. HOUGHTON.	
Walthamstow, Hatherley-rd.—"Oak Villa," f. ...	530
"The Chestnuts" and "Eversleigh," f., r. 232...	790
By C. & H. WHITE.	
Bermondsey—84, 96, and 98, Tanner-st., f., area 16,000 ft.	3,000
Brixton—35, Loughborough-rd., u.t. 41 yrs., g.r. 24, 10s.	480
Waterloo-rd.—Nos. 168 and 170, u.t. 8 yrs., g.r. 215	260
By HENRY & LATCHFORD.	
Clapham—81, Old Town, f., r. 250 p.s.	785

[Contractions used in this list.—F.g.r. for freehold ground-rent; L.g.r. for leasehold ground-rent; L.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; u.t. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.s. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

SATURDAY, NOVEMBER 30.

University College, London (Archæology).—Demonstration at the South Kensington Museum. 7 p.m.

MONDAY, DECEMBER 2.

Royal Institute of British Architects.—Mr. R. Elsey Smith on "A Tour in Greece and Cyprus in 1888 as Greek Travelling Student." 8 p.m.

Society of Engineers.—Mr. P. F. Nurey on "Fox's System of Solid Pressed Steel Wagon Frames." 7.30 p.m.  
Royal Institution.—General Monthly Meeting. 6 p.m.  
Paper by Mr. F. M. H. Jones. 8 p.m.  
Liverpool Architectural Society.—Mr. Damer Harrison, F.R.C.S.E., on "The Medical Aspects of Ventilation." 7 p.m.

TUESDAY, DECEMBER 3.

Institution of Civil Engineers.—Further discussion on Mr. J. I. Thornycroft's paper on "Water-tube Steam Boilers for Marine Engines." 8 p.m.  
Society of Biblical Archæology.—8 p.m.  
Glasgow Architectural Association.—Mr. W. Connor on "Elgin Cathedral."

WEDNESDAY, DECEMBER 4.

British Archæological Association.—Mr. J. M. Wood on "The Round Tower Churches of Essex." 8 p.m.  
University College, London (Archæology).—Mr. H. Wallis on "Oriental Ceramic Art under the Mahammadan Dominion from the Seventh to the Fifteenth Century." 6 p.m.  
Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting. 8.30 p.m.

THURSDAY, DECEMBER 5.

Royal Archæological Institute.—(1) Mr. F. C. J. Spurrell on "A Sickle and Other Stone Implements lately brought by Mr. Findler Petrie from Egypt." (2) Mr. J. E. Bale on "A Norman Font in Toffrees Church, Norfolk." 4 p.m.

FRIDAY, DECEMBER 6.

Institution of Civil Engineers.—Students' Visit to the Electric Light Installation of the Great Western Railway at Paddington (assembled at the Electrician's Office), and to the Locomotive Running-sheds, at Westbourne Park, &c.  
Bradford Historical and Antiquarian Society.—Mr. T. T. Empall on "Bradford in the latter half of the Seventeenth Century." 8 p.m.

SATURDAY, DECEMBER 7.

Association of Public Sanitary Inspectors.—Mr. E. C. Robins, F.S.A., on "Reasons for the Adoption of a Uniform Title of 'Sanitary Inspector,' and Suitable Test Examinations." 6 p.m.

**The Ventilation of Schools.**—On Saturday last Professor Carnelley (Professor of Chemistry, Aberdeen University) delivered an address under the auspices of the Aberdeen branch of the Educational Institute on "The Sanitary Condition of Our Schools." Professor Pirie presided, and there was a large attendance. Professor Carnelley spoke more particularly of the air of schools. After showing how important good air was to health, he went on to speak of the great necessity there was for improvement in this direction, in so far as schools are concerned. He referred with satisfaction to the position Aberdeen occupied in having, in proportion to population, introduced the mechanical system of ventilation in more schools than any other town in the country. Aberdeen had introduced the system in four schools; and in the whole of England and Scotland there were only seventeen schools so ventilated. In almost all schools the cubic space was far too little, and the ventilation was deficient. It was necessary that ample cubic space should be provided, because if the space were small the amount of ventilation that would be required would have the effect of creating draughts, which might be more injurious than pure air. The older a school was the more micro-organisms there were; and the younger the children, the less carbonic acid and the more germs; boys made the air of a school much more impure than girls. As to what to do to render the air better, he said he had visited, eighteen months ago, 150 schools with 110,000 scholars, and had received details regarding 173 other schools with 165,000 scholars, and he had come to the conclusion that mechanical ventilation should be adopted in all new schools. It gave much greater purity to the air, and it was much more independent of the weather than any other means of ventilation. There was a more equal distribution of the hot and the fresh air; mechanical ventilation was very effective in diminishing the micro-organisms, and it reduced the draughts to a minimum. It was far more conducive to health and comfort, and it was a factor in increasing the power of teaching and learning. The cost of such a system in a school for 1,000 scholars was £40 per annum. At the close Professor Carnelley was cordially thanked for his address.

## Miscellaneous.

**Association of Manchester Students of the Institution of Civil Engineers.**—At a meeting of the Association of Manchester Students of the Institution of Civil Engineers, held on Wednesday, the 20th inst., Mr. J. Proctor, M.Inst.C.E., in the chair, a paper was read by Mr. Thos. Ashbury, Assoc.M.Inst.C.E., giving a description of the proposed "Channel Bridge," designed by Messrs. Schneider & Hersent, to connect England and the Continent, a subject which has from the beginning of this century occupied the minds of a great number of eminent engineers. The author gave a general description of the proposed bridge, situation, foundation works, the caissons, the situation and dimensions of the brickwork supporting the columns, the masonry, the construction, conveyance, and fitting into position of the supporting columns, levelling the ground and filling in the concrete base, materials and machinery required for the completion of the works, selection of systems of girders, and arrangement of metallic superstructure, construction, transport, and putting into position of the metal spans and cantilever arms, and machinery necessary for the same, estimates of weight, time required for the work and cost, the length of the bridge being twenty-four miles, estimate of cost £3,400,000, and time required ten years. After discussion, on the motion of Mr. E. T. Ward, A.M.I.C.E., seconded by Mr. A. W. Lawson, Stud.I.C.E., and supported by the Chairman, a hearty vote of thanks was unanimously passed to the author for his paper. We gave a view of the proposed bridge in the *Builder* for Oct. 19.

**Narrow Escape of Beverley Minister from Fire.**—The Rev. Precentor Venables, in a letter to the *Times*, narrates the narrow escape of Beverley Minister. He writes:—"A few days ago sparks were seen to issue from the roof of the choir. Help, happily, was at hand, and the fire was speedily got under, but not till two or three of the main beams had been burnt through. The cause of the fire was the usual one—plumbers working on the roof, and carrying their fire-pans up with them to that windy height. Such work must ever continue necessary, for leaden roofs will ever need repair. But it need never be dangerous. No fire need ever be taken to the roof. I speak from experience. For the last twenty years the roofs of Lincoln Cathedral, which are of vast area, have been continually under repair; but our rule has been, whenever a defect has appeared, to strip off the whole faulty sheet, re-cast it, and replace it. No fire is on any pretence allowed to be taken to the roof, not—and this is most important—is any soldering allowed to patch-up holes. This is the chief cause of danger. Soldering is profitable to plumbers, and, therefore, popular to them; but it must be sternly prohibited as fraught with peril to the building. The Lincoln plan is perhaps a costly one, but it is the only safe one, and it may turn out to be the cheapest in the end, when one realises the cost incurred, to say nothing of other more serious losses, by the conflagration of a great church or cathedral. Is it too much to hope that this plan may become the rule instead of, as I fear it, the exception?"

**The English Iron Trade.**—Although the English iron market has been lately somewhat unsettled by the action of speculative investors, a more confident feeling has now been established in the trade. It is now certain that the recent advances were the natural result of a large and growing demand, and that we may look forward to a steady market and continued activity. There is a quieter tone in pig-iron, but it is combined with strength and firmness. The Glasgow and Cleveland warrant markets have been less excited; prices are lower for the former, and about the same as last week for the latter. Scotch makers' iron, although still in good demand, shows some up-and-down fluctuations. Bessemer pig in the north-west has receded 3s. per ton, and east coast brands are a shade lower, notwithstanding that it is scarce. The inquiry for manufactured iron has somewhat revived, although rates are almost prohibitive. The demand for steel continues very active, but slight reductions in prices are reported; steel material in the north-west being about 2s. 6d. a ton lower. Ship-building has again been stimulated by fresh orders placed this week. Engineers continue actively employed.—*Iron.*



**The Proposed Edinburgh Exhibition.**

On Monday a meeting of the London committee recently formed in connexion with the forthcoming International Exhibition of Electrical Engineering, General Inventions, and Industries, at Edinburgh, was held at the Mansion House. The Lord Mayor (Sir H. A. Isaacs) presided, and there were present Sir Lyon Playfair, Captain Shaw, C.B., Mr. G. N. Hooper, Mr. Ames Parman, Major Flood-Page, Mr. W. Oldham Chambers, Mr. J. C. Chubb, and a deputation from Edinburgh, consisting of Mr. R. Cranston, jun., Councillor Kinloch Anderson, Mr. A. R. Bennett, Mr. G. E. Watson, and Mr. Mitchell Thomson. The Lord Mayor having opened the proceedings, Sir George H. Chubb, chairman of the London committee, said it had been thought desirable to form that committee in connexion with the exhibition to give to those undertaking the arrangements the benefit of their advice and experience; and from the number of persons of eminence and distinction who had consented to join the committee there could be no doubt that the metropolis and the south of England generally would be well represented. They were especially glad to have the countenance and support of the Lord Mayor. The duties of the committee would be light, and the members would have no responsibility, monetary or otherwise, but it would be, perhaps, well to appoint a small sub-committee to further the interests of the exhibition. Mr. Lee Bapty, the general manager of the exhibition, said, speaking from experience of other similar undertakings, the prospects of the exhibition were extremely favourable. It had an exceptionally fine site of 90 acres, and there would be two railways within the grounds. The buildings were well under way, and the applications for space were very satisfactory. Foreign nations would be remarkably well represented. Councillor Anderson, of Edinburgh, said the idea of holding an electrical exhibition was due to the fact that electricity was a subject more before the public at present than perhaps any other. Large communities and companies were considering the matter of electric lighting and the uses of electricity for general purposes, and it was thought that to have a demonstration of electrical engineering and inventions on a scale never before attempted would be to the real benefit of the country at large. There would be, besides the electrical exhibits, classes for general inventions and industries and the arts. Mr. G. E. Watson, the Secretary of the exhibition, said the guarantee fund amounted ready to 23,000l., and the buildings would cost 5,000l., or more. The exhibition would be open from May 1 to Nov. 1, and applications for space could be received until Jan. 1 next.

**Civil and Mechanical Engineers' Society.**—On the 18th inst. Messrs. David Kirkaldy & Sons received the members of this society at their testing and experimental works, 99, Southwark-street. Mr. Kirkaldy, jun., showed his drawings of the historical steamship *Perla*. This is a most excellent piece of artistic draughtsmanship, and is stated to be the only mechanical drawing ever accepted and hung by the Royal Academy. In the presence of the visitors a tensile test was carried out on a piece of steel with 3 in. cross-sectional area in the million lbs. machine, which Mr. Kirkaldy built many years ago in such a way that it might equally well bring destruction on a girder 25 ft. long or a full-sized bridge strut, and also test exactly a small specimen of tinplate. The company were next shown the extensive and well-arranged museum, fully described by a member as a "Temple of Destruction," where they saw specimens of every kind of material, which had been subjected to every kind of stress, and amongst them several evidences of rascality which the gineer who does not have a percentage of his material tested always exposes himself to.

**Builders' Clerks' Benevolent Institution.**—At a special general meeting of the donors and subscribers, convened by advertisement, and held at the offices, 21, New Bridge-street, E.C., on Tuesday, the 26th inst., Mrs. Fisher, the widow of a builder's clerk, was elected to the pension of 20l. per annum by a show of hands, she being the only candidate. It makes a total of nineteen pensioners now on the books of the Institution. The proceedings were very brief, and at the close a vote of thanks was presented to Mr. E. Graystone (of the firm of Messrs. Hall, Biddall, & Co.), who had presided, in the unavoidable absence of Mr. John Aird, M.P., the President of the Institution.

**British Archaeological Association.**

The new session of this Association was commenced by a meeting on Wednesday, November 20, the Rev. S. M. Mayhew being in the chair. It was reported that the proposed demolition of the ancient Butter-market, Dartmouth, had been reconsidered, and that the buildings were now safe. A certain portion of the domestic buildings of Eggeston Abbey have recently been demolished, and a remonstrance had been addressed by the Association to the owner in favour of preserving what still remains. Mr. J. T. Irvine exhibited sketches of some curious objects of antiquity recently found near Crowland. Mr. Earle Way described an ancient tumulus at Leadfield, Oxon, and exhibited a stone mortar which was found in searching for treasure in the tumulus about sixty years since. It was filled with Roman brass coins at the time of its discovery; specimens of the coins were exhibited. Mr. Oliver read a description of the fine brass of Flemish execution, in All Saints Church, Newcastle, to the memory of Roger Thornton, 1429, and exhibited a rubbing. (We illustrated this brass on one of our double-page plates on November 16.) Mr. Lyman described a curious earth-work, or fortified post, to which much local attention has recently been drawn, but which does not seem to have been previously examined with much attention. It is situated in the valley of the River Blythe, about four miles from Stoke-on-Trent. It consists of a rectangular space 155 ft. by 150 ft., surrounded by double ditches, while a third extends along a single side. These are sunk in the general level of the site, and there are no raised banks. The quadrangular form suggests a Roman origin, and a Roman road existed at no great distance from the site. Mr. Loftus Brock, F.S.A., exhibited various portions of fifteenth-century service-books, which had been used by foreign book-binders for covering printed books of sixteenth-century date. One sheet of MS. still did duty as cover to an Italian book printed at Venice, 1553. The first paper, illustrated by some capital rubbings of brasses, was by Mr. C. H. Compton, on South Creake, Norfolk. The second paper was by Mr. Thos. Morgan, F.S.A., and had for its title, "The Rose of Provence and the Lilies of France."

**PRICES CURRENT OF MATERIALS.**

TIMBER.		£. s. d.		£. s. d.	
Greenheart, B.G.	ton	7	0	7	15 0
Teak, E.I.	load	12	0	14	0 0
Sapwood, U.S.	foot cube	0	2	0	3 0
Ash, Canada	load	8	0	4	5 0

**TIMBER (continued).**

		£. s. d.		£. s. d.	
Birch	"	3	0	4	15 0
Kim	"	3	10	4	15 0
Fir, Dantes, &c.	"	2	0	8	10 0
Oak	"	2	10	4	10 0
Canada	"	5	10	7	0 0
Pine, Canada red	"	2	10	3	10 0
" yellow	"	3	0	5	5 0
Lath, Dantes, &c.	fatton	4	10	5	10 0
St. Petersburg	"	5	0	8	10 0
Wainscot, Higs, &c.	log	2	15	4	5 0
Deals, Finland, 2nd and 1st	std. 100	8	10	11	0 0
" 4th and 3rd	"	7	0	8	15 0
Higs	"	7	0	9	0 0
St. Petersburg, 1st yellow	"	11	0	14	0 0
" 2nd "	"	9	0	11	0 0
" white	"	11	0	10	0 0
Swedish	"	8	0	18	0 0
White Sea	"	9	0	17	0 0
Canada, Pine, 1st	"	18	0	26	0 0
" 2nd "	"	11	0	17	10 0
" 3rd, &c.	"	8	0	10	10 0
" Spruce, 1st	"	9	0	11	0 0
" 3rd and 2nd	"	7	0	9	0 0
New Brunswick, &c.	"	8	0	8	10 0
Battens, all kinds	"	6	0	17	0 0
Flooring Boards, sq., 1 in., prepared, First	"	0	11	0	14 0
" Second	"	0	8	0	10 0
Other qualities	"	0	6	0	7 0
Cedar, Cuba	foot	0	0	4 1/2	0 0
Honduras, &c.	"	0	0	4 1/2	0 0
Mahogany, Cuba	"	0	0	5	0 0
St. Domingo, cargo average	"	0	0	5	0 0
Mexican, cargo average	"	0	0	4 1/2	0 0
Tobacco	"	0	0	5 1/2	0 0
Honduras	"	0	0	5 1/2	0 0
Bor, Turkey	ton	4	0	13	0 0
Rose, Rio	"	15	0	29	0 0
Bahia	"	14	0	18	0 0
Satin, St. Domingo	foot	0	0	9	1 0
Porto Rico	"	0	0	9	1 0
Walnut, Italian	"	0	0	4 1/2	0 0

**METALS.**

Iron—Bar, Welsh, in London	7	0	0	7	10 0
" at works in Wales	7	0	0	0	0 0
" Staffordshire, in London	8	10	0	9	10 0
Copper—					
British, cake and ingot	ton	63	0	54	0 0
Best selected	"	64	5	65	0 0
Sheets, strong	"	64	0	65	0 0
Chili, bare	"	47	0	0	0 0
Yellow Metal	lb.	0	5	0	5 1/2
Lead—Pigs, Spanish	ton	14	0	14	5 0
English, com. brands	"	13	0	14	7 0
Sheet, English	"	15	15	16	0 0
Tin Straits	"	98	10	0	0 0
Australian	"	97	0	0	0 0
English ingots	"	101	0	0	0 0

**OILS.**

Linseed	ton	21	2	6	21 7 6
Cocoon, Coochin	"	28	0	26	10 0
Ceylon	"	23	0	23	5 0
Palm, Lagos	ton	28	0	0	0 0
Rapeseed, English pale	"	31	0	0	0 0
" brown	"	33	0	0	0 0
Cottonseed, refined	"	23	10	0	0 0
Tallow and Oleine	"	21	0	40	0 0
Lubricating, U.S.	"	6	10	0	10 0
" refined	"	7	0	13	0 0
Tar—Stockholm	barrel	1	6	0	0 0
Archangel	"	0	15	8	0 0

**COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.***Epitome of Advertisements in this Number.***COMPETITION.**

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
New Police Buildings	South Shields Corp.	50l., 30l., and 20l.	Feb. 15th	ii.

**CONTRACTS.**

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Slop Vans	Paddington Vestry	Official	Dec. 2nd	xii.
Wrought-iron Fencing, Gates, Pillars, &c.	Hendon Local Board	S. S. Grimley	do.	ii.
Cast-iron Pipes	Southend Local Board	P. Dodd	Dec. 3rd	ii.
New Well	East Grinstead Gas and Water Company	do.	do.	ii.
Re-sewering and Paving Mews	Ealing Local Board	Official	Dec. 5th	ii.
Stores	G. N. R. Co.	do.	Dec. 7th	ii.
Roadmaking Works	Hendon Local Board	S. S. Grimley	Dec. 9th	xii.
Supply of Stores, &c.	St. Mary (Islington) Vestry	Official	do.	xii.
Kerbing, Tar-paving, Metalling, &c., Works	Lewisham Bd. of Wks.	do.	Dec. 10th	xii.
Sewering and Making-up Road	West Ham Council	Lewis Angell	do.	ii.
Roadmaking and Paving Works	Fulham Vestry	W. Sykes	Dec. 11th	xii.
Roadmaking Works	Wood Green Local Bd.	Official	Dec. 13th	ii.
Works and Materials	St. George (Hanover Square) Vestry	G. Livingstone	Dec. 14th	xii.
Broken Granite and Flints	Southend Local Board	P. Dodd	Dec. 17th	xii.
Sewer and other Works	Acton Local Board	D. J. Ebbetts	do.	xii.
Works at Outlet and Roads, Thirlmere Wks.	Manchester Corp.	G. H. Hill	Dec. 24th	xii.
Palm House, with Boiler, &c., Exeter		E. H. Harbottle	Not stated	ii.
New Church, Stoke-on-Trent		C. Lyman	do.	ii.

**PUBLIC APPOINTMENTS.**

Nature of Appointment.	By whom Advertised.	Premium.	Applications to be in.	Page.
Drawing Clerk (Surveying Department)	Hackney Bd. of Works	30s. weekly	Dec. 2nd	xvi.
Sanitary Inspector	Whitechapel Bd. of Wks.	125s.	Dec. 5th	xvi.
Assistant Sanitary Inspector	St. Mary (Newington) Vestry	125s.	Dec. 7th	xvi.
Junior Assistant in Surveyor's Office	Blackpool Corporation	60s.	Dec. 11th	xvi.
County Surveyor	Glamorgan C. C.	750l.	Dec. 20th	xvi.



## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursday.]

**FELIXSTOWE.**—For pulling down the present women's wing at the Suffolk Convalescent Home, the erection of the new Curthorpe Quilter wing, and the execution of other works for the Committee of the Institution. Mr. E. F. Bishopp, architect, Ipswich:—

A. Brown .....	£3,500 0 0
H. Everett & Son .....	3,500 0 0
Geo. Grimwood & Son .....	3,400 0 0
H. Bunnacles .....	3,400 0 0
J. Grimes .....	3,400 0 0
A. Cox .....	3,300 0 0
T. Ward, Felixstowe (accepted) .....	3,200 0 0

**LONDON.**—For building new offices, &c., Whitefield-street and Partridge-place, Finsbury, E.C., for Messrs. Blades, East, & Blades. Mr. O. R. Winter, architect, 119, Finsbury-pavement, E.C. Quantities by Mr. Mark W. King:—

E. Todd .....	£1,020 0 0
Jas. Greenwood & Son .....	954 0 0
Clark & Bracey .....	950 0 0
John Greenwood .....	947 0 0
Jas. Kent .....	955 0 0
W. Smith, Son, & Fletcher .....	938 0 0
Woodward .....	929 0 0

**LONDON.**—For pulling down and rebuilding 2, Great Titchfield-street, W. Mr. W. J. Miller, architect, 182, Oxford-street, W.:—

Tomas .....	£1,000 0 0
Bywater .....	1,039 0 0
Stevens .....	1,025 0 0
A. A. Webber, Mortimer-street* .....	1,016 0 0

\* Accepted.

**LONDON.**—For rebuilding No. 8, Prince's-street, Wilson-street, Finsbury. Mr. Sidney G. Goss, A.R.I.B.A., architect, 24, Finsbury-circus, E.C.:—

J. Grover & Son .....	£1,700 0 0
J. Morter .....	1,697 0 0
J. T. Chappell .....	1,688 0 0
J. W. Mollett .....	1,647 0 0
E. Toms .....	1,639 0 0
Neave & Neave (accepted) .....	1,619 0 0

**LONDON.**—For alterations, &c., at premises 11, Tokenhouse-yard, E.C. for Mr. J. Jones. Mr. W. Jacobs, surveyor, 1, Angel-court, E.C.:—

Frost .....	£373 0 0
Patrick & Son .....	547 0 0
Kilby & Gayford .....	507 0 0
Richardson Bros. ....	473 0 0
Coldwells & Son (accepted) .....	378 0 0

**LONDON.**—For the erection of a pavilion in the garden enclosure of Finsbury-square, Messrs. William Reddall & Son, architects, 10, South-street, Finsbury, E.C.:—

Woodward & Co. ....	£563 0 0
Kilby & Gayford .....	430 0 0
Heaps .....	423 0 0

**LONDON.**—For additional stabling at Castle-street, Finsbury, for Messrs. McNamara & Co. Mr. Lambham, surveyor:—

G. Parker (accepted) .....	£1,075 0 0
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[No competition.]

**STAINES.**—For erecting four houses, Laleham-road. Mr. W. I. Chambers, architect:—

T. Trent, Ascot .....	£2,949 0 0
G. Reavell, Staines .....	3,500 0 0
Jas. Norris, Sunningdale .....	2,495 0 0
Oades Bros., Egham .....	2,400 0 0
J. A. Baker, Staines .....	2,400 0 0
Mathews & Mann, Weybridge .....	2,257 0 0

\* Accepted, subject to modifications.

**SWANSEA.**—For new stables and dwelling-house in Frog-street, Swansea. Mr. H. C. Portsmouth, architect, Swansea. Quantities by the architect:—

Jenkins Brothers, Swansea* .....	£2,375 0 0
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\* Accepted.

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H. H.—T. H.—E. F.—R. F.—R. F.—R. F. (no). A slab does not become an arch constructionally because it is cast in the form of an arch. F. E. ("Spire") has a definite significance in architectural nomenclature, viz., a high pointed terminal feature to a tower. "Steeples" (Anglo-Saxon *stipes*) has no such definite meaning; it signifies merely a high tower of any kind, though in common custom it is generally applied more particularly to a church tower. A "steeples" may terminate in a spire or not; it is equally a "steeples" in either case.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

**NOTE.**—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY, but those intended for the front Page should be in by the same hour on WEDNESDAY.

**SPECIAL.**—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY morning.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

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Walnut Dadoes " 1s. 11d. "  
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Solid 1-inch Oak, straight boards, laid and polished, at 28. 15s. a square.  
Solid 1-inch Oak Parquet for covering Deal floors, laid and polished, from 25 a square.  
Oak Wood Tapestry Dadoes, from 1s. per foot super.  
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# The Builder.

VOL. LVII. No. 2444.

SATURDAY, DECEMBER 7, 1889.

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House, "Broom-y-Nant," Colwyn Bay.—Mr. Gerald C. Horsley, Architect.....	Double-Page Photo-Litho.
Sketches ("Wayside Notes") on the Norfolk Broads.—By Mr. John Shewell Corder, Architect.....	Double-Page Photo-Litho.
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### Private Bills and the Session of 1890.



It is stated that the applications for private Bills in the ensuing session amount to 228 in number, and that thirty-six of these relate either entirely or partially to London. Of the Bills to be brought in by the London County Council, two will be treated as public measures,—one being for regulating the theatres, and the other for amending the Metropolitan Management Act. To the Council's "Miscellaneous Powers" Bill we have already adverted.\* Their proposals in connexion with what is known as the Holywell-street, Strand, improvements will attract some attention, inasmuch as it is understood that the Council do not propose to concede the hitherto customary premium in consideration of compulsory disturbance or ejectment, and that their Bill will provide that owners or occupiers of property increased in value by this improvement shall contribute towards the cost thereof in proportion to such increase. The area within which these contributions shall be required, their several amounts, mode of recovery, and so on, will be determined by arbitration, or otherwise, as this Bill may provide. The Strand District Board of Works have already carried a unanimous resolution to oppose this Bill, on the ground that they deem it neither just nor reasonable that the Board should be called upon to specially bear any cost of the widening of the Strand (an improvement, they urge, necessary not only in the interests of the metropolis, but of the country) beyond that which is borne by the metropolis at large, in the manner provided by the Acts now regulating improvements of a metropolitan character. Of the Council's other private Bills may be cited that for the making and maintenance of subways, and for bringing all overhead wires under the Council's control. They seek for powers to transfer underground all such overhead wires as they may require to be removed, and to register, inspect, and regulate the rest, as well as to control the placing and maintenance of any tubes, wires, or similar appliances that are laid over, above, along, or across the

streets. They will ask for powers to require that all companies and persons supplying water, or gas, within the county limits, or having right to interfere with the streets, shall use the subways for their mains, pipes, and underground works, furnish plans and sections thereof, and pay rent for use of the same. Another of the Council's Bills relates to the removal of certain gates and bars in the parishes of St. Pancras and St. Giles-in-the-Fields, which have hitherto obstructed the road traffic along Torrington-place, Sidmouth-street, Upper Woburn-place, and Gordon-street. These obstacles stand upon the Bedford Estate; their abolition is to be effected upon such terms as may be agreed upon between the Council and their owner, and is to extinguish all rights, easements, and privileges which would interfere with the objects of this measure.

But for London the perhaps most noteworthy scheme is one for constructing an underground railway between Queen's-road, Bayswater, and the City of London and Southwark Subway, which latter, extending to Stockwell (and to be carried on to Clapham), will be shortly ready for traffic. Mr. Greathead, engineer of the Subway, will be associated with Sir John Fowler and Mr. Benjamin Baker in constructing this new line, which it is proposed to carry in two tubes, of about 11 ft. diameter, at a considerable depth below the surface. Beneath a portion of the route chosen,—that is, between Holborn and the General Post-office,—was laid, about twenty years ago, a branch of the Pneumatic Despatch Company's Service, for the transmission of mails and parcels by atmospheric agency. The gauge for the Central London Railway is fixed at the standard of 4 ft. 8½ in. "The motive-power to be employed will be electricity, or any mechanical power (other than steam locomotives)." Other similar lines are in the field; for instance, the City and North London, Kensington and Paddington, and North and South London.

Apropos of the recent strike by dock labourers, we should mention that the London and India Docks Joint Committee will ask to authorise the owners, agents, consignees, and masters of vessels resorting to their docks (formerly known as the London and St. Katharine's, and the East and West India Docks) to unload at their own expense, or at charges of the owners or consignees of the cargoes; the Committee levying rates and dues for the use of their quays, wharves, or

craft. The Regent's Canal, City and Docks Railway will ask for an extension of the period granted by the Act of 1882, in respect of their undertaking; but at the same time promote another Bill for the abandonment of the railway which was authorised by section 31 of that Act, for a repeal of the provisions for purchasing the canal, and for a general re-adjustment of their affairs. So, likewise, we find that the owners of Columbia Market, Bethnal-green, wish to relinquish their project, under the Act of 1885, for a railway, new street, and other works.

The official notice of the South-Eastern Railway recalls, by the way, two forgotten incidents in the past history of London. The company seek to commute a rent-charge of 40l. per annum payable by them to the trustees of Stow-in-the-Wold parochial charities issuing out of the Gleane, or Gleane-alley, Tooley-street, as acquired for purposes of the London and Greenwich line (1834-6); and another rent-charge of 70l. 3s. 4d. per annum, due to the Corporation, which issues out of lands in the parish of All Hallows the Great, formerly the Steel Yard Estate, but now covered by Cannon-street terminus.\* This company intends to complete its extension line from Strood Station to East Rochester, and to widen portions of its system in Bermondsey and Southwark. The Great Eastern ask for the transfer to them of the Hunstanton and West Norfolk Railway Company, for various minor alterations of their main and suburban lines, and for powers to contribute towards the expense of widening and improving the North Quay, Yarmouth. The proposed widening of some of the suburban lines by the London, Brighton, and South Coast Railway involves the sacrifice of 5,776 square yards of Tooting Bec Common. This company's Bill asks for confirmation of an arrangement made with the mayor and aldermen for sale of the site of the Central Croydon Station,—by the field, Park-road, where, within our own memory, Croydon fair was held,—for the erection thereon of a new town hall, with library, fire-station, municipal offices, &c. The Great Western contemplates two branch lines—Avonmouth Dock, via Berkeley, to Almondsbury, in Gloucestershire, and Urchfont to East Coulston, in Wiltshire; also to widen its main line as between Taplow, across the Thames, Maidenhead, Twyford, Wargrave, Sonning, and Reading. The Channel Tunnel

\* See "Note" in the Builder of November 30 last.

\* Vide the Builder, October 27, 1888.

Company mean to continue their borings "for experimental purposes," still with a view to ultimately securing sanction by the Treasury to the prosecution and completion of the works upon a permanent basis.

We hear that 179 applications, including 26 for London and the suburbs, have been made from various parts of the United Kingdom to the Board of Trade for the grant of Provisional Orders in respect of electric lighting, under the Acts of 1882 and 1888. Within Metropolitan limits the London Electric Supply Corporation undertakes to serve the area of the City of London with its liberties; whilst the Kensington and Knightsbridge Electric Light Company will appropriate the parishes of Paddington, Marylebone, and St. George, Hanover-square, together with so much of St. Mary Abbott, Kensington, and St. Margaret and St. John, Westminster, as is not already included by their Order of this year. Other large districts are similarly provided for: such as Lambeth, St. Pancras, Hammer-smith, Strand, and St. Martin's-in-the-Fields, &c. The Chelsea Electricity Supply Company are now fully established in their "generating" works at Draycott-place, near to Sloane-square; their existing installation extends to more than 5,000 lamps, and they anticipate that this number will speedily rise to 30,000 more, and thus provide for an opulent quarter lying about Sloane-street, Cadogan-place, Lowndes-square, Onslow-square, and Fulham-road.

Compared with the figures (in brackets) which we gave last year, some of the totals

for this year stand as follows:—72 railways [47], 12 tramways [14], and 46 provisional orders for tramways, railway certificates, gas and water bills, and piers and harbours [46]. To these should be added 38 bills deposited with the Board of Trade, Harbour Department, for various canal, waterside, and navigation works.

### ROLLED JOISTS.

BY A. T. WALMSLEY, M.INST.C.E.

**A**T a recent meeting of the Royal Institute of British Architects a paper was read upon the application of iron and steel to building purposes, and attention was drawn to the variations in the amounts of the safe loads given in the lists furnished by manufacturers and dealers in rolled joists (see the *Builder*, Nov. 23, p. 366). It was also stated that the limit of stress per square inch, upon which such sections are calculated, is very rarely given, and that this accounts for the discrepancies which have doubtless been noticed in different printed lists.

Any load or combination of external forces applied to a joist will produce an alteration in the form or outline of that joist. This alteration is termed "strain," and the resistance which the particles composing the joist offers to prevent this change of form is termed "stress." If the material be strained beyond its limit of elasticity it does not return to its original shape or volume, and a "set" is produced, the consideration of which must be

borne in mind by every constructor. Hence a coefficient of safety is usually assumed to reduce the ultimate unit breaking stress to a working unit stress within the elastic limits. Makers' lists give the safe distributed load for various clear spans measured between bearings, when the girders or joists forming the girders are freely supported, but the effect upon the girder varies with the way the loads are applied.

The following table gives the resistance in "inch-tons" of given sections in the order of their depth from 22 in. to 3 in. By "inch-tons" is meant the product of tons weight multiplied by square inches sectional area, and the term "inch-tons" is applied exactly in the same way as the term "foot-pounds" is applied to horsepower, it being well known that 33,000 lbs. moved 1 foot per minute, or 1 lb. moved 33,000 ft. per minute, constitutes one-horse power. Hence, in calculating stresses the bending moment must be equated to the moment of resistance, as fully explained in our Student's (Column "Iron," article xxi. (the *Builder*, May 26, 1888, p. 381). The moments of resistance are derived from the moments of inertia, and the method of arriving at the moments of inertia are shown in the Students' Column of May, 1888, pages 345 and 364.

In the following table the moment of inertia  $= I = \frac{(BA^3 - 2ED^3)}{12}$ , plus four times the area of the curved angle piece at K, multiplied by the square of the distance of the

### SECTIONS OF ROLLED JOISTS.

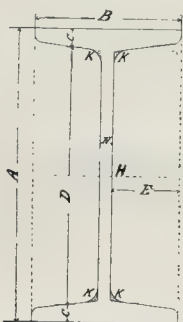
Stated Sizes.	Calculated Mean Thick- ness of Flanges.	Calculated Thickness of Web.	Maker's Reference Number.	Stated Weight per foot run in lbs. for wrought iron.	Sectional Area in square inches.	Moment of Inertia.	Moment of Resistance.		Maker's List from which the Calculation is made.	REMARKS.
							Iron.	Steel.		
inches.	inches.	inches.		lbs.	sq inches					
22 x 8	1 1/2	1 1/2	A <sup>4</sup>	112	33.6	2514.64	1143.01	1600.22	Gardner, Anderson, & Clarke	
20 x 8	1 1/2	1 1/2	A <sup>3</sup>	105	31.5	1905.519	952.76	1333.863	do.	
19 1/2 x 7 1/2	1 1/2	1 1/2	50L	100	30.0	1682.239	851.76	1192.47	Measures Bros.	
19 1/2 x 7	1 1/2	1 1/2	A <sup>4</sup>	102	30.6	1685.877	853.608	1195.05	Gardner, Anderson, & Clarke.	
18 1/2 x 7	1 1/2	1 1/2	A <sup>4</sup>	92	27.6	1611.313	815.85	1142.19	M. T. Shaw & Co.	
17 1/2 x 6 1/2	1 1/2	1 1/2	A <sup>2</sup>	83	24.9	1237.953	687.75	962.85	Gardner, Anderson, & Clarke.	Measures, 1 lb. per ft. run less (No. 45L).
17 1/2 x 6	1 1/2	1 1/2	45L	82	24.6	1425.184	802.92	1124.08	Measures Bros.	
16 1/2 x 6	1 1/2	1 1/2	41	77	23.1	1087.673	612.77	857.88	M. T. Shaw.	
16 x 6	1 1/2	1 1/2	40L	70	21.0	850.342	507.66	710.73	do.	
15 x 5	1 1/2	1 1/2	2	52	15.6	745.479	465.924	652.294	Measures Bros.	Gardner, 1 lb. per ft. run heavier (No. 1).
14 x 6	1 1/2	1 1/2	35L	60	18.0	548.95	392.107	548.95	Gardner, Anderson, & Clarke.	
12 x 6	1 1/2	1 1/2	30M	56	16.8	380.42	317.02	443.82	Measures Bros.	
12 x 5	1 1/2	1 1/2	30L	42	12.6	293.100	244.25	341.95	do.	
10 x 6	1 1/2	1 1/2	25HH	56	16.8	268.027	268.03	375.237	do.	Gardner, 1 lb. per ft. run heavier (No. 7).
10 x 6	1 1/2	1 1/2	43	44	13.2	216.173	216.173	302.642	do.	Gardner, 1 lb. per ft. run heavier (No. 10).
10 x 5	1 1/2	1 1/2	25LH	36	10.8	172.846	172.846	241.944	M. T. Shaw.	
10 x 4 1/2	1 1/2	1 1/2	25L	32	9.6	145.846	145.846	204.184	Measures Bros.	Gardner, 1 lb. per ft. run heavier (No. 11).
9 1/2 x 4 1/2	1 1/2	1 1/2	10A	30	9.0	130.427	137.29	192.208	do.	Gardner, 1 lb. per ft. run heavier (No. 12).
9 1/2 x 4	1 1/2	1 1/2	24LH	29	8.7	126.556	133.216	186.53	M. T. Shaw & Co.	
9 x 3 1/2	1 1/2	1 1/2	23L	24	7.2	94.105	101.735	142.429	Measures Bros.	Gardner, 1 lb. per ft. run heavier (No. 14).
8 x 6	1 1/2	1 1/2	20HH	36	10.8	115.027	143.783	201.297	do.	
8 x 6	1 1/2	1 1/2	19	34	10.2	110.548	138.185	193.459	Gardner, Anderson, & Clarke.	
8 x 5 1/2	1 1/2	1 1/2	13	29	8.7	89.831	112.289	157.204	M. T. Shaw & Co.	
8 x 4 1/2	1 1/2	1 1/2	20L	22	6.6	65.632	81.915	114.681	Measures Bros.	
8 x 2 1/2	1 1/2	1 1/2	28	15	4.5	41.138	51.422	71.991	M. T. Shaw.	
7 x 2 1/2	1 1/2	1 1/2	18L	20	6.0	44.889	64.127	89.778	Measures Bros.	M. T. Shaw, 1 lb. per ft. run lighter (No. 19).
6 1/2 x 3 1/2	1 1/2	1 1/2	29	14	4.2	19.22	27.46	38.44	M. T. Shaw.	
6 1/2 x 3	1 1/2	1 1/2	16L	16	4.8	30.074	48.118	67.365	Measures Bros.	
6 1/2 x 2 1/2	1 1/2	1 1/2	22	18	5.4	29.652	47.44	66.420	M. T. Shaw.	
6 1/2 x 2	1 1/2	1 1/2	31	13	3.9	21.527	31.443	48.220	do.	
6 x 5	1 1/2	1 1/2	016	11	3.3	18.78	30.048	42.066	Measures Bros.	
5 1/2 x 2	1 1/2	1 1/2	22A	30	9.0	50.823	84.705	118.587	M. T. Shaw.	Measures Bros., 1 lb. per ft. run lighter (No. 153L).
5 x 4 1/2	1 1/2	1 1/2	32	10	3.0	12.526	22.774	31.880	do.	
5 x 3 1/2	1 1/2	1 1/2	145L	23	6.9	27.170	54.34	76.076	Measures Bros.	
4 1/2 x 3	1 1/2	1 1/2	25A	13	3.9	15.499	30.996	43.394	M. T. Shaw.	
4 1/2 x 2	1 1/2	1 1/2	12L	13	3.9	12.99	27.347	38.286	Measures Bros.	
4 1/2 x 1 1/2	1 1/2	1 1/2	34	8	2.4	7.84	16.505	23.107	M. T. Shaw.	
4 x 3	1 1/2	1 1/2	012	8	2.4	7.281	15.328	21.459	Measures Bros.	
4 x 2	1 1/2	1 1/2	38	12	3.6	8.786	21.965	30.751	M. T. Shaw.	
4 x 1 1/2	1 1/2	1 1/2	36	8	2.4	5.79	14.475	20.265	do.	
3 1/2 x 1 1/2	1 1/2	1 1/2	44	7	2.1	5.092	12.725	17.815	Gardner, Anderson, & Clarke.	
3 x 1 1/2	1 1/2	1 1/2	37	5 1/2	1.65	2.280	7.296	10.214	M. T. Shaw.	
3 x 1	1 1/2	1 1/2	39	10	3.0	4.197	13.99	19.586	do.	
3 x 1 1/2	1 1/2	1 1/2	47	5 1/2	1.65	2.337	7.79	10.906	Gardner, Anderson, & Clarke.	
			08	5	1.5	1.976	6.587	9.221	Measures Bros.	



centre of gravity of K from the centre of the uniform section of joint at H.

Thus in the case of rolled joist No. A<sup>4</sup> (see table), stated to be 22 in. by 8 in.,

$$I = \frac{(8 \times 22^3) - (2 \times 3 \cdot 62 \times 19 \cdot 69^3)}{12} + 4 \cdot (0 \cdot 6) 9 \cdot 5^2 = 2514 \cdot 64.$$



It is always advisable in selecting a section for a design to inquire if it is actually kept in stock. All sections which are described in makers' lists can be supplied direct from the works at special quotations, but in many cases time must be allowed for rolling, so that it is often expedient to employ a heavier section which is kept in stock than to incur the risk of delay in waiting for a special section, the strength of which would satisfy the conditions under which it is to be loaded. Most sections named in the usual trade lists can be rolled to order 10 per cent. thicker or thinner in both flanges and web if required. Two or more joists coupled together with a wrought-iron plate rivetted on to one or both flanges, forming a box-girder, are not only laterally stiffer than a single beam of the same weight of metal; but, according to Fairbairn, are a trifle stronger for the same span and depth.

Rolled joists are usually obtainable from stock in lengths from 10 ft. to 36 ft., with all intermediate lengths of even feet; but under no circumstances can a girder less in depth than  $\frac{1}{4}$ th of the span be recommended, although some makers take  $\frac{1}{5}$ th as the limit. Extra prices are usually charged for lengths over 30 ft. The large sections can be rolled to over 40 ft., but the increased cost of manufacture, and especially of carriage, renders the price of extra lengths prohibitive, except for special cases.

In addition to the makers named in the table, Messrs. Long & Co., of Middlesbrough, Yorkshire, publish a useful list of mild steel sections, in which the weights of maximum, mean, and minimum sizes are given, and also data for calculating the strengths, in which the following factors of safety are observed: (a) One-third of the ultimate load for a dead load, which may include all permanent or stationary loads gradually applied; (b) one-fourth for loads not so gradually applied; and (c) one-fifth for live loads rapidly moving or suddenly applied. In the table here given a coefficient of about one-fourth, as a mean, has been worked to. Thus if R = the moment of resistance,

$R = \frac{5}{8} d$  for iron sections, equal to a quality of  $\frac{1}{2} d$  20 tons per square inch tensile breaking strength.

$R = \frac{7}{8} d$  for steel sections, equal to a quality of  $\frac{3}{4} d$  28 tons per square inch tensile breaking strength.

The result being, as previously stated, in "inch tons."

Messrs. William Lindsay & Co., the well-known makers of trough flooring, have also advertised in the *Builder* some new rolled sections, suitable for stanchions as well as girders. In conclusion, it may be remarked that the extra for cutting steel stock-joists is slightly dearer than for iron sections, and that both in steel and iron sections allowance for waste must be considered.

## NOTES.

**T**HE circular of the President of the Local Government Board of Dec. 2, addressed to the various local authorities, pointing out their duties and powers in regard to sanitary matters, is well timed. But whether it will have much practical or permanent effect may be doubted. The fact is, that the way in which local authorities fulfil these particular duties depends,—and, we fear, must continue to depend,—very largely on personal influence. If in a local district a sanitary officer has a high sense of duty, or unusual energy, the sanitary state of the district may be kept up to the mark; or, again, if there is some individual member of the Local Authority who possesses these qualities, the same result may follow. But in ordinary cases the sanitary officer does not investigate the state of his district in the way which is absolutely necessary, and some insanitary dwelling has usually to become almost a public scandal before the officer interferes. The twentieth section of the Sanitary Act, 1866, by which periodical inspection of a district is ordered, is more honoured in the breach than in the observance. It will remain so until the Local Government Board make the periods of such inspection compulsory, and have the results tabulated and sent to their department.

**A** CORRESPONDENT draws our attention to the fact that in an article in the *Morning Post* of Friday, the 29th ult., the credit of having started the idea of a Forth and Clyde ship canal is attributed to Mr. Wilson, who has been writing some very able letters on the subject in the *Economist*. This is hardly the case. The idea may have occurred to Mr. Wilson independently, but the fact remains that we went into the subject fully, with strong recommendation of the scheme, in an article published in the *Builder* as long ago as September 6, 1884.

**T**HE London County Council and their constituents are to be heartily congratulated upon the choice which they made on Tuesday last in filling up the important post of Chief Engineer to the Council, rendered vacant by the sad death of Mr. Gordon, whom they appointed to the office only a few months ago. In Mr. Clement Dunscombe, who has been for the past ten years City Engineer of Liverpool, the London County Council will have an officer of high attainments and large experience as a municipal engineer, and as he is still in the prime of life, we trust that he may fill for many years the high and responsible office to which he has been unanimously elected. Mr. Dunscombe was a candidate for the post earlier in the year, but, curiously and inexplicably, as we remarked at the time, his name was not included in the final list which was submitted to the Council on that occasion, as it certainly ought to have been. It was not surprising, therefore, that when the post again became vacant, Mr. Dunscombe announced his intention, as we stated in a "Note" a fortnight ago, of not again becoming a candidate for the appointment. But we are glad that he reconsidered the matter, for although Liverpool will lose a valuable officer, London has need of the highest engineering ability being brought to bear upon the increasing difficulties of its sewage question. When the report of the Standing Committee was submitted to the Council, the feeling of the Council in favour of the unanimous adoption of the report was so apparent that the Chairman, Lord Rosebery, with his usual tact and discrimination, suggested that if the Council were agreed on the selection of Mr. Dunscombe, it would be an unnecessarily disagreeable thing to put the names of the other recommended candidates to the vote, and therefore that invidious course was not taken. Later on in the course of the sitting of the Council the question of the alleged exercise of undue influence by members of the Council in favour of Mr. Duckham was conclusively disposed of, the

charges being shown to be as baseless as the assertion that Mr. Duckham was "an engineer of mediocre abilities." Councillor John Burns was responsible for these imputations upon the honour of the Council as well as for the disparaging remarks relative to Mr. Duckham, and as there was no withdrawal of the imputations upon his fellow-Councillors, we are glad to see that the Council passed a resolution practically tantamount to a vote of censure upon Mr. Burns. His remarks about Mr. Duckham's abilities were entirely unwarranted. Mr. Duckham is well known as a capable engineer, but he is much more of a specialist in dock engineering than in matters appertaining to municipal engineering, and it is confessedly on these grounds, and on these grounds alone, that his nomination as Chief Engineer by an irregularly-constituted committee a fortnight ago has been entirely passed over in favour of an engineer of special municipal experience.

**S**IR HENRY LAYARD'S letter in the *S. Times* of Thursday on the National Portrait Gallery shows the unavailability of writing from Venice about matters in London. He says:—"It is reported that the architect contemplates a different style of architecture from that of the present building in Trafalgar-square, to which the new galleries are to be an addition, and even to employ a different material—it is to be presumed, brick. We are so much accustomed to the disfigurement of our public buildings that nothing in that direction need surprise us." The new building is to be faced with stone, and the back and east end of the National Gallery is of brick, so that, as far as the materials are concerned, the facts are the reverse of what is stated. The portion adjoining the east end of the National Gallery is to be designed to correspond with Wilkins's architecture, while it will hide the unsightly brick wall now existing; but the main block in the rear of the National Gallery must necessarily be treated in a different manner from the front of that building, because the National Portrait Gallery must have three stories in order to find the requisite accommodation on the site, and only the upper story can therefore be top-lighted; the lower stories must be side-lighted, and therefore must have larger windows than could be provided in an architectural treatment similar to that of the front of the National Gallery.

**O**NE of the witnesses at the Board of Trade Inquiry on Railway Rates, last week, was a veteran official of the London and North-Western Railway, Mr. D. Stevenson, the metropolitan traffic manager, who completed fifty years of service in 1887. His evidence dealt with the manner in which the London terminal duties were performed in the early days of the company's existence; and he stated that at that time the railway company merely conveyed the wagons to or from the carriers' sheds, their part of the transaction being then completed. Messrs. Pickford's manager gave similar evidence, but the great carrying firm ceased to be "carriers" under the original system as far back as 1847. Since that date they have acted as the agents of the railway company, and in Mr. Williams' work on railways, dated 1852, all the terminal work is described as being performed by the company's servants. Of course, the contention is that the carriers were bought out, and that the companies are entitled to continue their charges in the form most convenient to themselves, in addition to their own rate for conveyance. Lord Balfour strongly deprecated going far into "ancient history," and, indeed, loses no opportunity of impressing upon counsel the desirability of limiting the evidence as much as possible. It has been remarked concerning railway questions dealt with in Committee, that it is almost impossible for a Committee-man to have one tangible idea floating in his head after hearing all the conflicting evidence of the lawyers and witnesses; and Lord Balfour is wise in endeavouring to avoid being overwhelmed with testimony. A considerable



amount of discussion took place with regard to a statement put in by the railway company, giving details of cost of construction and maintenance of sixteen stations of varying importance, in support of the claim for station terminals. The traders' representatives seemed disposed to question the impartial selection of these stations, but it was seen that this might lead to a great mass of such evidence being demanded, thus increasing the difficulty of coming to a decision. It was ultimately resolved to appoint an expert to examine the figures submitted, and report as to their reasonableness, and also as to whether the amounts were properly apportioned for goods traffic and other purposes. It is understood that, in agreeing to this proposition, the traders are not assenting to any principle, and this part of the question may be reopened.

**T**HIS week there has been formed in Glasgow a Provisional Committee for the promotion of a ship-canal on the "direct route," that is, in a straight line from the Clyde, a little below the city, to the waters of the Forth at Grangemouth. It is intended that this preliminary committee should be replaced shortly by a large representative executive committee, and thereafter an authoritative survey of the crossing, if possible, obtained, together with statistics and general information. One of the earlier results will probably be the calling of a public meeting in Glasgow to discuss the proposal.

**A** CORRESPONDENT of the *Standard* writes, ascribing the death of a relative to the insanitary state of the Royal Naval College at Portsmouth. These charges ought only to be made with due deliberation. We fear, however, that there is too much reason to suppose that many barracks and other public buildings in Great Britain are not in the proper sanitary condition in which they should be. The mistake which is made is that persons write anonymously to newspapers and make somewhat vague charges against the state of public buildings, instead of carefully formulating their charges, and then making a systematic attempt to have reforms brought about by departmental or by parliamentary action. If a sufficient number of well-established charges against the sanitary state of the barracks of the United Kingdom could be proved, a Royal Commission would undoubtedly be obtained to investigate the general sanitary state of various buildings under the control of the War Office and Admiralty.

**N**O less than 179 sets of drawings have been sent in for the "sketch" competition for the Sheffield Municipal Buildings. These, we are informed, are to be hung in two large unoccupied rooms in the Mappin Art Gallery. All the packing-cases were numbered consecutively as they came in, by the Borough Surveyor's staff, and have then been unpacked and the drawings and letter in each case marked with the same number as on the case. The letters will not be opened till Mr. Waterhouse has made his selection; and no one has access to the rooms except the Surveyor and two assistants, so that there is little possibility of any one getting to know who is the author of any design. The Borough Surveyor (Mr. C. F. Wike), to whose courtesy we are indebted for this information, adds, "Every precaution has been taken to ensure a fair competition, and we hope to make this a model one."

**A** REPORT to the Local Government Board (dated September 6), by Dr. Spear, on the causes of the prevalence of diphtheria and enteric fever in the Penistone Registration Sub-district, gives again the pollution of water supply as the cause of disease. In regard to the occurrence of typhoid fever at Oxspring School in the district, the report says:—

"The water supply is derived from a spring which issues from the millstone grit, and makes its appearance in a grass field at an elevated spot some 1,300 yards from Oxspring School. In its course to Oxspring it is conveyed partly in socketed pipes,

but for the greater distance in rough stone channels. These lie quite near the surface in a soil that from time to time, in certain places, is manured by night-soil and other refuse; they pass in close proximity to some ten cottages and farmsteads, and here and there, where dipping-troughs are supplied, the water is befouled by cattle, swine, &c. Just above the school a branch pipe supplies Oxspring Lodge, where the servant-maid, who sickened from the fever at the beginning of June, was employed; below it falls into a raised stone cistern, whence by one pipe the school and school-house taps are supplied, and by another, a roadside trough, that serves the six adjacent cottages."

In regard to another district (Thurstone) Dr. Spear reports that, as has been noted in some former cases, the want of proper supervision and the inadequate salaries paid to Medical Officers of Health and Nuisance Inspector (10*l.* a year each in this case) are largely responsible for the existence of such conditions. As an example of the need for better instruction and supervision in the district he gives the following incident in the Penistone Urban Sanitary district, where also the Inspector of Nuisances receives 10*l.* a year, and is said to be "very willing, but uninstructed":—

"When I examined this officer's books, one of the last entries recorded a visit to Unwin-street, about the condition of which it was stated there was 'nothing to report.' I happened to have visited this particular row of houses, and knew that very grave sewage nuisances existed there, and so requested the Inspector to visit again the first house in the row, to make a thorough inspection, and to report the result to me. He reported that in the cellar of the house, a cellar reached by an internal staircase from the kitchen,—direct communication (through which, apparently, rats invaded the house) existed with some unknown drain; that the houses were not connected with the public sewer, but drained to deep cesspools in the house yards; that the cesspool of No. 1 had not been emptied for years, and that the contents were now apparently 'soaking into the cellar about the level of the third step from the floor.'"

**A**N address on "Art Education," read by Mr. Wyatt Papworth, "Master of the Worshipful Company of Clothworkers," delivered at the opening of the Bingley Technical School, on October 23, has been issued as a pamphlet, and is well worth the attention of those interested in the working or establishment of schools of drawing and design. Mr. Papworth is strongly in favour of keeping schools of design strictly to their avowed object of teaching drawing and design, and not going into what is sometimes called "high art," in which most of the pupils would probably never acquire the power of doing anything worth having from that point of view, while most might learn to draw and many to design. We quote the following passage from the address:—

"Now, you might ask, What is the difference between a School of Drawing and a School of Design? The two differ entirely. Every one should be able to draw, more or less correctly, but it is not every one who can design. I understand that in your classes freehand drawing is taught, that is the first step; then comes, for practice, the copying (and not too much of that) of subjects already designed and perhaps worked out, for various workmanships. But this is not sufficient—it does not teach 'design.' In your case, where textile fabrics are concerned, a set pattern, say, is required. At first, probably, the master of the school, and perhaps the master tradesman subsequently, may say, 'I want a new design;' or gives an idea of his wishes. The student, having mastered drawing, brings to bear his taste, which in a great degree is the result of his previous education in drawing and copying, and elaborates this idea into a design suitable for the particular purpose for which it is required. How is this elaboration to be effected? Say that a mere leaf is wanted as an elementary form; there are thousands of leaves around us which can be used for this purpose,—not copied, but conventionalised, as the term is,—that is, adapted for the purpose of the ornament. Then, beyond that, may be the introduction of foliage, as for a 'dress piece' for a lady. The plants adapted for this purpose are nearly as numerous as the leaves. One may be taken, and carefully drawn out and arranged. This is 'design.' But this is yet not sufficient. The design has to be adapted for the special trade. The drawing of a leaf that will do for fine work, as lace, muslin, and so on, will not answer for a carpet; and in all cases the material in which the design is to be executed must be carefully kept in mind. Cast iron and hard stone each re-

quires a bold and broad treatment; a softer stone and marble have finer workmanship applied; silver ware may be treated with still finer details; and gold should have the finest design and Art workmanship that can be given to it. I understand the formation of such a Class of Design is contemplated for your Schools; pray keep it from so-called High Art."

**W**E have received the specification and drawings of an arrangement of band-saw recently patented by Mr. E. Whibley, which has some advantages for light work. The principal novelty lies in the table, which can be centred to any required angle, and made to move round the saw. This is effected by mounting the table upon the frame of the machine in such a manner that it can be turned about two axes. One axis is parallel to the cutting edge of the saw, and the other is at right angles to it. In this way a cut can be taken at any angle within the range of the machine, clamps being provided to hold the table firmly in place when once set to the required position. The saw guides are also adjustable, and the pivot on which the table turns at right angles to the saw is slotted to let the latter pass. Another novelty claimed for this machine is the manner of attaching a moveable fence so arranged that it can be moved to meet any angle which the work may assume during the operation. The machine is already in work, and is said to give great satisfaction. We can easily understand that it would prove a useful tool in a joiner's shop, as the compound movement of the table would enable a very large number of forms to be encompassed.

**I**N the columns of *L'Architecture* a discussion is being kept up on the old question, so often "vexed" in France, as to the responsibility of the architect. M. Deménieux, the last contributor to the correspondence, upholds the view which French architects (and we honour them for it) have constantly come back to whenever the subject of the heavy legal responsibilities they are subject to in regard to their buildings is discussed, viz., that the responsibility is rather an honour than otherwise, and that the word "responsabilité" is one "qui ne sonne mal que vis-à-vis de ceux qui ne remplissent pas leur devoir avec science et désintéressement."

**T**HE December number of the *Magazine of Art* contains an interesting illustrated article on "The Nativity of Christ as Depicted in the National Gallery," with illustrations from Fra Angelico, Botticelli, and Rembrandt. The frontispiece to the number is an etching by Flameng from Meissonier's picture of "The Halt." The same number contains also an interesting and ably written article by Mr. J. P. Seddon on a subject which he thoroughly understands, "What a memorial window should be," which is well worth the attention of those who are about to erect memorial windows. It includes two illustrations of designs by the author, one for a triplet lancet window in Llandaff Cathedral; the other a very curious but undeniably clever design for a decorative treatment of the subject of "The Passage of the Red Sea." The *Art Journal* for the month contains an original etching by Mr. Percy Robertson of "Harrow Church," a beautiful little work in feeling and execution. This is supplemented by an article on Harrow School by Mr. Percy M. Thornton, with further sketches about the school precincts by Mr. Robertson. The most important article in the number, from our point of view, is one on "The Museum Buildings at South Kensington—a plea for their completion," a plea in which we heartily join. It is discreditable to the nation that the front of the building should so long have been left in its present unfinished and hideous condition. The article is accompanied by several illustrations of completed portions of the building, and a small elevation of the original design by Captain Fowke, with side-wings connected by quadrant arcades with the central block. The *English Illustrated*



*Magazine* is a very large Christmas number of very varied contents, including music (a song by Mr. Hamish MacCunn), an interesting article on nail and chain manufacture by the Rev. Harold Rylett, with illustrations by Mr. Tom Hill, and another entitled "In the Peloponnesus" illustrated in rather a curious manner with views drawn in a decorative spirit by Mr. Walter Crane, and of which the chief interest, to say truth, is that they are signed with his name. These, we presume illustrate the decorative principle in book illustration, of which we hear a good deal now. Where it is a question of the illustration of natural scenery, we humbly confess that we prefer pictures.

EVERYONE has heard and enjoyed stories of impossible answers by schoolboys in examinations. It seems that the preliminary examinations for students at the Institute of Architects may furnish their quota of this style of anecdote; one example reached us the other day. In an examination in French one candidate gave the English of "Il vient de sortir" as, "That comes of going out." There is a practical simplicity of linguistic method about this, at all events.

#### LETTER FROM PARIS.

THE Champ de Mars is now reduced to the melancholy spectacle of an international demolition carried on amid a perfect sea of mud. In regard to the main buildings, the result of some negotiations carried on between the State and the Municipality of Paris, in accordance with suggestions drawn up by M. Alphand, is that the State will take charge of the Palais des Machines, the central dome, and the 30-metre gallery. On its side, the Municipality will become the proprietor of the Raft and Dessalx galleries, the Palais des Beaux-Arts and that of the Arts Libéraux, as well as the terraces, the gardens, and the luminous fountains, the sculptures of which will be re-executed in bronze and marble. The Municipal Council will pay in return a sum of 4,000,000 francs and will give up any claim on the part of the city to the bonus on the exhibition, its share in which M. Alphand values at 2,700,000 francs. If, as is hoped, this combination is accepted, work will be immediately commenced with the view of restoring the Champ de Mars by next spring to its usual aspect. According to a project discussed, there is to be a large carriage-drive bordered with trees constructed between the Avenue Bourdonnais and the Avenue Saffren, as a communication between the Seventh and Fifteenth Arrondissements, and the whole of the large space now occupied by the Palais des Expositions Diverses and that of the foreign exhibits, to right and left of the central dome and the 30-metre gallery, will be transformed into plantations, lawns decorated with statues, and parterres of flowers. As to the buildings themselves, M. Alphand proposes to make use of the Palais des Machines for military parades, horse-shows, or agricultural shows; the central dome and the gallery will serve for musical performances; the Palais des Beaux-Arts will receive the annual Salon pictures and other artistic exhibitions, and the Palais des Arts Libéraux will be given up to a permanent exhibition of industrial art.

This scheme, however, is not universally favoured. The Société des Artistes Français, in particular, are very little satisfied with the future reserved for them. They are much better pleased with their present position. Unfortunately the Municipal Council intends to make use of the Palais d'Industrie, which is the property of the city, for large fêtes, and thus the Salon will necessarily have to shift its quarters. The artists are afraid that this will materially affect the success of their exhibitions, and that the public will not be content to come to a building so much less central than their existing exhibition building. If the project is carried out, it will be necessary to find a new ground for military manoeuvres for the garrison of Paris, and the military authorities intend in that case to make use of the large expanse of ground situated behind the fortifications on the territory of Issy.

The decorations granted to exhibitors did not appear in the *Journal Officiel* till the beginning of November, and the somewhat tardy bestowal of crosses has caused almost as many com-

plaints as the medals. This, however much to be regretted, was only what every one foresaw, and it is no use to say more on a disagreeable subject. Another thing to be regretted is that no note was taken in the *Journal Officiel* of the honours awarded to representatives of foreign countries, a most ill-judged course, whereby the honours awarded them have been, as far as the French public is concerned, practically obliterated.

Various inaugurations of monuments are coming on in Paris. The first is that of the Musée Guimet, which the President of the Republic inaugurated some few days since, and which is now open to the public. We have already given a brief description of the edifice, which in regard to architectural design leaves it must be confessed, a good deal to be desired. On the other hand, the interior is exceedingly well arranged for its purpose; and, thanks to the generous donor, Paris finds itself now with a new centre of study, in which is preserved the richest collection of religious manuscripts and books which bear upon the study of the religion of the Eastern world.

Next comes the inauguration of the monument raised by public subscription, on the Place Wagram, to the memory of de Neuville, whose name has already been given to a neighbouring street. The monument is placed at the intersection of the Avenue de Wagram and the Boulevard Malesherbes. The pedestal has been carried out by M. Ulysse Gravigny. The statue, executed from the model by M. de Saint-Vidal, represents a figure deficient in the dignity and repose of effect demanded by sculpture, half seated on a rustic fence and holding his palette in his hand. Apart from the resemblance, which leaves much to be desired, the general outline and design of the work are much open to criticism, and it certainly does not add much to the credit of the sculptor, the author of the large though rather mediocre fountain which stands in the basin under the Eiffel tower.

A very different work is the statue of Balzac, the model for which M. Chapu has just completed, and which is to be erected, at the cost of the "Société des Gens des Lettres," in the Orleans Gallery at the Palais Royal. The figure is placed, in a seated position, on a low pedestal, clad in a kind of monkish robe which Balzac was accustomed to wear when at work; the arms are crossed and a pen is held in one hand; the expression is that of absorbed meditation. A pretty female figure, supposed to represent "La Comédie Humaine," takes off her mask. The pedestal is adorned by a small representation of a theatre, where a troupe of marionettes are playing "Mercadet," one of the *chefs d'œuvre* of the author, and by masks representing his principal creations. The design looks well from all points, and is worthy of the genius of M. Chapu.

Very fine also is the austere simplicity of the monument erected in Père Lachaise to the memory of Baudry, and of which the sculptural portion is by M. Mercié. We have already referred, in describing the Salon of the present year, to this monument, of which the architectural design is by M. Ambroise Baudry. It bears the double inscription:—

FRATRI OPTIMO	CIVES ET AMICI
FRATRI PIUS ET	HONORIS CAUSA
INFELICISSIMUS	POSUERUNT

At the base of the monument, which is in the form of an altar, is a female figure in bronze, of grand character, who seems bowed in affliction over the remains of the dead.

In our last we gave an account of the result of the very satisfactory competition opened at the Hôtel de Ville for the *salon* which is to be adorned with paintings representing the siege of Paris. The competition for the decoration of the Gallery Loban, of the failure of which we spoke at the same time, has been (as we half predicted) annulled on account of the feeble character of the works sent in, and will be opened again in a few months. It is deplorable to see how little progress the art of the decorative artist has made in France during recent times, and how little the art of architectural decoration is understood. A melancholy example is found in the work submitted in this competition by M. Toché, who gained some reputation three years ago by decorative paintings at the Hôtel de Chenonceaux, exhibited in the Georges Petit Gallery. In his work for the Loban competition, M. Toché

wished to symbolise in a decorative painting the twenty arrondissements of Paris. The idea is good enough in itself; but what is one to say to an artist who, for the decoration of a Renaissance edifice, personifies the quarter of the Bourse, for example, by a representation of a monument surmounted by a golden calf, while Fortune on her classic wheel and in the usual simple costume, races before a file of scribes and persons in modern costume? Such a decorative conception, for such a situation, really passes the proper limits of a joke.

In the competition for the statue to Condottet, the jury have selected the sketches by M. Louis Noël, Jacques Perrin, and Steiner, who will exhibit works for a second competition in six months.

The Palace of the Louvre is at present the subject of various important works. In addition to the restorations undertaken on all sides of the building, we may mention the decoration of the Grand Salon of the Pavillon Beauxvau, situated on the first-floor, at the extremity of the Renaissance Galleries. This large room, in which the scaffolding is now being erected for the work of decoration, is to be adorned with an allegorical painting on the ceiling, to be executed by M. Carolus Duran. The artist has chosen for his subject "The Triumph of Marie de Medici." The general decoration of the room is expected to be completed about July of next year.

The sculpture museum at the Louvre has hitherto possessed no work by Carpeaux, a deficiency which will now be supplied through the acquisition by the State of various models by this eminent sculptor, among which is that of the group of "The Dance" on the façade of the Opera House, which was such a bold innovation on the then accepted ideas as to monumental sculpture, and gave rise to violent polemical discussion.

The Ecole des Beaux Arts has now resumed its activity, and the jury have disposed of the competition in the history of architecture opened for the students of the first class, but nothing more than "mentions" were obtained by any of the competitors. The competition for the Chaudesmaignes prize has also taken place. The subject was "Un établissement hospitalier dans l'Afrique Centrale," a subject certainly leaving sufficient scope for originality and freedom in regard to style. From among twenty-three competitors, the Commission have admitted *en loges* the following:—M.M. Binet and Honoré Marc, pupils of M. André; M. Hanot, pupil of M. Gerhardt; M. Letrosne, pupil of M.M. Letrosne and Raulin; M.M. Maistrasse Pradel and Umbdenstock, pupils of M. Guadet; M. Reney, pupil of M. Ginain; and M. Talboureau, pupil of M. Raulin.

Comte Ludovic Lepic, a distinguished marine painter, has died at the age of fifty. He was a pupil at the Ecole des Beaux-Arts, of Cabanel, and obtained a troisième médaille in the Salon of 1877, and frequently exhibited pictures of note, especially (in 1880) that representing the arrival of the remains of the Prince Imperial at Portsmouth. Besides paintings and etchings, Comte Lepic frequently designed dresses and decorations for the Paris Opera.

Heilbuth is also dead, the brilliant water-colourist, the painter of exquisitely graceful scenes of Parisian life, who, a guest from Germany originally, completely assimilated himself as a Frenchman and a French artist. He was born at Homburg, and was practically expatriated on the breaking out of the Franco-German war, when he settled in London, and was a kindly friend to French artists who like himself had been exiled. On his return to France, Heilbuth solicited and obtained naturalisation, and in 1881 was, as a French painter, created officer of the Legion of Honour. Among his very numerous works we may mention "Une réception chez Rubens," much admired at the Salon of 1883; "Palestrina," "Etudiant," and "Politesse," three pictures which gained him a deuxième médaille in the Salon of 1877. In 1861 he exhibited, besides other pictures (the "Fils du Tien" and Tasse à Ferrara"), the "Auto-da-fé," and also the "Mont de Piété," which was much admired. This was his first manner, but after 1880 we find he had completely broken with historical painting and scenes from the pontifical court at Rome. He gave himself up now to "plein air" painting; the banks of the Seine, the environs of Paris became his favourite scenes, and the subjects of many charming water-colours. He died very suddenly of heart disease, at the age of 63. He

\* The general title Balzac gave to his great series of novels.



leaves part of his property to the Société des Artistes Français.

Almost at the same moment we hear of the no less sudden death of Rapin, the landscape painter, in the 49th year of his age. He was born in 1840 at Noroy-le-bourg, in Franche-Comté, and successfully studied under Gerôme, Gleyre, and François. He obtained various medals at the Salon Exhibitions, and a gold medal at the recent Universal Exhibition.

Another artist gone in this very fatal month has been the sculptor Etcheto, at the early age of 36. He was the author of the fine statue of François Villon purchased by the Municipality some years ago out of the Salon, and now erected on the Place Monge.

Lastly we have to record the death of Oudinot, the artist who was commissioned to report on stained glass design in the Paris exhibition. He originally studied under Delacroix, and in 1862 was appointed "peintre-verrier" to the Municipality of Paris. He obtained a gold medal in the exhibition of 1878. The principal works commissioned from him by the city were the windows of the churches of St. Clothilde and St. Jacques du Haut Pas, at St. Len; the two Renaissance windows of the Tower of St. Germain l'Auxerrois; the windows of St. Augustin, and those of the choir at la Trinité. He executed also, for the State, the restoration of the sanctuary of the Cathedral at Limoges, the windows for the oratory of Princess Clothilde Napoleon, and those of Beauvais Cathedral.

We may mention also the remarkable windows at the Church of Ste. Croix at Liège, commissioned from him by the Belgian Government, and the stained glass in the windows of the Hôtel de Ville at Paris, which reproduce the arms and insignia of the "Prévôts des Marchands" from the origin of the Parisian Municipality to the present day.

Oudinot died at the age of sixty-two, leaving a great quantity of artistic work behind him, and the reputation of having been one of the best of the modern French artists in stained glass.

#### THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

##### THE RECENT EXAMINATIONS.

THE third ordinary meeting of this Institute for the present session took place on Monday evening last at 9, Conduit-street, Mr. Alfred Waterhouse, R.A. (President), in the chair.

Mr. W. White (secretary) announced that during the week commencing the 25th prox., an Examination in Architecture had been held in the rooms of the Institute, the graphic and written examination taking place on the Monday, Tuesday, Wednesday, and Thursday, and the oral examination on the two following days. During the week forty candidates were examined, and of these twenty-eight had passed. The following are their names:—

Baker, Herbert, London.	Hoskings, Arthur W., Sydney.
Bassett, Gilbert T., Salisbury.	Johnson, B. V., London.
Bedford, Francis D., London.	Lambert, Horace, Red Hill.
Britton, Charles E., Oxford.	Lidstone, H. G., London.
Callon, Charles A., London.	Luck, Harold R., London.
Clarke, W. A. P., London.	Mayo, Ernest A., Deal, Kent.
Conford, Leslie C., London.	Niven, David B., London.
Doe, Herbert W., London.	Paterson, A. N., Glasgow.
Downing, H. P. B., London.	Reeve, Robert A., Stone, Staffs.
Fraser, James W., London.	Rogerson, John, Glasgow.
Gilbert, Horace, London.	Rantz, Ernest A., London.
Gravell, William D., London.	Savidge, W. B., Nottingham.
Hind, Arthur H., Leicester.	Wadmore, B., Tonbridge, Kent.
Horsley, Gerald C., London.	Yates, Alfred B., London.

Mr. W. H. White also announced the results of the Preliminary Examinations held in London and in various parts of the country. At these 107 candidates presented themselves for registration as probationers. Of the 107 candidates 44 from all parts of the country were declared exempt, and of the remaining 63, 36 were examined in London, 8 in Bristol, 16 in Manchester, and 3 in Dublin. The secretary then read the names as follow:—

Richard George Thompson, Shankill, co. Dublin; Joseph Spain, Sunderland; Percy Ryder Smith,

Richmond, Surrey; William Slater, Nottingham; Samuel Joseph Lee Vincent, Great Yarmouth; Thomas John Anderson, London; Wilberforce Ernest Russell, London; Harry Teulier, Sheffield; Albert Ernest Hall, Sheffield; Benjamin Robert Irvin, North Shields; Richard Henry Ward, Bishops Stortford; John Gibbs Rigaud Murray, London; Roger Oldham, Ashton-upon-Mersey; James St. John Phillips, Belfast; Arthur George Turner, London; Arthur Marvon Watson, London; Walter Patrick Belk, Sheffield; Edmund Farley Cobb, Strood, Kent; Alfred Phillips Crabb, London; Charles Matthew Ellison Hadfield, Sheffield; John Kirkland, Nottingham; Harry Tom Boden Spencer, Bedford; Hugh Stammers Tiffin, London; William Charles Waymouth, London; Henry Aitken, Airdrie; Edward Thomas Allcock, Loughborough; Frank William Chapman, Wells, Somerset; Frank Berridge Cooper, Leicester; William Harrison Cowlishaw, Leicester; Allan Graham, Glasgow; William Thomas Groomcock, Hinckley; George Alfred Groves, Urnston, Manchester; Charles Frederick Innocent, Sheffield; William Sampson Jervois, Dublin; Richard Francis Caulfield Orpen, Dublin; Philip Barlow Osborn, Birmingham; Philip Appleby Robson, London; William Benjamin Rolfe, Bath; Harold Charles Parkinson, Nottingham; John Charles Teather, Sheffield; John Hollingworth Woodward, Peterborough; James Vincent Woodfin, Sheffield; Percy Pavlich Cotton, London; Charles Edgar Salmon, Reigate; Timothy Honnor, Sutton, Surrey; John Pain Clark, London; Charles Gail May, Maidstone; Frederick George Jodwell Moore, Gloucester; Ernest Tingle, Kettering; Alexander Paul MacAlister, Southsea; Ernest Godfrey Page, Bridgewater; William George Legg, London; Robert James Stafford Price, London; William Henry Marsden, Chesham; Frederick John Parkinson, Blackburn; Roger Francis Bacon, London; George Francis Hampton Banks, Crawley; Ronald Baxter, London; Lawrence Cubbert Bernard, Clifton; Michael J. Calligan, Dublin; Frank Brookhouse Dunkley, Dunham Massey, Cheshire; Hugh Alfred Ellis, Manchester; Arthur Harston, Bexley Heath; Edward Haywood-Farmer, Northampton; Richard Croft James, Clifton; Richard Ernest Knowles, Manchester; William Josiah Langley, Northampton; Harry Wilson Prye, London; John Arthur Smith, Reading; Thomas Pettit Wardrop, Dublin; William Alphonse Scott, Navan, co. Meath; John Bladen, Manchester; Richard Booth, Manchester; John Arthur Brand, London; Frank Herbert Gorst, Manchester; Henry Ernest Kirby, London; Sidney Burton Lee, London; Henry Seton Morris, Bath; William Walter Powell, London; Percival Soames, Bromley, Kent; Alfred Spiers, London; Thomas Harry Weston, Bristol; Ernest Arthur White, London; Ernest Borissov, Cambridge; Edward Wormun Tarver, London; Frank H. Willis, London; and Charles Joseph Molinieux Hansom, Bristol.

The President added that in hearing the long list of names it was most gratifying to the members to find so many students coming forward to accept the terms of the Preliminary Examination. It was also pleasant to notice the number of honoured names in the list, showing that the sons desired to worthily follow in their fathers' footsteps (applause).

The President next said that the members had met for the purpose of hearing a paper from Mr. R. Elsey Smith, son of their esteemed friend, Professor T. Roger Smith (applause). It would be remembered that the Council, rather less than two years ago, chose Mr. Elsey Smith as a suitable person to be sent out to the British Archaeological School at Athens, to do such work as he would be appointed to perform in the way of excavation or exploration. When Mr. Smith reached Athens his work appeared not to have been quite cut out for him, but the use he made of his time there would be detailed in the first portion of the paper, and the illustrations by which it would be accompanied. The second part of the paper would contain Mr. Smith's experiences when engaged at the Temple of Venus, at Paphos, in Cyprus, and it also would be followed by lime-light illustrations on the screen, from photographs taken by himself.

##### A Tour in Greece and Cyprus.

Mr. R. Elsey-Smith, Associate (Greek student), then read a paper entitled:—"A Tour in Greece and Cyprus, 1888."

Mr. Elsey-Smith commenced his paper with an account of the most recent excavations in Athens itself, where great attention has been attracted to the Acropolis by the thorough and very successful examination of its upper surface, now just brought to a conclusion, revealing in addition to a vast number of fragments of sculpture, pottery, bronzes, &c., part of the old way up from the postern-gate on the north side; and on the south walls, supposed to belong to the Chalkotheke. This was followed by

an account of the Propylæa, based on Dr. Dörpfeld's theory that the design of the building was never completed, and that even the portion which remains was not brought to a finished state so far as the dressing of the surfaces is concerned, and a plan and elevation of what is supposed to be the complete design were displayed. The next building referred to was the theatre of Dionysos, at Athens, where some remains of an early circular orchestra constructed of polygonal masonry and the foundations of the original Greek scenes of two distinct dates, have been uncovered. From the levels of the work recovered it seems evident that here, as at Epidaurus and Oropos, there was originally no raised stage, and that the circle of the orchestra was complete. The extent and character of the Roman alterations, both to stage and orchestra, were referred to.

A somewhat new form of Choric monument, which was discovered last spring in the course of excavations carried on by the American Archaeological School, was described. This consisted of a semicircular stone building with pilasters at the ends, carrying a large inscribed lintel, the whole being roofed with a thin slab of stone. The lecturer next referred to recent excavations in the Peloponnese at Epidaurus and Mycenæ. At Epidaurus the Tholæ with its foundations of six concentric rings of masonry, and the curious maze-like corridors formed between the four inner rings, were described; the details of the superstructure were also referred to, especially the very graceful Corinthian order of the interior. The theatre was referred to specially as showing very clearly and perfectly the arrangement of the Greek orchestra and the sill of the scene, which in this case was found complete, and both nearly at the same level. The plan of the great palace which occupied the summit of the fortress at Mycenæ was described, as well as the plan of a smaller house found lower down the slope of the hill. The palace, it was pointed out, though not so complete as the one at Tiryns, followed out the same general plan very closely, and must have corresponded with it in size very nearly, if it did not, indeed, exceed it.

The conclusion of the paper was devoted to the work of the Cyprus Exploration Fund carried out by the Director and Students of the British Archaeological School at Athens. The crusading fortress of Leondari, on the site of a very much earlier settlement and fort, was referred to, but the attention of the meeting was chiefly directed to the work carried on in excavating on the site of the ancient temple of Aphrodite at Pafos-Paphos. The site of the modern village and of the temple was described, and Roman coins, showing the temple, were referred to; the fact of the absolute destruction of the entire superstructure and the practical clearance from the site of all its materials made, it was observed, the restoration of elevations or sections that should have any real value as correct, impossible; but with the plan it was different, for that had to a considerable extent been recovered. Three distinct types of early walling, besides considerable Roman additions and repairs, were described; two of these occur in a wing projecting to the south, while the main body of the plan belongs to the third epoch, but was considerably modified in Roman times. The possible or probable uses of the various parts were discussed in the paper, and the almost total absence of any mouldings or architectural details of an earlier period than Roman was deplored, and the very inconsiderable depth of earth and debris which covered the site, and which must have made it an easy prey to the spoiler in the past, was suggested as a cause for this. Finally, a very brief résumé of some of the principal objects found was given, and discussion on the somewhat complicated and difficult plan was invited.

The paper was copiously illustrated by plans and photographs, and by many fine lantern slides, admirably prepared and exhibited by Mr. W. Brooks, of Reigate, from Mr. Elsey Smith's own negatives.

The President, at the conclusion of the paper, said they must all have been gratified by the nature of the paper, and the excellence of the illustrations. It was, he believed, the first occasion on which they had had such photographic slides exhibited at a meeting of the Institute,\* and he hoped it would not be the

\* Not the first time, we believe. A large series of photographic lantern slides were exhibited a good many years ago at the lectures by the late Mr. Parker, in illustration of a lecture on Roman archaeology.—Ed.



last (applause). They were favoured with the presence of several gentlemen that evening who, he hoped, would speak, notably Mr. F. C. Penrose, formerly Director of the British School of Archaeology at Athens, and to whom they were indirectly indebted for this excellent paper (applause.)

Mr. F. C. Penrose said it was rather a late hour to make any very lengthy remarks upon the most interesting paper they had been listening to, and indeed anything that could be said must be in entire praise of what they had heard. It was also a very great advantage for Mr. Smith to be able to bring his audience into the immediate presence of the buildings he had been describing, by means of the life-like photographs exhibited by the lantern. These showed the extreme accuracy and excellence with which they had been taken, by the fact of their enlargement on the screen not showing defects.

On a great part of the descriptions connected with Cyprus he could offer no remark, except that there were several points with regard to the Temple of Venus which reminded one of Solomon's Temple so far as one could vaguely understand the construction of that magnificent fabric. It seemed to him that this temple in Cyprus presented the most hopeful clue towards further understanding Solomon's Temple, so that the time spent upon the examination of the Temple of Aphrodite in Cyprus could not be said to have been wasted. Therefore, although the finds had not been of much importance, either of architectural or beautiful objects, still the plan which had been exposed was very remarkable, and its use had yet to be made out. He was more at home in regard to the Athenian Acropolis, and he had received much pleasure from Mr. Smith's descriptions and illustrations. He certainly agreed with the lecturer in his regret that all the Medieval works had been destroyed, and particularly the picturesque tower. He supposed that a few inscriptions had been found, but nothing architectural to speak of, from the removal of the Turkish work. The place between the Parthenon and the Cymonian retaining wall was full of interest, but that had yet to be interpreted, and it was premature to say at present what would be the result of the excavations. The works at Epidaurus were also full of interest. The building called the Tholos, upon which the beautiful Corinthian capital which had been referred to was found, must have been a work of surpassing beauty, as was the theatre. There was another Grecian theatre which had been untouched by the Romans, and which resembled in many respects the theatre at Epidaurus. He referred to the theatre at Oropos, in the northern corner of Attica. That theatre contained, quite as well preserved, and in some respects even better preserved, remains than the theatre at Epidaurus. The Corinthian capital referred to was to him of extreme interest, because it was similar to a capital of the Temple of Jupiter Olympus, to which he had drawn a good deal of attention. The form of the leaves, the particular ornament of the central flower, and the curve of the capital, all reminded him in a remarkable degree of details in the Temple of Jupiter Olympus, and from their form his opinion was that those capitals were Greek, and not Roman, work. As to the Palace of Tyrins and Mycenae, on his first visit he had some reasons for doubting whether they were so ancient as was believed. The walls were so extremely rough, and so badly built in many parts at Tyrins, that he could not believe they were the works of good Greek builders. On subsequent examination, however, he saw they were planned and exactly fitted to portions of the buildings, which bore undoubted traces of the work of the great builders. His doubts respecting the scamping work of the partition-walls thereupon fell to the ground, and he quite agreed that Dr. Schliemann had at Tyrins discovered the undoubted palace of the ancient kings. Mr. Penrose concluded by proposing a cordial vote of thanks to Mr. Eisey Smith for his extremely interesting paper.

Mr. E. J. Tarver seconded the motion, which, on being put to the meeting, was carried by acclamation.

Mr. Eisey Smith briefly replied, and said that, considering how largely photography entered into the method of illustrating books and other things, the exhibition of photographs on a large scale by the lantern seemed to him the most suitable way of illustrating a lecture, and he was gratified in being the first to use

that method of illustration before a meeting of the Institute.

The proceedings then terminated.

#### THE ARCHITECTURAL ASSOCIATION.

The fourth meeting of this Association for the present session was held on Friday, the 29th ult., at 9, Conduit-street, Mr. Leonard Stokes (President) in the chair. The following gentlemen were elected members, viz., Messrs. J. C. Stockdale, J. H. Wilson, and G. G. Milne.

The President announced that the "Common Room," although not in complete order, was now opened.

Mr. E. Fridham Warren then read a paper on "The Decoration of Churches," which we print *in extenso* on another page.

Mr. William White, F.S.A., in proposing a vote of thanks to Mr. Warren for his paper, said that he did so with very great pleasure, because the subject of the paper was one in which he had always been especially interested, and he had advocated its study very strongly. At the Architectural Museum, about thirty years ago, he gave a lecture upon the subject, but he could not say that he had advocated the use of colour with greater earnestness or with greater force than had Mr. Warren. He appealed for the use of colour in all our domestic buildings, as well as in churches, for he held very strongly indeed that colour was one of the essentials of human nature,—and, in fact, of human life. He would not say it was as great an essential as pure air, fresh water, or the warmth of fire, but he believed that of all the æsthetic elements we had, colour was one of the greatest and most necessary for us. He thought they would see the force of that if they considered what it would be to be confined for a few months, or even a few days, in either a light white-washed room, or in a dark black-painted room. He believed that such confinement would have a serious deteriorating effect upon the physical life of those who might have to endure it: in the case of the occupant of the white room, there would probably be a tendency to idiosyncrasy, and in the black room the tendency would be to melancholy madness. Holding that view, then, so strongly, it was a great pleasure to him to propose a vote of thanks to Mr. Warren, who had brought the subject before them so fully and thoroughly, not only as to the principles of colour, but also as to the practical way in which studies of colours should be carried out. He had said so much in that respect that it was almost impossible for him (Mr. White) to say more. But he should like to say a word or two with reference to the future developing of structural colour. He thought decorative colour might be used with great advantage on the structural portions which were brought out in the nature of the material. At the Church of St. Saviour, Aberdeen Park, Highbury, he had treated a great deal of the walls of the church by using plain red brick, picked out with decorative colour, and he did not think that a much better groundwork could be obtained than was thus afforded. The principle which Mr. Warren had suggested, of alternating the colours between the upper and lower portions of the roofs and walls, showed the necessity of having one portion of red brick and the other of lighter brick of some sort or another, and in almost all cases he should say that the darker ground ought to be the lower one. There was one point of detail in Mr. Warren's paper as to which he would ask for further information. He was questioning in his own mind some days before whether the painting of a curtain was ever found simply as the back of an altar reredos. He did not think so; but Mr. Warren had mentioned an instance of it, but that, he thought, was fifteenth-century work. He did not think that it would be so in the earlier centuries, although that particular form of decoration lasted through three, if not four, centuries. It was a very popular and prevalent mode of decoration, as also was, where only a little decoration was required, the plan of lining out the walls into squares, with perhaps a flower in the centre, and a scroll or two to connect them. This form of decoration lasted for four or five centuries, but was used only for such portions of walls as were to be treated with very little decoration: just sufficient to take off that horrible baldness and bareness which was to be found in almost every modern interior.

Mr. F. T. Ragallay, in seconding the motion, said the thanks of the meeting were especially due to Mr. Warren for the trouble he had taken

in preparing so many diagrams and models for the occasion. Many of the members could not doubt remember the day when no colour was to be seen at all in churches, when the whole of the walls were covered with ghastly whitewash. Although he was afraid that there were a great many churches still in the same state, it was gratifying to see that colour was coming much more into use, especially as people were beginning to find out that a simple colour-scheme was not necessarily expensive. People were often very much astonished at the very small expense which was involved in decorating a church throughout in colour; for the amount of effect which could be obtained by the use of a little colour for a small sum of money was very much greater in proportion than could be attained for the same sum of money spent in constructive decoration. The expense, too, in such cases, really fell upon the designer,—the architect,—for after the work of designing the decoration had been performed, the work left to be done upon the walls was really very small in amount. Mr. Warren had not troubled them much with theories, which, perhaps, was well. He (Mr. Ragallay) had been speaking to a gentleman that day who was well known to most of them, about Mr. Warren's paper, and had asked him what theories he had on the subject of colour decoration. The answer was that he had no theories; whenever he had a thing to do he sat down and did it without any theorising. That was the view of a man who had had a great deal of experience, and it was, he believed, the view of many others. One could not, however, help having theories, and one of his was that, before they set about any decoration at all, they must think out and design a scheme of the work, in the same way that they would design every detail and colour. The number of possible schemes for the decoration of a church was, perhaps, limited, for they must be religious schemes of some sort; but there was always a certain variety, and some suitable scheme could always be devised. There could always be found a particular subject to which the others could be made to lead up, the principal subject being always located in the chancel. Mr. Warren had spoken of simplicity of colour as a very great point in good decoration, and that was certainly true, for if they kept their colour scheme simple they did not get into any very great difficulty, whereas if they used a great many colours it required much skill to avoid going wrong. As long as they stuck to two or three colours they were pretty sure to go safe.

Mr. F. M. Simpson said there were two rules which they learned in the study of all decorative work. The first was the use of few colours,—thus getting broad effects. The second was the transposition or counter-change of colours. In these two things, he thought, lay almost the entire secret of colour decoration, whether for a church or a domestic building. The effect of using two subdued colours,—such as blue and grey, blue and green, or green and grey,—the high notes being obtained by the sparing use of brilliant colours, such as red and gold,—generally produced the best effect. The other day he saw what was perhaps the most perfect modern church in England, viz., Messrs. Bodley & Garner's church at Pendlebury, to see which was in itself, he thought, a liberal education in what church decoration ought to be. At that church he particularly noticed the splendid effect which was obtained by the use of one diaper. Of course, other diapers were to be seen, but he was referring to the one which was used at the west end of the church, and also round the chancel. In the chancel and in the nave the diaper was of two shades of green. In the nave, in the centre of the large flower of the diaper, was the "I. H. C.," in the light green of the background. In the chancel the "I. H. C." was red in some cases and was gilded in others, and it was difficult to see at first that the same pattern had been used, for the use in some cases of a red "I. H. C.," and in others of a gold "I. H. C.," almost made it a different design. With regard to counter-changing of colours, one of the most successful roofs that he remembered was octagonal, divided into square panels, one of which was painted blue, with the ornament upon it painted green. The next panel was painted green, and the ornament was blue, white scrolls with black "Alleluia" being introduced as relief on both, and the whole effect was as rich as it possibly could be. With regard to the point of taking into account the light and atmospheric effect upon colour decoration, this



could not be done in one's office, and he thought that one reason why decoration so often failed was that this matter was not taken into due consideration. If they had a church with beautiful stained-glass windows, the colour used in that church would look totally different to what it did in a room where there was a strong light. All decoration, too, should be designed with due regard to its distance from the eye. In the use of *sfraffito*, it seemed to him that if they got their colours good *sfraffito* was more lasting, and the effect was finer than that of distemper.

Mr. A. W. Earle said that in some of the cathedrals and churches of Moscow and elsewhere in Russia, the colours were of a much richer nature than those used in England.

Mr. Randolph said that in Germany, especially in North Germany, the church interiors were entirely whitewashed as an aid to the decoration. The decoration was not carried out all over the church in one great scheme, but it was focussed in various points of interest. The dead-white background afforded an admirable background to the rich and subdued tone of colour which was used. With regard to the Russian churches, he thought that the decoration was often merely constructional decoration, obtained by the natural colours of the rich marbles and stones which were used.

Mr. F. G. Hooper agreed with Mr. Baggallay that where great economy was necessary more effect could be obtained for a given sum of money by painting than could be got by constructional decorations, and thought that when an architect had to study economy very strictly in the construction of his building, he should bear in mind that some future benefactor might be willing to expend money on the decoration of the building. If opportunities were provided, decoration might then be applied which would convert poverty into richness. The designs which Mr. Warren had brought before them that evening went to demonstrate that broad spaces ought to be treated flatly. Few things were more irritating to see than a raised design on a wall or floor. The same applied to carving, as colour in varying grades and gradations would destroy the effect aimed at by the carver.

Mr. C. H. Brodie said he would like to enforce the remarks made about mosaic. He had given some attention to the study of mosaic, and the fact was constantly brought before him that mosaic was a risky material to use. Glass mosaic could only be used as Mr. Warren had said, when it was some distance from the eye; for it was gaudy and did not lend itself to the structure. The material to be used if near the eye was marble.

Mr. F. R. Farrow said that, with regard to the Medieval work, he was sorry to hear Mr. Warren, perhaps to a limited extent, deprecate the use of figure-painting in the decoration of churches. He could not divest his mind of the idea that, at any rate in the fourteenth century, pretty nearly every English church had a figure-painting of St. Christopher or some other saint in fresco. What they were now trying to introduce by means of diaper and other cheaper ornaments was to be regarded as simply a preliminary to what they might expect if the painters were to devote themselves to decorative work instead of painting easel pictures. In studying the decorative paintings of Medieval times, they saw, by the scheme of decoration, that the frescoes were not simple isolated paintings, painted on walls, but were parts of a purely decorative scheme. Their present efforts towards the introduction of colour into churches would only be the stepping-stone of the use of figures in church decoration. One point struck him very forcibly in studying some East Anglian screens, that was that the gradual progress made in the use of colour in the work on those screens. He quite agreed with what Mr. Warren said about the *gesso* work at Southwold Church. That was an example of the finest description of that work, but although there were plenty of other churches—small churches in small parishes—where they could find *gesso* work, he had never found this form of work used earlier than in fourteenth century decoration. It was only in the latter part of the fourteenth and beginning of the fifteenth centuries that they would find *gesso* work used on screens. He hoped they would not be driven very much in their church decoration to the use of the cast lead stars which Mr. Warren had recommended, and for this reason: it was the introduction of a principle which might be all very well in the hands of an artist-decorator,

but when in the hands of others it was not suitable. He would particularly like to enforce the practical remarks which Mr. Warren had made to the effect that in considering their colours they must bear in mind the position in which the decoration would be, for it was impossible to tell what the colour effect would be until the work was seen in position. Light varied so greatly, and in each building there were so many other features, that it was impossible to tell without much experience what the precise effect would be of any colour which might be put up, and especial care would have to be taken with dimly-lighted parts of churches. One of the most awkward things to do was to introduce into a dimly-lighted part of a church a gold background, for they would find that in such an event the colours lost their individuality; and the gold shone out and absorbed all the light in the place. He had come to the conclusion that in dark situations gold, unless carefully used, was a very dangerous means of decoration. There was one other practical difficulty to which Mr. Warren had not drawn attention, namely, that in designing decoration they must consider two things, viz., the effect of the decoration as seen from a distance and its effect as seen from close quarters. In many instances in the church the decoration which they put up would be looked upon by some people at close range and by others from a long distance; and in looking at Mr. Warren's designs, they would see that while there was plenty of fine detail for near inspection, there was a good mass which would give a definite design when seen at a distance, and that was what they wanted in designing decoration for churches. The Church of St. Saviour, Aberdeen Park, which Mr. White had mentioned, was certainly one of the most charming churches to be found in London; but he did not agree altogether with what he had said about the use of constructional colours for the decoration. The constructional colours at that church were the colours of the bricks; there was no plaster on the walls, and the brickwork alone,—the greater part of which was red,—almost killed the decoration. Mr. Baggallay had spoken of the necessity of having some scheme of decoration in their minds to begin with when they had to decorate an interior. That was exactly the practice of German decorators.

The President, in putting the vote of thanks to Mr. Warren, said that a great deal of valuable information had been put before them that evening in an attractive way, and Mr. Warren's remarks offered many suggestions, which they could consider more carefully at leisure. He did not see why our churches should not be decorated in the same good taste as our houses were. There was one point upon which Mr. Warren might have touched, and that was the decoration of town churches, especially the churches of smoky towns; for, if they were painted, they got dirty very soon, and then it became a question of redecoration, though, of course, where there was plenty of money marble might be used. If they could go to the expense he did not think there could be any doubt that in many cases marble and other similar materials were more to be preferred than paint. The great labour which Mr. Warren had taken in the drawings which were exhibited deserved their best thanks, for it was of the greatest use to them, as architects, to see the way in which these things were done. It was to be regretted that they could not decorate a new church, for the walls were always too damp and all decoration was thrown away if attempted then. Very often the architect was got rid of, or forgotten, before the church was fit for decoration, and when the church was two or three years old, the architect being forgotten, some rich person came along and found the money, to be spent by some firm of "decorators."

The vote of thanks was then put, and carried with acclamation.

Mr. Warren, in reply, thanked them for the way in which they had received his paper. So many interesting points had been raised upon his paper that it would be impossible for him to notice them all. With regard to the point raised by Mr. White about the dossal, the one in question was not simply the representation of a curtain, but the representation on a dossal of figure-subjects. Mr. Baggallay had brought one point forward, which he had not perhaps sufficiently emphasised, viz., that colour was a powerful weapon to wield. There was no doubt that colour was a very powerful weapon, for by its use one could completely transfigure a building. He

did not believe in theories with regard to colour; a man who theorised about colour was like a man who theorised about music,—he was not likely to feel much. Mr. Earle had made some remarks about Russian buildings, which had interested him very much; but not having visited Russia, he was unable to appreciate the effects to which Mr. Earle alluded. But in advocating the scheme which he had put before them, he was speaking of English interiors. In Russia, with clearer skies and stronger lights, it was very possible that the effects would be more successful than they were in England. What he had seen of Oriental decoration led him to think that it was not suited for England, and would have a *bizarre* effect. Mr. Bodley had recently made an interesting remark to him about Westminster Abbey. It was well known that Westminster Abbey was entirely coloured originally, and if they looked at the vault of the north transept with the aid of a good opera-glass, they would observe traces of the colour still. Mr. Bodley said that he fully believed that the beautiful brown colour on the piers at the Abbey was obtained, to a great extent, by the use of oil in the paint which was used to coat them. In conclusion, he again expressed his thanks to those gentlemen who had assisted him with drawings.

#### THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday afternoon in the Council Chamber, Guildhall, Lord Rosebery in the chair.

*Appointment of Chief Engineer.*—The Standing Committee reported as follows:—"We have proceeded upon the resolution of the Council of November 19, referring to us for consideration the report of the Joint Committee of the Main Drainage and Bridges Committees relative to the appointment of a Chief Engineer in the place of the late Mr. Gordon. Feeling how important it is to the Council and to the inhabitants of London that the office of Chief Engineer should be filled by a thoroughly qualified and experienced person, we have given the most careful and anxious consideration to the subject. We have had before us seven candidates for the office, four of whom had previously been seen by the Joint Committee, and, having weighed their respective merits and qualifications, and made inquiries of some of the leading members of the profession, have come unanimously to the conclusion that Mr. C. Dunscombe, the City Engineer of Liverpool, is the best qualified for the office. In accordance, however, with the usual practice of submitting three names, a practice from which we do not feel at liberty to depart without a direct instruction from the Council, we also submit the names of Mr. J. Allison, the City Engineer of Manchester, and Mr. A. R. Binnie, Water Engineer in the service of the Corporation of Bradford. We think it right to mention, in justice to the Joint Committee which previously considered this matter, and whose report was transferred to us, that Mr. Dunscombe was not before that Committee when it selected the three engineers whose names were submitted to the Council on the 19th of November.\* We now recommend—

"That Mr. Clement Dunscombe be appointed Chief Engineer of the Council, at a salary of £5000 a year, upon the following conditions:—That he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office, and be not allowed to take any private practice; and that on retirement he shall not be entitled to any superannuation or pension."

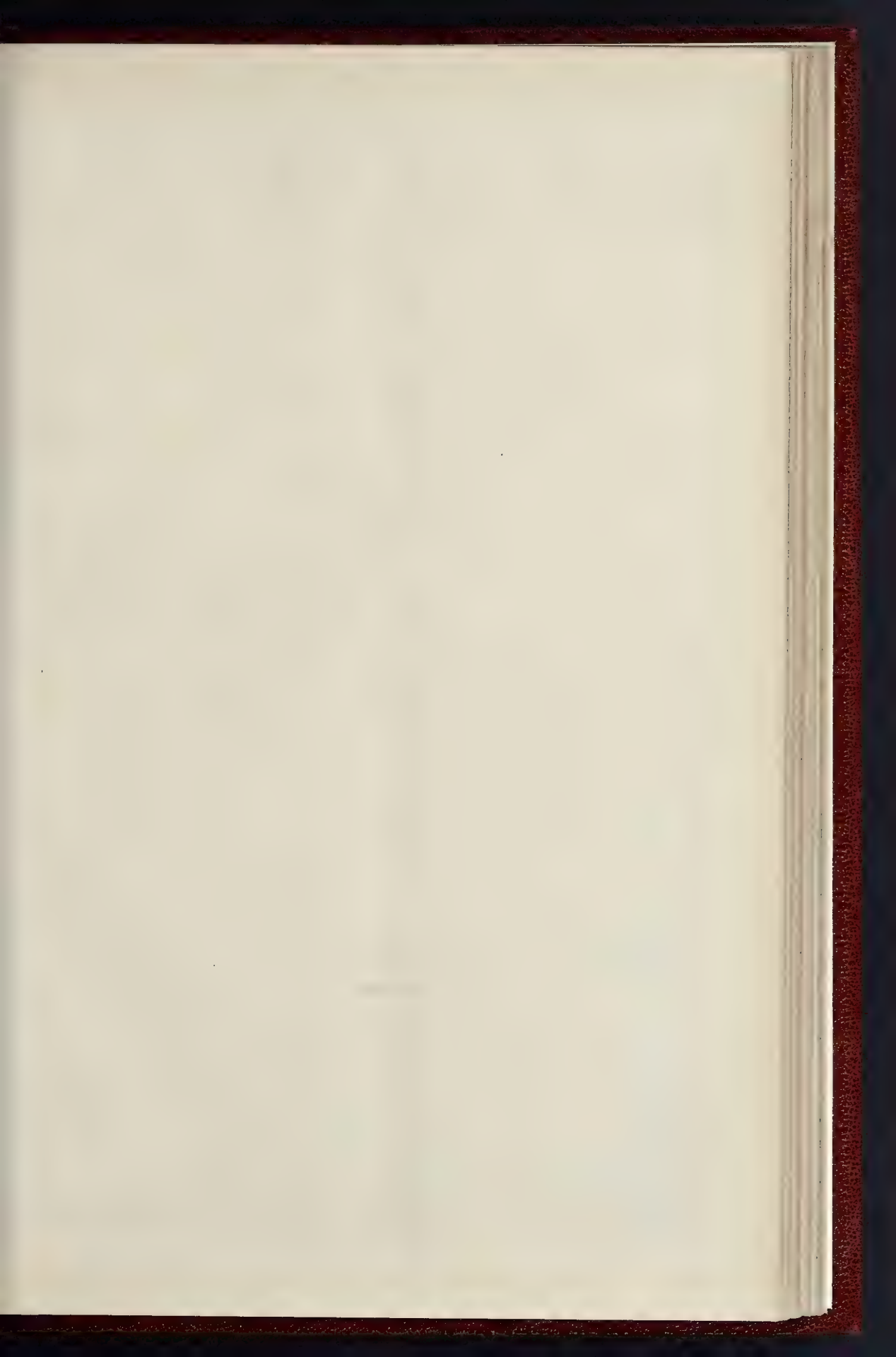
Mr. Haggis, the Deputy-Chairman of the Council, in moving the adoption of the report, referred to Mr. Dunscombe's great experience as a municipal engineer, and to his work at Croydon, Kingston-on-Thames, Derby, and Liverpool. He was convinced that in Mr. Dunscombe the Council would secure an engineer of unquestionable ability to perform the duties that would devolve upon him, and he trusted that his election would be unanimous. Mr. Dunscombe would soon, he hoped, by the courtesy of the Corporation of Liverpool, be able to enter upon his duties,—at any rate, partially.

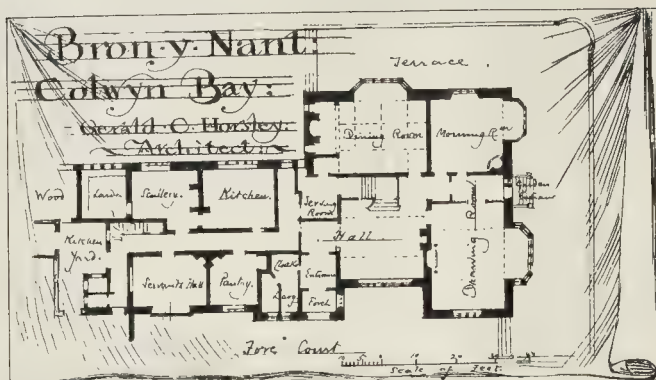
Mr. Arthur Arnold, as Chairman of the Main Drainage Committee, strongly supported the recommendation of the Standing Committee, which he trusted would be unanimously agreed to (cries of "Agreed," "agreed.")

The Chairman said that as it was the evident

\* See *Builder* for Nov. 23, p. 374.















feeling of the Council that they should elect Mr. Duncombe, he proposed to put his name to the meeting singly, unless any member objected to that course being taken, for if the Council were agreed on the election of Mr. Duncombe, it would be an unnecessary invidious and disagreeable thing to put to the vote the names of the other two gentlemen whose names were mentioned in the report. ("Agreed.")

The Chairman then formally put the motion that Mr. Duncombe be elected, and this was carried *nem. con.* A little later,

Mr. Duncombe appeared on the dais, and having been introduced to the Council by the Chairman, he expressed his acknowledgments for the high honour conferred upon him. He said he was fully sensible of the importance of the post, and in assuming its duties, which he should do with some diffidence, he trusted to be able to so acquit himself as to merit the confidence of the Council and to justify his appointment to so important and honourable a post.

**Vacancy for an Assistant Engineer.**—The same Committee also reported that their attention had been directed by the Main Drainage Committee to the necessity of the Council appointing as early as possible an Assistant Engineer, to take the place of Mr. Thomas Lovick, resigned, so that the new official might have the benefit of Mr. Lovick's experience before the latter left the service of the Council. The Standing Committee concurred in the expediency of that course, and accordingly recommended—

"That an Assistant Engineer be appointed at a salary of £302 a year; that he do his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office, and not be allowed to take any private practice; and that the appointment be, in other respects, subject to the conditions which have been already laid down by the Council with regard to all appointments made in its service.

That advertisements be issued inviting applications for the appointment, and that the applications, when received, do stand referred to the Standing Committee with instructions to select (after conference, if necessary, with other Committees concerned) and report to the Council, the person or persons whom it considers the most suitable for the appointment."

This was unanimously agreed to, with the proviso that the limitation of the ages of candidates be between thirty and fifty years.

**Dwellings for the Working Classes.**—The report of the Housing of the Working Classes Committee contained the following:—

"Your Committee have had before them the subject of the arrangements which should be made in any buildings which may be erected under the control of the Council for the housing of the poorer classes, particularly as regards the staircases, basement floors, bath-rooms, and closets, and the size of the rooms. Your Committee have repeatedly considered these questions in conference with the Medical Officer and the Architect, and they now submit the following suggestions:—

(a) **Staircases.**—A central staircase in blocks of dwellings is objectionable, and, as regards convenience of plan and thorough ventilation of each dwelling, the best amongst the modes commonly in use is that which provides a staircase close to the outer wall, and having large openings communicating with the open air. Such a staircase can be conveniently arranged to give access to four dwellings, and the ventilation of such dwellings can be effected by means of open doors and fanlights, so that a thorough current of air can be obtained when it is desired. If it is felt in the winter time that this arrangement leaves the persons using the staircases too much exposed to the weather, windows partially enclosing the openings can be provided.

The chief alternative to this kind of staircase seems to be one which is in the centre of the block, and gives access to dwellings on each side of it. In this case the ingress of fresh air to the staircases can only be through the entrance doorway and along a short passage, and through the skylight at the top of the block. Upon this the dwellings opening from the staircase have to depend for their through ventilation. Both these plans are in considerable use. Staircases in buildings more than three storeys high should be at least 4 ft. in width. The walls of the staircases to a height of about 4 ft. 6 in. should be finished with glazed or hard pressed bricks; the upper portions with hard bricks neatly pointed.

(b) **Basement Floors.**—There is no doubt that, as compared with the other floors of a building, the basement floor is undesirable as a residence, but in building artisans' dwellings it is generally expedient to construct a story below the ground floor, though it is not necessary that they be used as 'dwellings'; but inasmuch as there is no definite evidence at the present time that basement rooms, fronting

upon a principal street, should not be used for dwelling purposes, their use need not be forbidden, provided that adequate precautions against fire are taken, and that the bottom of the window-sill is not lower than the level of the adjoining pavement, and not more than 3 ft. above the floor, and that in other respects they agree with the provisions of section 103 of the Metropolitan Local Management Act (18 and 19 Vic. cap. 120) as applied to new buildings. They are usually set at a rate materially lower than the rooms above them, but if they are let at the same rate as the upper floors in a high block of buildings, they are preferred by many people who are not able to mount a considerable number of stairs. Beyond the question of health, it is not necessary to object to such rooms on account of their proximity to the street, those who occupy them being able to make such arrangements for privacy as they find necessary. Where no areas are practicable, the walls should be covered with asphalt or other damp-resisting material, from the damp-course to the footings.

(c) **Bath-rooms, &c.**—Unless they are in close vicinity to public baths and wash-houses (a condition which can very rarely happen), bath and wash-house accommodation should be provided to every block of dwellings, and this can best be provided in a separate building, or on the basement floor, or in a distinct section of the block that can be constantly under inspection, and to which inexpensive arrangements for water-supply, &c., can be applied. In connection with this matter, the water-closet accommodation has been considered on the assumption that the dwellings to be built or proposed by the Council will generally be for the accommodation of the lowest class of the population which inhabits separate tenements, a class just above that which uses the common lodging-houses, and for which neither private speculators nor the societies for building artisans' dwellings make any provision. It seems inexpedient to provide, within any of the dwelling rooms now under consideration, either water-closets or separate water supply or sinks. A sufficient number of closets should be supplied to each floor of dwellings to which a separate staircase is provided, together with a provision of sinks and water supply for common use. Such closets should have both doors and windows opening directly to the open air; and, where possible, there should be one closet to each family. Dust-shoots should be provided from each common scullery, or from the landing adjacent, to discharge into galvanised iron moveable dustbins, which can be carried out and emptied into the dust-cart.

(d) **Size of Rooms.**—The number of rooms to be provided in each tenement, and their sizes, have been considered as one question, and the following may be regarded as minima:—

(1) In a one-roomed tenement the minimum superficial area should be 144 ft. This would conveniently be provided in a room measuring about 12 ft. by 12 ft.

(2) A two-roomed tenement should have a similar room, with an additional room containing 96 superficial feet, or measuring 12 ft. by 8 ft.

(3) A three-roomed tenement should have a large room containing 144 ft. in superficial area, and two rooms each containing 96 ft.

These sizes, however, should not be rigidly fixed, but rooms of various sizes should be provided. Four-roomed tenements need not be provided, but if they are, the fourth room should be of about 100 ft. superficial area. It would be convenient as regards planning, and also as regards the population to be accommodated, that some little variety should exist in the sizes of the rooms in each tenement as well as in their number, in order to provide for the different conditions of the families. The standard height for every room should be 9 ft. The walls of the rooms should be finished in some hard material, for which purpose Portland cement upon brickwork, or brick with pressed face on both sides, should be used up to a height of about 3 ft. 6 in. The upper parts of the walls can be finished by a thin coating of hard plaster upon brickwork, but upon this point some further inquiry is desirable. In designing the buildings, some care should be taken to give a pleasant appearance to them. As regards the interval which should exist between any block of dwellings and the nearest building obstructing the light from its windows, it is suggested that, if practicable, this distance should be equal to one and a half times the height of the obstructing building. But it does not appear that this space can, in view of the cost of land, be generally provided. Under no circumstances should a nearer distance than the height of the buildings be allowed.

In dealing with this subject, your Committee have kept mainly in view the provision of accommodation for the poorer classes; and it will, of course, be understood that the figures mentioned in their recommendations are the minimum of what they deem necessary. Your Committee have referred to the Architect for report the subject of the desirability and cost of providing lifts in blocks of artisans' dwellings, and they are not at present prepared to make any recommendation on this head. Your Com-

mittee submit the above suggestions, and recommend—

"That they be approved and adopted by the Council."

This was agreed to after a very brief discussion.

**The Charges against Connors.**—Mr. Hubbard moved that the question of the charges made by Mr. Burns against Messrs. McDougall and Lidgett, re Mr. Duckham's nomination for the post of Chief Engineer, be referred to the Standing Committee for investigation and report. This was seconded by Mr. Collard. After hearing Mr. Burns, Mr. Arthur Arnold, and Mr. Lidgett, Mr. Phillips moved and Mr. Leon seconded, as an amendment, "That the Council is of opinion that the imputations made by Mr. Burns against Mr. Lidgett and Mr. McDougall are totally unfounded." This was carried with only one dissentient.

**Christmas Recess.**—After some discussion, the Council resolved—

"That no meeting of the Council be held after Tuesday, December 17, until Tuesday, January 15, 1890, and that there be no meetings of Committees between Friday, December 20, and the day fixed for the re-assembling of the Council, unless in a case of urgency which will not admit of delay."

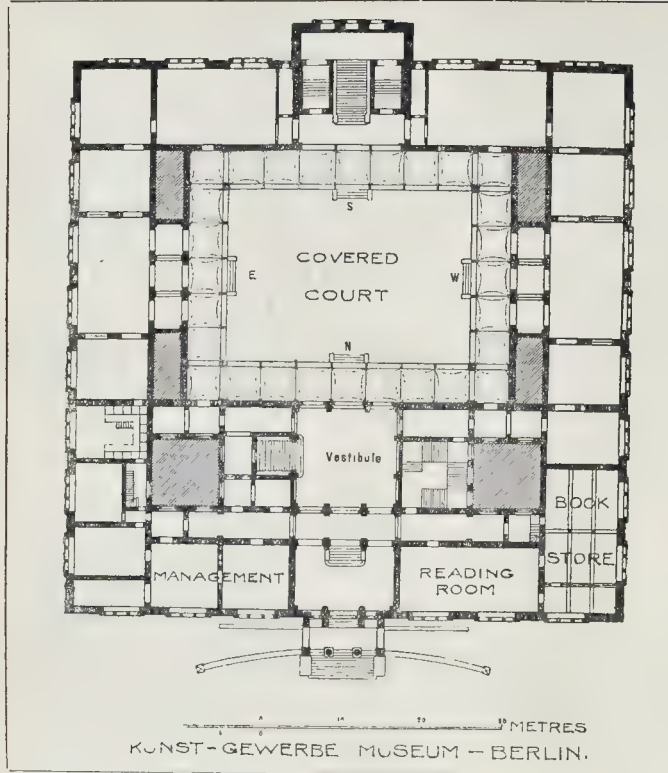
## ARCHITECTURAL SOCIETIES.

**Birmingham Architectural Association.**—A meeting of the Birmingham Architectural Association was held on Tuesday evening last, when a paper, entitled "The Decorative Treatment of Architectural Ironwork," was read by Mr. C. J. Hart, in which, after laying down as the principles which govern all designs for ironwork that they should be consistent with the metal as well as with the purposes for which they were intended, that no feature should leave a doubt as to whether it was designed for cast or wrought iron, that the ornaments should be subservient to the construction, and that attention should be paid to the distance at which the object was to be placed from the eye, Mr. Hart pointed out that, at the present day, craving after variety was often gratified at the expense of fitness, and that deception was often practised in the forms adopted, and that such deception was necessarily leading to a degradation of art. The paper was illustrated by some lantern illustrations of the ironwork on the doors and in grills at Kenilworth, Lincoln, Westminster, Rouen, Notre Dame, Paris, &c.

**Manchester Architectural Association.**—The third ordinary meeting of this Association was held on the 3rd inst. at the Diocesan Buildings, Mr. J. H. Woodhouse, President, in the chair. Mr. V. H. Bidlake, M.A., read a paper on "Dry Rot: a Botanical Contribution to Architecture." He prefaced his remarks by a scientific description of the growth of trees. The germs were, he said, often transmitted to sound timber by the tools which had been used on infected wood, and remained dormant until favourable conditions brought them into activity. Messrs. Mee, Chadwick, Hodgson, Stelfox, and the chairman took part in the discussion following.

**Edinburgh Architectural Association.**—The present session of the Edinburgh Architectural Association was opened on the 28th ult., in the Architectural Hall, 42, George-street, by Mr. W. M. Conway, M.A., the hon. secretary of the National Association for the Advancement of Art, with a lecture on "Ancient Egyptian Architecture." Professor Baldwin Brown, President of the Association, occupied the chair. The lecture consisted of a series of comments on an interesting number of lantern views, chiefly of Egyptian temples of the ancient, middle, and new empires and the period of the Ptolemies. By way of introduction, Mr. Conway called attention to the method of construction in tombs, which, he explained, offered an indication of the general principles of Egyptian building. The walls were made up of slabs laid one upon another, and in the interior there were columns, upon which were placed monoliths for the formation of the roof. Alluding also at this stage to the Pyramids, Mr. Conway expressed the opinion that the term architecture could not be applied to any of these erections—they could only be regarded as examples of building. Mr. Conway proceeded to show the development of the column and capital, first in wood and metal and then in stone, the basis of the open flower and the closed bud being noticeable as the ornamentation. He thereafter explained the leading features of a number of the temples. Views of these were mostly representations of





the actual ruins—a few mere representations of reliable sketches of the original structures. At the close the Chairman said they all must have felt that the next best thing to going to Egypt themselves was to listen to such a lecture as they had been given. On the motion of Mr. McGibbon, a cordial vote of thanks was passed to Mr. Conway for his lecture.

*Royal Institute of the Architects of Ireland.*—The regular Council meeting of this Institute was held at No. 37, Dawson-street, Dublin, on Monday, December 2nd. Present, Mr. W. M. Mitchell, Fellow, in the chair; other Fellows present, Messrs. J. L. Robinson, C. Geoghegan, Albert E. Murray, hon. secretary. The hon. secretary read the minutes of last meeting, which were signed. Ballot papers were taken, when the scrutineers declared candidates duly elected "Members," subject to the By-laws being complied with. The hon. secretary then read out the names of those gentlemen who had passed the preliminary examination of the R.I.B.A.,—viz, P. Wardrop, M. Colligan, and W. A. Scott, and the following gentlemen having otherwise qualified were also allowed their examinations,—viz., R. C. Orpen, W. S. Jervois, and R. G. Thompson. The annual general meeting was decided to be held on the 14th inst., at the above address, and the annual dinner at the Grosvenor Hotel, after the meeting.

**The "Lacoon" Pen.**—This is a fountain pen patented by the Rev. E. Lacon, of Nether Wallop Vicarage, Hants, in which the pen has the form of an ordinary pen nib; the ink is filled into the handle and an air-tight stopper put over the filling-hole, and the ink filters downward by capillary attraction under a kind of separate nib fixed on the back of the actual pen, and with a point ending on the top of the little of the pen. The ink has a tendency to run a little on first filling, and requires holding for a moment over blotting-paper to allow for this; afterwards it works very well, and we prefer the feel of the nib to that of the round or point used in some other fountain pens. We have not very much faith in fountain pens at all, our experience being that few of them can be depended on to keep in working order for long; but Mr. Lacon's seems a good one, with some advantages of its own.

### Illustrations.

#### THE "KUNST-GEWERBE" MUSEUM AT BERLIN.

THE low standard of art-workmanship by Germany shown at the London Exhibition of 1862 was felt and acknowledged by none more candidly than by the Germans themselves. This feeling took such root at Berlin, that in five years it bore fruit in the shape of a movement which, initiated by a few patriotic men, encouraged by the State, and patronised by Royalty, soon developed into an important institution, having for its object the establishment of a museum of reference and a school for art workers.

Foremost among those who interested themselves in the scheme was the late Emperor Frederick, then Crown Prince of Prussia, and the Princess Victoria, who both brought their influence to bear upon its development, and what was begun by a few but earnest workers, with small beginnings and small means, soon rose to a substantial and important institution; contributions were sent from royal and private collections, and funds came in from various sources, which enabled the committee to purchase rare and beautiful specimens of art-workmanship, and to found chairs and secure teachers and instructors in the various products of art. And whilst other important centres of industry in Germany have since followed suit, it is, no doubt, owing to the start obtained by Berlin that that city still maintains the lead in the art production of the country.

The institution once thoroughly established it was soon found that the hired premises in which it began its existence were no longer sufficient, and the State coming to its aid with funds and a site, Messrs. Gropius & Schmiedern were commissioned to prepare the design which we publish to-day.

The building measures 230 ft. by 230 ft. by a total external height of 86 ft.; it is arranged in four lofty stories, namely, half basement, 14 ft.; ground floor, 22 ft.; first floor, 25 ft.; and top floor, 20 ft. high.

The drawing and lecture rooms are contained in the entire top floor next the front on the two lower floors. The library and management are

to the right and left of the main entrance; the remainder is devoted to the exhibition of the art collections above mentioned.

The large covered court, of which we give a view, measures 98 ft. by 72 ft., and is surrounded on all sides by galleries, 14 ft. wide; it is only two-storied, and covered in with a glass roof of curved form.

Every opportunity was taken here, as elsewhere, inside and outside, and within reasonable limits, to show the adaptation of those arts which the whole building is intended to foster and promote.

Polished syenite piers carry the fire-proof arcading and glass roof; construction is ornamented, but not veiled; painting, gilding, and glazed tiles, mosaics, wrought-iron art workmanship being introduced in their proper places. The style throughout is Renaissance Greek. Externally, the elevation presents a massive substructure, 27 ft. high, in sandstone, over which the windows of the ground and first floors are grouped upon a red terra-cotta surface, the openings being framed in sandstone dressings, richly ornamented; the windows of the top story are connected by a series of designs in gold mosaic; and the main cornice, which has a projection of 4 ft. 6 in., is formed in glazed terra-cotta of the same light-red tint as the walls.

The building, begun in 1877 and finished in 1881, cost 147,800*l*.

#### BRON-Y-NANT, COLWYN BAY.

THIS house, now in course of erection, near to Colwyn Bay, North Wales, is built of local stone, with facing stone from the Leysfaen Quarries, and dressings from Cefu, near Ruabon. The roof is of Broseley tiles. The contractors for the work are Messrs. Foster and Dicksee, of Rugby. The architect is Mr. Gerald C. Horsley. The drawing from which the illustration is taken was exhibited in the last Royal Academy Exhibition.

#### WAYSIDE NOTES IN EAST ANGLIA.

No. 5.

##### THE NORFOLK BROADS.

THERE are doubtless very few of the readers of this journal who have not at one time or another visited the Norfolk Broads and Rivers; indeed, so well known are all the nooks and corners of this interesting locality that a few words of description will suffice. Starting from Wroxham Bridge and sailing to Yarmouth, one may obtain a very fair idea of these picturesque lakelets and their surroundings.

On the way down the River Bure we pass the Broad of Wroxham, Horston, Salhouse, South Walsham, and Ranworth, and several other less important ones; whilst amongst the spots worth more than a passing notice are Horning village, with its picturesque cottages with red thatched roofs and brick gables; Horning Ferry, with its little inn and quaint sign and hospitable landlord; St. Benet's Abbey, monument of Canute's piety, standing up gaunt and bare in the marshes, untenanted save by birds; Ranworth Church, with its marvellously-painted screen; and, lastly, Acle Bridge, Church, and Village.

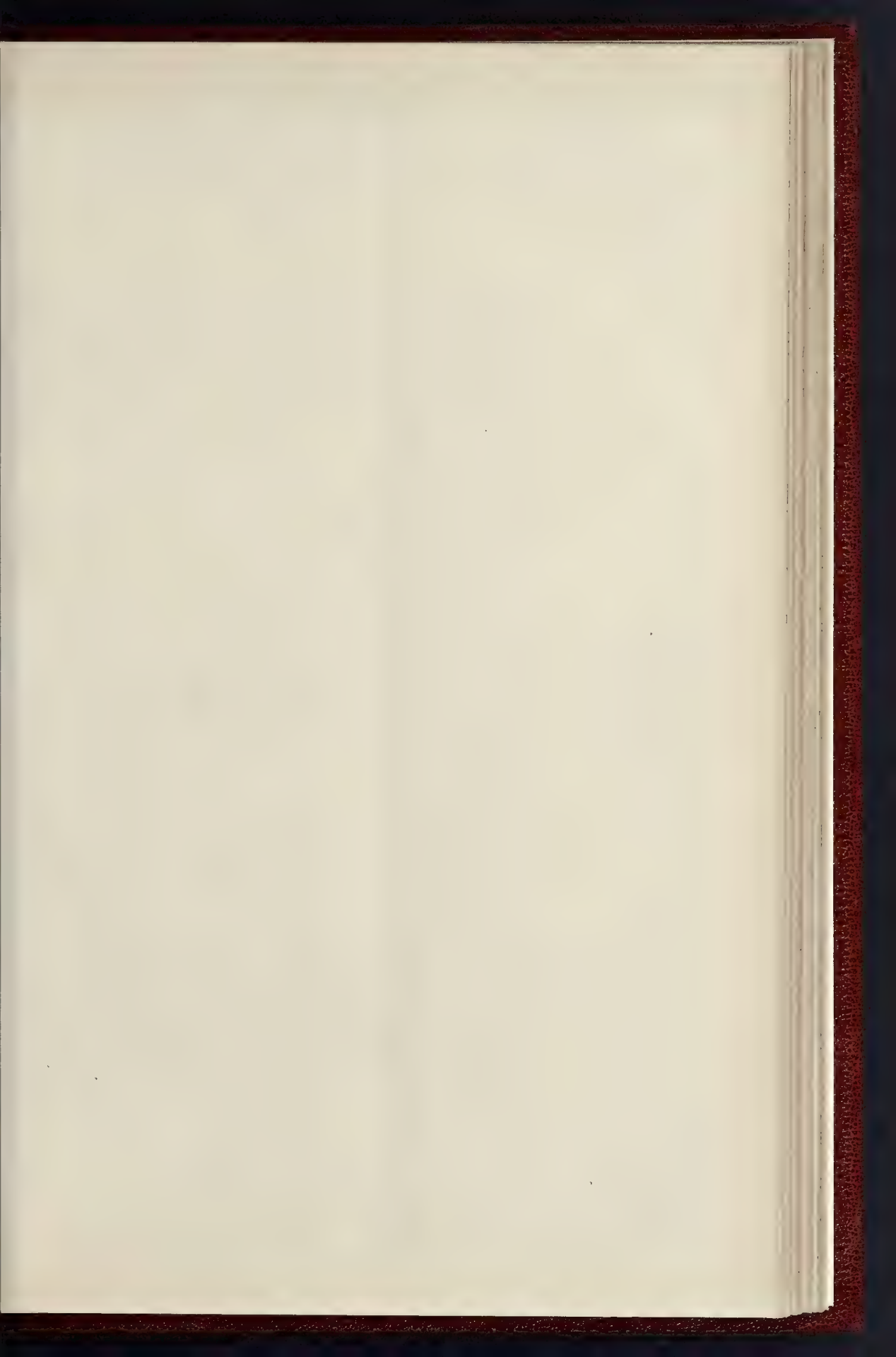
The artist, naturalist, and botanist will find much of interest on this brief voyage. Almost at every turn and bend in the stream rise up pictures full of peaceful beauty.

Subjects for pen and pencil may be found in the old farm-houses, with their tumble-down outbuildings, on the shores of those quiet expanses of calm water, haunts of the water-fowl and breeding-places of the gull. Along the margins grow in profusion the water-lily and many varieties of aquatic plants; and there is abundance of sport for followers of the gentle craft. The "idle architect" whose views appeared in these pages awhile since, and who advocated entire rest, would spend a more profitable holiday in the above neighbourhood than in the painfully uninteresting village he describes—even though he left all the paraphernalia of his profession at home.

JOHN SHEWELL CORDER.

**Water Supply and Sewerage, Leighton Buzzard.**—We understand that the Rural Sanitary Authority of Leighton Buzzard have called in Mr. C. Nicholson Lailey to advise them with regard to a scheme for supplying their town with a proper water-supply and sewage disposal works.





THE BUILDING



THE "KUNST-GEWERBE" MUSEUM, BERLIN

VIEW IN GALLERY



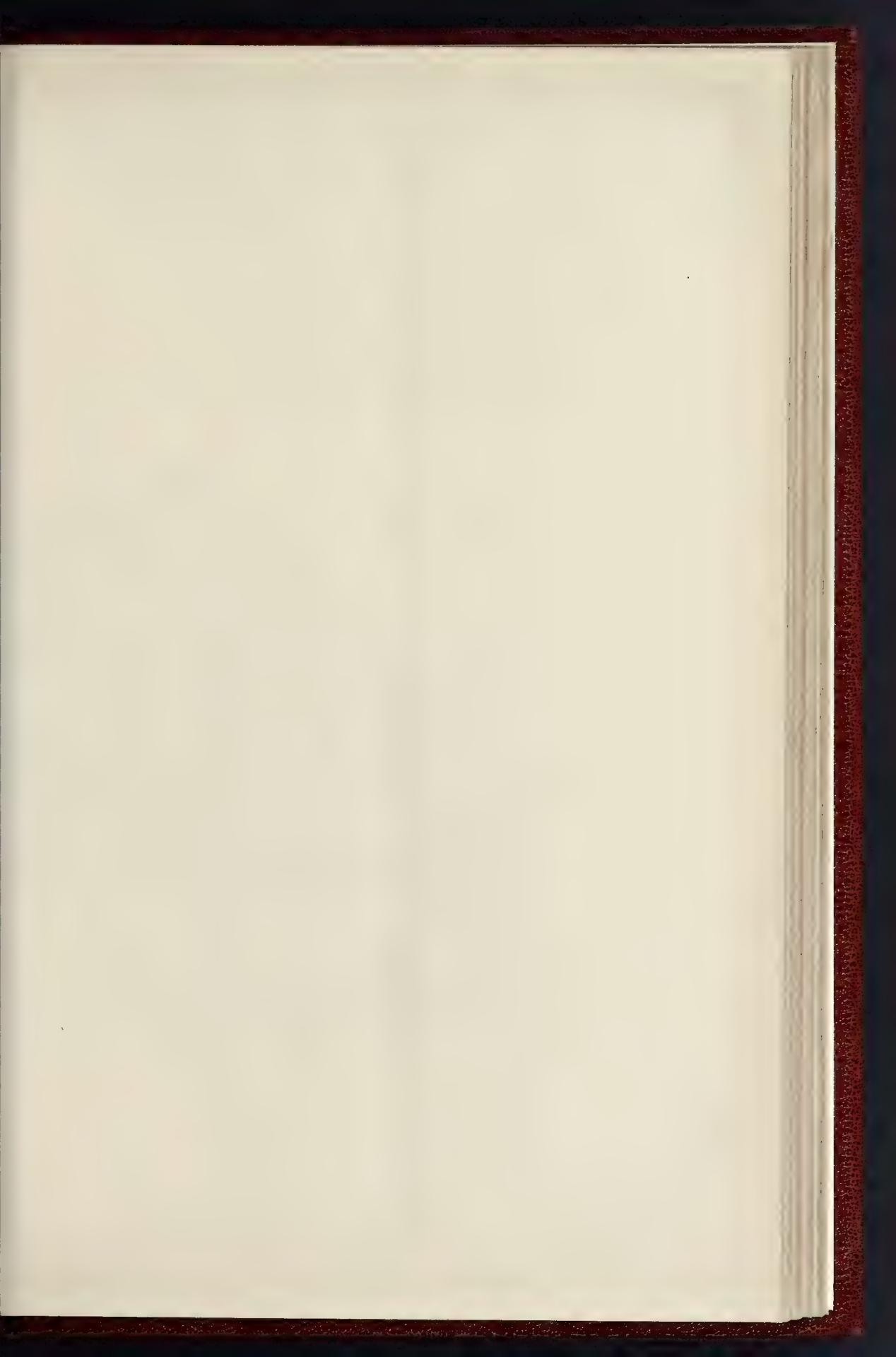


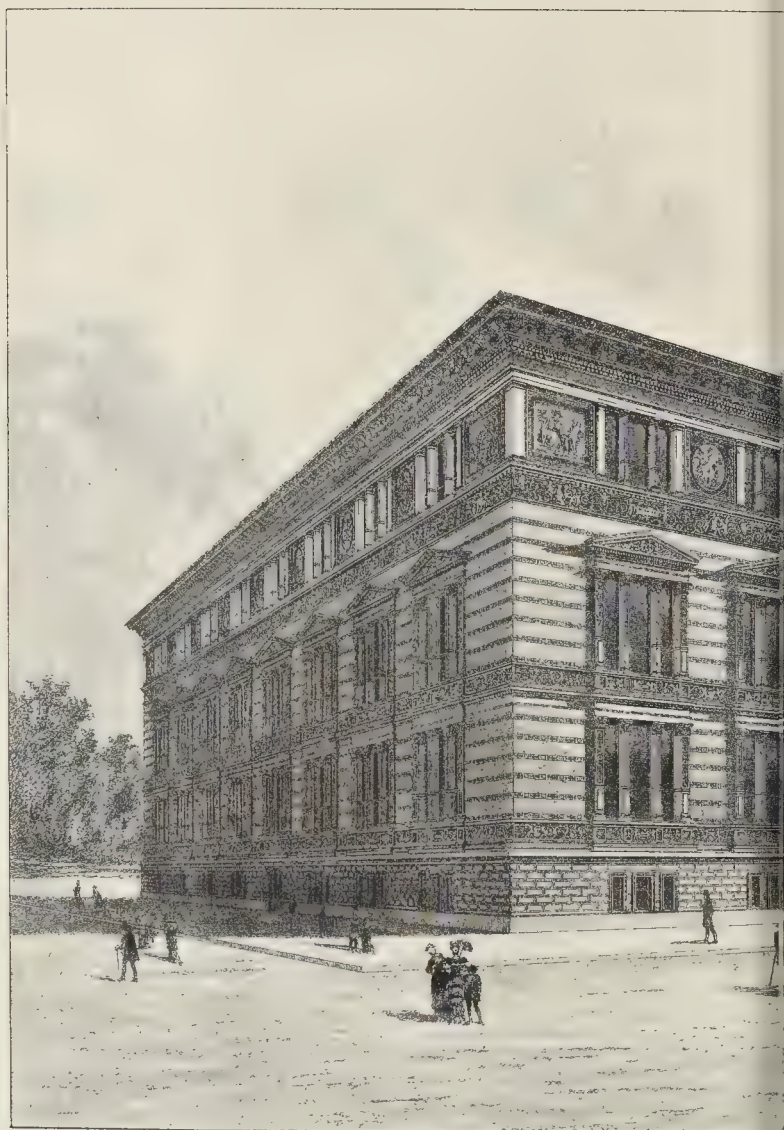
HMIEDEN AND THE LATE HERR GROPIUS, ARCHITECTS

TRAL COURT.









THE "KUNST-GEWERBE" MUSEUM, BERLIN





PHOTO SPRAGUE & CO LONDON

HMIEDEN AND THE LATE HERR GROTIUS, ARCHITECTS.





## THE COLOUR DECORATION OF CHURCHES.\*

I AM well aware that my subject is no new one. It has been treated by many able and cultivated minds. I can lay no claim to originality in its choice, but I do claim for it that it is an important subject, especially so in England, where I think I may safely say church architecture is more closely studied and more successfully practised at the present time than in any other country. If we consider the most prominent names, the most distinguished reputations in the list of architects whom England has produced within the last half-century, we shall find that, with few exceptions, those names have been largely associated with and those reputations, to a great extent, founded upon the building of churches. When one remembers that these islands are divided into countless parishes, and that every parish implies the existence of at least one church, while the parishes of large towns have often many, and that those churches are frequently the largest and most conspicuous buildings in the towns or villages where they occur, one cannot but concede to churches, quite apart from their sacred association and function and special significance, a supreme architectural importance; and I will venture to say that if, as I think will be generally granted, the interior of any public building is at least of equal importance to its exterior, the internal aspect of churches is of the first and highest importance, and the study of their decorative possibilities and the special methods applicable to them is a study which the church architect cannot afford to neglect.

While decorative art, as applied to civil and domestic buildings, has made enormous advances during the past few years, while old methods have been revived and amplified, and new methods have been devised and perfected, it is a question whether a corresponding and equally general advance has been made in the decoration of our churches. The average homes of educated people, nowadays, show at any rate an earnest, though often unsuccessful, attempt at decorative beauty, a preference for soft, warm tones and subdued effects. In this true of our churches, for the decoration and embellishment of which precisely the same classes are responsible? Is it not rather the case that the average English church interior is one of cold formality, relieved too often by harsh spots of colour—unconsidered, inharmonious, the cruel, kaleidoscopic glare of bad stained glass, the vivid crudity of upholstery, the hard outlines and harder tones of stencilled ornaments, or the prevalent treacly nastiness of varnished pitch-pine? There is an effect of barrenness, of ready-made cheapness, of ecclesiastical triviality about the fittings and furniture. Cheap ready-made pulpits, candlesticks, and crosses, called by well-meaning but un instructed people from the illustrated lists of church furnishings or from the "ecclesiastical department of the co-operative store." "Our Early English lectern at so much," "Our Gothic gaseliers at so much and six."

It is chiefly, however, of colour, and the want of it, that I have to speak; for in those churches, numerous already, and daily increasing in number, where the greatest skill and care have been spent upon the fabric and its more immediate necessities, where the mind of an artist has impressed itself upon stone or marble, metal or wood, there is usually a partial, more usually an entire, absence of colour-decoration—beauty of form without beauty of colour; and even in those rare cases, happily becoming less rare, where the windows are filled with mellow, soft-toned glass, they are generally isolated patches of colouring amidst the cold, low tones of the stonework and bare plastered walls; they stand out in too vivid contrast to their surroundings, like jewels set in ivory, whereas it may almost be accepted as a rule, that in old churches, which contain remains of fine glass, you will also find traces of painting on walls and roofs. The windows were but a portion of the decorative scheme, an extension of the general adornment to a translucent surface.

I think it is not generally realised to what an extent the interiors of our English churches were adorned with painting and gilding.

Not only were the walls and roofs, whether of stone or timber, profusely and richly decorated; but the piers and arches, the carved nichements of capitals and mouldings, the

shrines and monuments of stone, the oak screens, pulpits and lecterns, the fonts and their spire-like covers, the stalls and doors, and even the mullions and tracery of the windows, bore their share in the general adornment. It is, perhaps, difficult for us—accustomed as we are to see our ancient churches, beautiful indeed, inspiring and religious in spite of long-continued spoliation and neglect, standing like poor bare skeletons of the past—it is difficult to realise their solemn splendour, glowing as of old from floor to roof with colour and gilding. There are few of us, I think, who would willingly accept bare stone or plastered walls in our own homes. We demand something finer, warmer in effect, more joyous in colour. Yet in our churches we submit, for the most part with easy resignation, to an absence of decoration we could not tolerate at home.

This is, I believe, to a great extent the fault of architects,—many of whom, even men of great practice and well-founded reputation, seem to ignore colour decoration other than what I may term constructive colouring,—the use of coloured stones, brick, marble, tiles, and glass mosaic; or, when they employ decorative painting, do so in a timid and partial manner, which is ineffective. There are, of course, several notable exceptions to this rule, artists who have made a profound study of colour effects, and who thoroughly sympathise with the Medieval craving for colour, the sense of incompleteness without it. Still, there is not enough leaven to leaven the whole lump, and it is the exception, not the rule, to find a church which presents anything like a consistent scheme of decoration.

I do not wish it to be understood that I understate constructive colouring,—far from it; in fact, I propose further on to devote, with your permission, a few moments to its consideration; but I wish, first of all, to deal with those simpler and less costly methods which are more generally applicable, and which, in the unfortunately usual inadequacy of funds, often present the only decorative possibilities.

There is a very general impression, amongst clergy and laity alike, that polychromatic decoration is always a very expensive matter. That it is often so I do not deny; but that decoration of a quiet, restrained, and dignified order is necessarily costly is an entirely wrong impression. The first step towards the revival of a lost art is the study of the works it has bequeathed to us, and it must be my task now to try and interest you as well as I can, by illustration and description, in some of the methods of that decorative art which flourished in the latter half of the fourteenth and first half of the fifteenth century all over north-western Europe, and particularly in England. I have chosen that period, not because I ignore the many beautiful instances of the work of preceding centuries which remain to us, but because it seems to me the period most full of instances worthy of study, and, to some extent, of imitation, to-day.

Aware as I am of the impossibility of dealing with my subject within the limits of this paper in a wide or general manner, I propose to confine myself to the consideration of such methods as are applicable to the average English church; and I may at once disclaim any intention of dealing with pictorial frescoes, except incidentally, for pictorial decoration demands the highest skill, and, extremely desirable though I deem it to be, its application is necessarily costly, and, therefore, unfortunately practicable only in exceptional cases. Moreover, I hold, with Mr. Gambier Parry, that "it is a great mistake to suppose that a high and refined sense of beauty can only be shown in figure-painting; for," as he says in speaking of stained glass, "ornamentation is to art what the varieties in form and tint of leaves and flowers are to nature, and often expressive of its great beauty. It is a branch of art never despised by the really great artist."

Broadly speaking, I am safe in saying that the average English church is a Gothic building, either ancient or modern; and I propose, therefore, to speak mainly of the treatment of Gothic interiors, and to begin by describing some of the typical methods of the period I have referred to. Though much—alas! most—of the decorative beauties of our old churches have disappeared before the ravages of time, wilful or ignorant neglect, and wanton destruction, enough survives Puritan whitewash and the misguided zeal of the restorer to show what has existed, and to suggest what may yet be accomplished.

The internal faces of the walls of English churches were usually coated with plaster, though in large and important churches, or where fine stone for ashlar was obtainable, that material was left uncovered. When plaster was used it was regarded as a vehicle for painting, and the usual method of treating it was as follows:—A ground tint was washed over the whole surface to be decorated, and upon this all manner of patterns and devices were painted, frequently in one, and not often in more than three colours, though gilding was sometimes introduced as an enrichment. The pigment was generally, if not always, what is known as "dis-temper," the colours being vegetable earths, ground fine, and mixed with size or glue in water. The ground tint was very often a toned, or as modern house-painters call it, a "broken" white; but sometimes a soft shade of red, blue, green, or yellow; the pattern tints being upon white grounds, generally red, green, black, or dark grey, and upon coloured grounds, either a dark tone of the ground-tint, or black or grey.

A common type of decorative design was what we know as diaper patterns, that is to say, patterns which suggest, or were suggested, by the designs of figured diapers or stuffs, just as our modern paper-hangings suggest in name, and to some extent in design, the actual hangings of silk or damask from which they are derived. These diapers vary greatly in richness and complexity of design, but are generally flat and simple in colouring. The designs are sometimes distinctly oriental in type, and seem to indicate that eastern draperies, or their imitations, were used as hangings in northern churches. Sometimes the designs are merely geometrical, at others a combination of geometrical figures and freely-drawn flowers, foliations, and even figures of birds and animals. They are often precisely similar in character to the tapestry backgrounds and enriched draperies of our contemporary pictures.

This class of design may be freely studied in our National Gallery, and the student will be greatly assisted by consulting Mr. Vacher's most painstaking and excellent book, the illustrations of which are taken from pictures in that gallery.

Roughly speaking, these diapers may be divided into two classes,—“close diapers,” in which the ground is almost covered by a closely interwoven continuous pattern, and “sparse diapers,” in which conventionalised sprigs and flowers are sprinkled at regular intervals over the ground so as to form a pattern. Akin to the method of sparse diapering is that of sprinkling, or, as it is technically and heraldically termed, “powdering,” the ground with monograms, initials, religious emblems, or even heraldic devices. This was of very frequent use,—good instances are those of the crypt at Canterbury and the south chapel of the parish church at Ewelme, in Oxfordshire.

Occasionally a certain hanging in loose folds was conventionally depicted when the space to be covered was comparatively small and great richness of effect was desired. Examples of this are more common, I think, in the Low Countries than in England. The huge round piers of the Grote Kerk, at Haarlem, are painted with diapered curtains in this manner.

And there is a good instance of a sparsely-diapered curtain at Bois-le-Duc in the Church of St. Jean. Tracery patterns giving the effect of pierced stone or woodwork are also to be met with, but more frequently, I think, upon wooden roofs, of which I shall treat further on.

The range of colours, as I have said, was small; but the changes were so cleverly rung upon them that a great variety and richness of effect was obtained. An underlying principle of Gothic decoration is transposition of colours: thus, when the same design is repeated over a wall surface, upon roofs, or, still more noticeably, upon screen panels, though each repetition may be identical in outline, and the same tints are employed, their relative position is so changed as to vary the effect most pleasantly. We shall notice the application of this principle to roofs and screen panels later on.

Devices in distinct colours or in gold were sometimes overlaid upon these diapered grounds.

Occasionally, tablets representing pictures were overlaid in this way. Sometimes diapered or powdered patterns were carried over the whole wall from floor to cornice; sometimes a dado was formed by a band of ornament of a distinct colouring dividing the upper pattern from a lower and simpler one, or from a plain coloured surface, and in some instances, where a simple pattern extended over the general wall surface,

\* A paper by Mr. E. F. Pridham Warren, read before the Architectural Association on the 29th ult., as elsewhere mentioned.



a much richer design was used in recessed niches or on the jambs of window and door openings. The ornamental bands which were used to form dados, or to divide a space into panels, were frequently of rich and complicated design, but often simple tracery patterns contained by broad lines.

The projecting mouldings—labels over doors, windows, niches, sedilia, and the like,—were much enriched with parti-coloured bands, special twists, waves, and conventional round or square-headed flowers. Carved enrichments, such as the caps of piers, bosses, and finials, were generally gilded, though occasionally painted yellow to represent gold.

The treatment of moulded woodwork was more elaborate and minute, as we shall notice further on.

To enrich ornament as it ascends is an admitted principle of design. It is an expression of the natural tendency of the human intelligence to seek a climax, and is founded upon a broad rule of nature. The flower is richer than the stem, the head is finer than the body. So in art the smooth shaft leads upward to its carved capital, the mullions tend to the traceried window head, the tower terminates in its fretted battlement, as the jewelled crown or mitre surmounts the rich robes of monarch or priest.

In the interior of a Gothic church, where the predominance of upward lines, that aspiring tendency which is at once the essence and poetry of Gothic art, leads the eye naturally to the roof, it must ever be the culmination of any scheme of decoration, the crown and glory of the work. And there can be, I think, no nobler field for decorative painting than the roof or ceiling of a lofty building, and that this was fully realised by Mediæval artists we have abundant testimony. In the embellishment of stone-groined roofs painting was less used than upon roofs of timber: and naturally so, for the smooth masonry of the vaulting was often, as in Westminster Abbey, relieved by courses of different-coloured stones, and formed an ornament in itself. Sometimes, however, the masonry was tinted all over, and painted with elaborate designs,—foliated, scrolled ornaments, and emblems. We have instances of this in the Lady Chapel at Chichester, and in many foreign churches, as at St. Jacques, Liège, at Bruges, at Haarlem, and elsewhere in the Low Countries and Germany.

Sometimes the apex only of each vaulting compartment, formed by the groin ribs where they converge upon the central roof-bosses, was painted; but whether the vaulting was painted or left plain, the moulded ribs were, as a rule, richly coloured and gilded, sometimes for a few feet only from their central intersection, but often for their entire length; and the carved stone bosses were almost always gilt, and relieved with colour. The ribs were sometimes merely treated with broad bands of different colours running transversely across the mouldings; but often each moulding was separately coloured, as was, I think, invariably the case with woodwork, and very generally the round members were ornamented with a spiral twist, or "barber-poled" pattern, such as I shall describe further on.

In some cases, where weakness of walls or considerations of expense, prohibited the use of a stone roof, wooden groining was used in its place, and was decorated in a very similar manner. The beautiful choir roof of St. Alban's Abbey,—familiar, I trust, to most of you,—is the best instance I can call to mind. But it was in the treatment of open-timbered and panelled roofs that the greatest skill and ingenuity were shown by English painters.

One of the most complete and effective, though at the same time simple, instances of the decoration of an open-timbered roof, is that of Palgrave, in Suffolk, illustrated by Brandon. It is a roof of simple form, spanning a nave about 20 ft. wide; the rafters, as usual in these roofs, square faced; the principal timbers and cornice richly moulded.

The ground colour over the whole roof is white, upon which the decoration is painted in two tints only—red and dark grey. The faces of the rafters are ornamented with a tracery pattern in dark grey on white; their sides are red, and this treatment of the sides merits particular attention, for it gives a very rich and glowing effect to the roof when looked at obliquely from east or west; whereas, if the spectator stands facing due north or south, and looks at the roof in front of him, he misses the red rafter sides, and gets a general effect of

white and grey, relieved only by the wavy-rayed red stars on the boards between the rafters.

Of all the fifteenth-century coloured roofs that I know, that of Palgrave seems to me to offer the best instance of an extremely simple and highly artistic treatment. You will observe that no gold is employed in this roof, and that only two colours besides white are used.

Other good instances of the colour treatment of open roofs are those of Ufford and Blythburgh in Suffolk; Sall, Knapton, and the south transept of Aylsham in Norfolk, and Aldenham, in Hertfordshire. Knapton, illustrated by Brandon, is, in my opinion, more curious and interesting than decoratively successful, a strong ochre tint being laid over principals and rafters, and the carved angels on the hammer-beams being rather vividly coloured in reds and greens.

Blythburgh and Sall show designs of the same type. The nave-roof of the latter is coloured entirely in dark grey and red on a white ground; that of Blythburgh, which is one of the most delightful and delicate examples that I know, is in red, dark green, and bluish-grey, and is full of freely and finely-drawn stems and tendrils and four-leaved flowers. Sall shows a curious use of a tracery design, the piercings simulated in black or dark grey.

Aldenham differs widely from all the foregoing, which are all of a typical East-Anglian type, a bold diaper pattern in red and black being painted upon the faces of the rafters, while a scrolled rose design, on a white ground, ornaments the sides of the principals. There is a quaint little *Agnus Dei* in black, repeated at intervals along the cornice. The rose pattern is in some respects similar, though very inferior in drawing, to that on the remains of the Ringers' Gallery at Trunch.

#### Ceiled Roofs.

The treatment of ceiled roofs was, of necessity, different to that of open roofs. The surfaces of these ceilings were usually divided into square or oblong frames, by means of moulded intersecting ribs—though in some instances these ribs were simulated by painted bands. A common and simple method of decorating these panels was to paint them a soft blue, and to fix upon them a number of small gilded leaden stars—as a suggestion of the firmament. The ribs were painted in various colours, each moulding receiving, as a rule, its distinct tint. Sometimes they were partially gilded, but gold was generally reserved for carved or cast lead enrichments, for curved or broken surfaces, and not for flat treatment—a point worth noticing. Occasionally the panels were "powdered," as in the north aisle at Wymondham, with initial letters. By far the most usual and typical design for square panels was that of a large monogram—a device such as the *Agnus Dei*, as at Dereham, Norfolk; the chalice, as at Thaxted, Essex; and the flaming star, as at Minster Lovell; angels holding shields or scrolls, as at St. John's, Maddur Market, Norwich; and at St. Albans Abbey, enclosed in a circular wreath.

The wreath, which may have typified the crown of thorns, is always of a purely conventional character; sometimes a mere scrolled circle, but often throwing out branches to fill the corners of the panel—simple, as at Minster Lovell and St. Albans, or elaborate, as at Dereham. Representations of parchment scrolls, bearing mottoes or sentences from the Liturgy, were frequently used as roof ornaments. In the beautiful little Clifton Chapel at Long Melford, we find small scrolls repeated at intervals upon the red rafters of the flat roof, bearing the prayer, "Jesu, Mercy and grace," while a larger scroll wound round a twisted stem bearing flowers and fruit, all carved in relief and coloured, runs along the cornice and sides of the beams. A very splendid panel decoration (illustrated by Colling) is to be seen at the east end of the south aisle of St. Mary's, at Bury St. Edmunds. The initial letter G, of the motto "God me Guide, grace me govern," which traverses the panels diagonally, is as ornate and relatively as minute as a corner letter from an illuminated missal.

Round bead mouldings were generally, almost invariably, I think,—treated with some variety of what we call "barber-polling,"—a suggestion of a ribband (the very word is suggestive of this treatment, "rib-band") wound round a pole, spirally. This ornament is usually in two colours only, and those grey or black and white, sometimes red and white, and less frequently in red, grey, and white. On the small round mouldings of the screens we find

an infinite variety of these twisted spiral designs in gold and black or blue, gold and red or green, and in combinations of red, green, black, grey, and blue, with white, and not always in the form of a single twist, but elaborated into various graceful forms. The treatment of screens, pulpits, font-covers, and wooden furniture generally were in method and principle much the same as that of roofs, but naturally different and much more minute in detail, finer in drawing and design. The work was near the eye, and capable of close scrutiny, the surfaces to be decorated were smoothly wrought and comparatively small. Oil colour or tempera, which could be brought to a fine face, was used; and the patterns and ornaments were often extremely minute and exquisitely finished. The panels of chancel and parclose screens, and of pulpits, reredoses, and doors, were frequently painted with figures of saints, angels, apostles, or doctors of the church, kings, queens, bishops, and occasional allegorical representations of virtues. Gilded gesso in low relief was often used for backgrounds, and for crowns, jewels, and other ornaments. The rich mouldings of muntins, transoms, and tracery were still further enriched with waved ornaments in two colours, with small four, five, and six-leaved flowers in gold or with gilt centres and points, or with delicately painted sprigs in brown or dark green, bearing red or blue flowers.

The carved crests which abounded were usually gilt, and gold was freely used in the mouldings and panels. The latter, where gilded backgrounds were not used, were usually painted red and white, or green and red, in alternate panels, these colours being almost invariably counter-charged in the traceried heads. The figure-subjects of these panels, though sometimes crude and poorly drawn, are occasionally of great beauty. Those in the screens at Southwold and Ranworth are admirable works of art—expressive, poetical, magnificent in colour, gloriously decorative,—while other instances are hardly inferior. The raised and gilded gesso backgrounds of Southwold are most finished and beautiful than anything of the kind that I have met with, and are, I think, suggestive of a method of decoration which we might employ to great advantage. The Southwold mouldings are lavishly adorned with small gilded gesso patterns, and with painted sprigs and flowers, the blue cornflower occurring repeatedly upon a white ground.

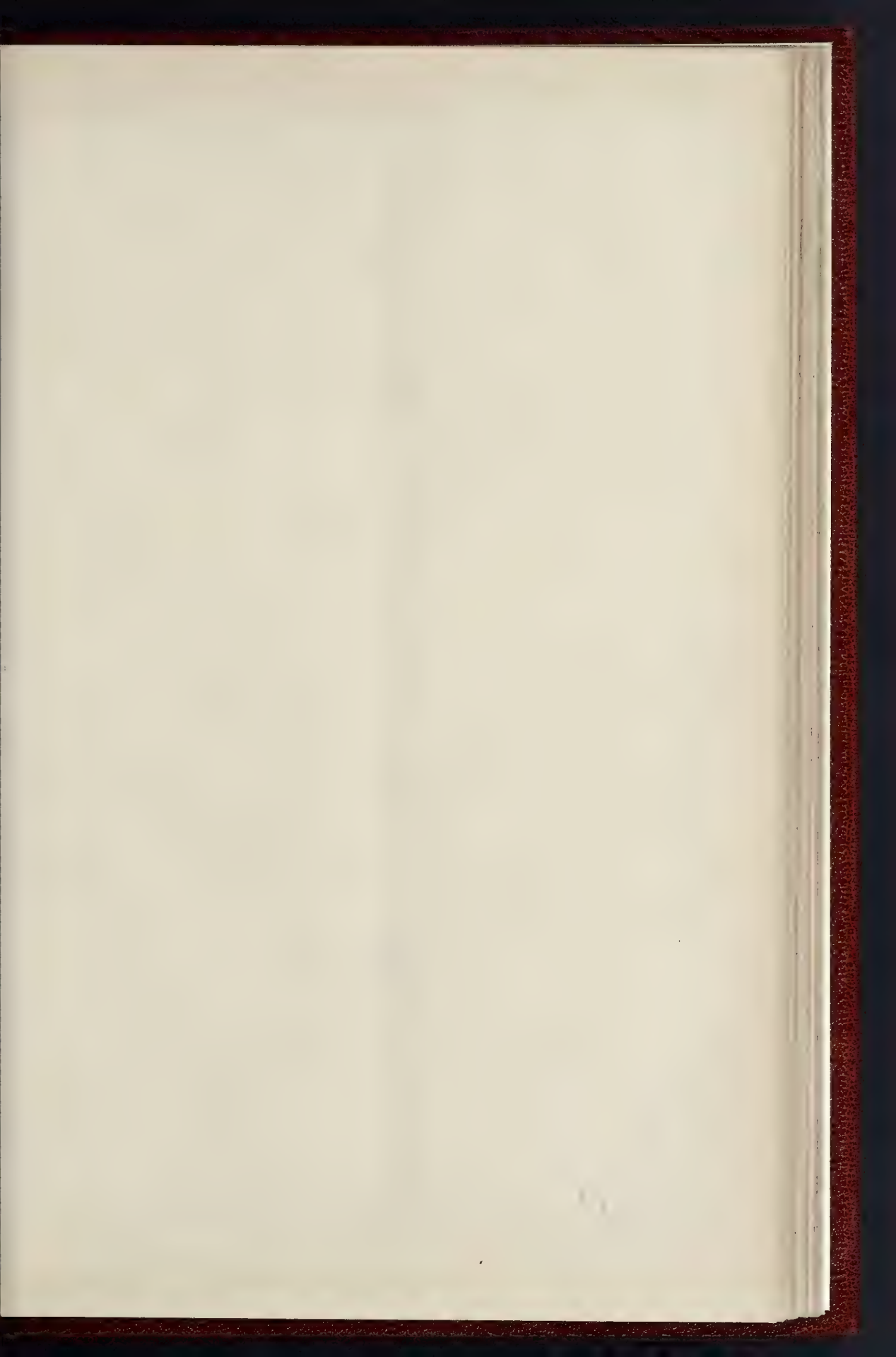
I will not further tax your time and patience with a classification of ancient methods, but should like to invite your attention to what I consider to be the more important lessons to be derived from their study.

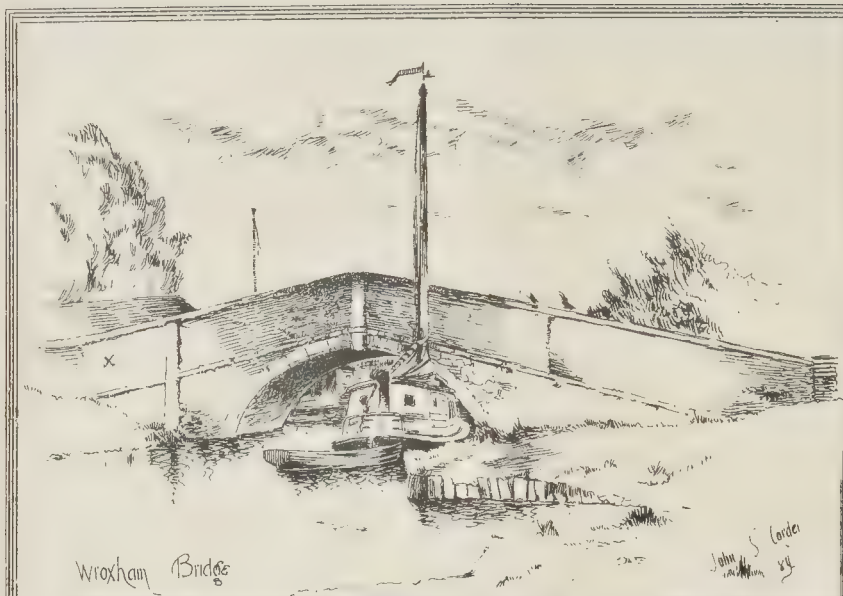
And the first of these is the restricted use of colours,—the simple gamut of four or five tints,—the breadth obtained by the predominance of a prevalent colour. The second is the counter-change or transposition of colours, as in alternate panels or roof bays; this is a most pleasant and successful means of avoiding absolute monotony of effect.

The third is the subordination of figure-subjects, such as screen-panels or mural frescoes, to general decorative effect. One is so apt nowadays, to see this condition reversed, with the result that the figure-subjects swamp the decorative scheme and become obtrusive, I am inclined to think figure-subjects should be sparingly used upon a roof, except, perhaps, upon a low roof, and then upon panels either vertical or inclined only at a very steep angle. Figure-subjects inevitably attract minute inspection, and such inspection of an object high above one's head is ever a more or less painful effort.

I think there can be little doubt but that our modern method of producing roof and wall decorations in churches is substantially the same method. We transfer our designs to wall or roof by means of "pouncing," a little description of which may possibly not be out of place. The design,—for a panel, rafter-face, or interval, or for the repeat of a diaper, or for any decorative device,—is drawn full size upon a sheet of strong paper,—it may have been parchment or sized linen in the old days,—and the sheet is laid over another sheet, under which is placed a cushion or pad, such as a folded rug or blanket. The outlines of the design are then carefully pricked with some sharp tool,—a large needle set in a cork does as well as any,—through both sheets into the cushion, and a thus transferred from the first to the second sheet, which receives the design outlined or pricked holes, and is then called a "pounce."







Wroxham Bridge

John S. Loder  
1884



Wroxham Village



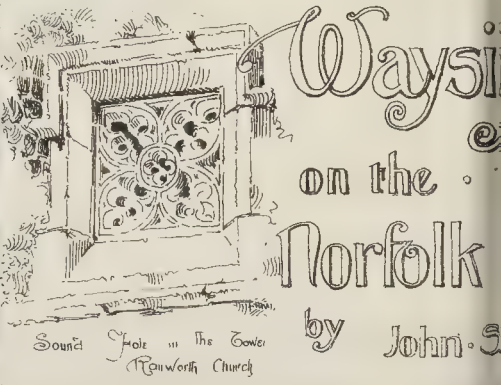
Old Inn at  
Fole



S. Loder



House  
S. Walsham



Sound Hole in the Tower  
Newworth Church

Wayside  
on the  
Norfolk  
by John S.





Notes  
roads:  
S. Corder.





This pounce, or pricked sheet, is then held or pinned to the surface to be decorated, and the outlines are dabbed over with the pounce-pad, a little bundle of rags tied up in linen, and dipped now and again into a saucer of powdered colour, generally black if the ground-tint is white or light-coloured, and white if it is dark-coloured. Thus the outlines of the design are transferred in dotted lines to the surface of the work, and the painter has then to fill them in by hand with their respective colours.

Conventional flowers, square or round paterae, are quickly done by the use of the stencil, which needs no description. But in my opinion the less stencilling is used the better will be the result. The stencil is too mechanical,—it is a cheap and soulless method.

Lead ornaments, suns, stars, shields, and the like, are cast from carved wooden models, and screwed to the timbers, or to lead plugs in case of walls. They are generally gilt or coloured before fixing. I would not advise their use when better means are available, but when, as is generally the case, it is desirable to get a good effect cheaply, they are very useful. It is generally best to keep roof and wall treatment very flat; little shading should be used. A few dark pencillings may be used with advantage to give an effect of roundness to a crown or cornice, for instance. It is often necessary, particularly on roofs, to accentuate outlines in black or dark colour, the strength of such outlining being, of course, proportionate to the light of the building or the height of the design from the floor.

As a matter of general principle I should say that the colours used for walls or roofs should be soft and subdued, but decided, and dead,—that is, free from gloss, so as to present a refracting surface. If oil colour is used the final coat should be "flatted," or deadened, but on dry walls or upon roofs distemper does perfectly well, is cheaper, and has the advantage of being much more easily removable from the walls or floor, upon which spots are seen to fall from the painter's scaffold. Designs at a considerable height or upon dark-toned grounds should be comparatively simple and bold; a whitewash seems to demand more enrichment. The amount of gold-leaf used and its distribution must depend upon the nature of the design and the scheme of colour, but it is generally well to confine it to such portions as it is desirable to enrich more freely than the rest. Thus in a chancel roof the easternmost bays over the sanctuary may be, according to traditional use, treated with especial richness of design and colour, and more copiously gilded. The gilding can be lacquered, glazed, or deadened to relieve it of the tinselly effect it is apt to have.

The average lights of the church must be considered; it is dangerous to choose your colours on a very bright or a very dull day, unless you can make allowance for changes. The light of a church interior is generally affected by the tones of its window-glazing, and the colours must be toned to suit it. Another factor which must not be overlooked is the natural blue of the atmosphere, quite appreciable in our misty climate. It is often necessary, for instance, when reds or greens are used, and are carried to a great height, in order to maintain an apparent evenness of tone, to infuse more and more yellow into the colours as they near the apex of the roof; without this precaution the red is apt to look purple, the green too blue. In short, it is only by careful experiment, and by observing the effect of colours at different heights, and in varying lights,—gas-light especially included,—that the tints should be decided.

Before leaving the subject of decorative painting, I should like to say a few words about a process which has barely been introduced into this country, but which, I think, promises well. It is called the German Imperishable Fresco Process, and professes to give results in wall-painting which are practically imperishable, a profession which it uses in Germany, and recent experiments in England, seem amply to justify. For my knowledge of this process, and for the examples of materials and colours which I am able to show you, I am indebted to the Rev. J. A. Rivington, of Littlehampton, who read a paper upon the subject before the Society of Arts, in February, 1884, and who has been good enough to give me a personal interview.

The process is one invented, and perfected after years of labour and research, by Mr. Adolf Keim, of Munich, and consists in the use of pigments prepared from mineral earths, and mixed with distilled water, upon a ground of mortar formed of special ingredients, the

work being finally glazed or "fixed" with a solution of silicate of potash, treated with caustic ammonia and caustic potash. The mortar which forms the ground is composed of the finest white quartz sand mixed with quicklime, slaked with distilled water, in the proportion of eight parts of sand to one part slaked lime.

For work executed in the exterior of buildings—for which the process is specially available—Mr. Keim recommends the use of pumice-sand in addition to the other ingredients. It is essential that throughout the work only distilled unfiltered rain-water should be employed, to obviate the possibility of the presence of lime in the water, as that would affect the solution used for fixing.

The colours present a full scale of forty-one in number, and are chemically prepared to anticipate any chemical change to which the conditions of the process may give rise. The only medium used is distilled water, and the tints are applied from the palette with ordinary brushes and in the ordinary way. They can be combined, toned, and modified precisely in the same way as ordinary water-colours. The process, in fact, presents no difficulties to the manipulator. The fixing solution, which is applied with spraying apparatus, the effect of forming a hard surface of silica which is absolutely impervious to damp, smoke, dirt, or the acids of the atmosphere, and which can be washed and scrubbed to any extent; furthermore, it is perfectly dead and presents no glaze or refracting surface.

It need hardly be pointed out that a fresh process, which gives results impervious to damp and the deleterious action of carbonic acid gas, is one which commends itself for use in England, and particularly in London.

Mr. Rivington has been good enough to provide me with a few descriptive pamphlets, which I shall be happy to place at the disposal of any of my audience who are interested in the subject.

This German process seems to me to be peculiarly applicable to mural frescoes, and especially to figure subjects, the costly nature of which renders their preservation a matter of the first importance. I believe that artists and their patrons are frequently deterred from the execution of frescoes by the unfortunate fate of many modern works which have relied upon perishable processes.

I have treated so far entirely of decorative painting. I should like to add a suggestion of other methods. First, of the use of coloured stone for the internal faces of walls, for piers, arches, and mouldings. Finely-coloured stones, suitable for interiors, are to be found in many localities,—none, perhaps, more satisfactory than some of the red stones of the northern counties and of Scotland. Red stone may be combined in alternate courses or panels with white, grey, or creamy yellow, and may be carved and enriched with gilding, or moulded and relieved with colour. Coloured stone might be very well used as a dead or base treatment to a wall painted or treated in parieting or graffito work. Of the latter means of decorating church walls, I believe considerable use has already been made in England. I have endeavoured to show by models, which Messrs. Wheeler, of Reading, have prepared for me, how it may be used for simple patterns and ornamental bands. The graffito process, I think, is too familiar to you to need description. It is well explained in the preface to the Catalogue of the Arts and Crafts Exhibition now being held. Another decorative possibility is the application to walls of raised designs in indurated plaster or cement, pressed or moulded, which may be coloured by the ordinary or the German process, or gilded to any required extent. Still another, for wainscoting or for screens or seats, is the use of dyed woods,—of which I have a few specimens here.

In conclusion, I should like to say a few words about what is perhaps the most glorious and least perishable of decorative means—the use of glass mosaics.

I am indebted to the Venice and Murano Company, who have done so much towards the revival of this splendid art, for the loan of a few specimens of their work. I think one is very apt to become prejudiced against the use of glass mosaic in England, by the half-hearted and unsuccessful attempts which are unfortunately so common. Personally I am of opinion that mosaic should, as a general rule, be used only upon broad surfaces, in a mass,

and not for small subjects which are brought near the eye—such as reredos and pulpit panels. For I think that one of the great charms of mosaics is the uneven placing of the tesserae, which gives a delightful texture to the surface when seen from a distance; but which, when closely inspected, breaks up and interferes with the design. It is an evident mistake to try and perform in one material what is better done in another, and for small panels painting is more suitable than mosaic.

A study of the glorious roofs of Venice, Murano, and Ravenna, leads, it seems to me, to the conclusion that the most effective use of mosaics is upon the concave surfaces,—of domes and vaults,—and I think that a very splendid effect might be achieved by the use of mosaics in Gothic vaulting, the ribs being of deep red stone. Unfortunately, the ever-prevailing consideration of cost prevents the free use of mosaics; but there is, I believe, a growing feeling in their favour. Who, indeed, that has felt the golden glamour of St. Mark's at Venice can fail to appreciate their glorious possibilities.

I have not found time to speak of many elements in the decorative effect of a church interior which merit close and careful attention. The floor, the hangings of the sanctuary and altar, the metal furniture, and above all the window-glazing, are important items of the general effect. What is needed is that the study of church decoration should be more general, that churches should be designed with a view to the highest decorative effect, and that in lieu of handing over one of the most delightful branches of their art to the decorative specialists, church architects should, as far as possible, design their own decoration. For without it their scheme is incomplete, and their efforts may be marred and frustrated by the subsequent endeavours of another. When they do not find that they can trust their own capabilities, I think they would do well, if possible, to consult their decorator before designing those features of their building which are destined to be the field of his labours.

Thanks are due for sketches and drawings to Messrs. Basil Champneys, Millard, Cleverly, Walters, and Skipworth; and for actual examples of applied decorations to Messrs. H. A. B. Smith, of Lewisham; and Messrs. Powell Bros., of Lincoln; Wheeler, of Reading; and the Venice and Murano Mosaic Company; also to the hanging committee for the prompt assistance given in arranging the diagrams and models.

[A report of the discussion which followed will be found in another column.]

#### BUILDERS' BENEVOLENT INSTITUTION.

##### ELECTION OF A PENSIONER.

AN election of one pensioner on the funds of this Institution was held at the offices, 4, Vernon-place, Bloomsbury-square, on Thursday, the 28th ult., Mr. J. W. Hobbs, J.P. (President), in the chair. There were seven candidates for the one vacancy, viz., three men and four women.

Shortly after the close of the poll, the scrutineers (Messrs. T. Stirling and T. F. Rider) announced the results of the polling to be as follow, viz.:—James Picking, 19, Mantua-street, Clapham Junction, aged 62, builder (seventh application), 3,503 votes; Robert Childhouse, 5, Ashmore-road, Paddington, aged 74, builder (second application), 1,529 votes; Charles Sabey, 97, St. Peter's-street, Islington, aged 70, builder (first application), 534 votes; Margaret Alice Richardson, Preston, North Shields, aged 65, widow of T. B. Richardson, builder (second application), 653 votes; Mary Ann Shapland, 132, Stamford-street, Lambeth, aged 70, widow of William Shapland, builder (first application), 146 votes; Emma Bird, 48, Chippendale-road, Paddington, aged 60, widow of Joseph Bird, builder (first application), 2,573 votes; and Elizabeth Darby, 2, Ashmore-road, Clapham Junction, aged 59, widow of Edward Darby, builder (first application), 346 votes. The successful candidate was, therefore, declared to be James Picking.

Among the friends of the Institution (other than those already named) who took part in the proceedings, were Messrs. Geo. Flucknett, J.P. (hon. treasurer); W. Scrivener, C. Bessell, J. T. Bolding, C. Ansell, R. Richardson, and F. Forley.

Votes of thanks to the chairman and scrutineers closed the proceedings.

#### Industrial Exhibition in Stockholm.

A movement is on foot in Scandinavia for the holding of a great industrial exhibition in Stockholm in 1892. State grants have been applied for.



## ROBERT BOYLE &amp; SON, LIMITED.

THE fourth annual general meeting of this Company was held at the City Terminus Hotel on the 27th ult., when a dividend of 12 per cent. was declared, one-sixth of the profits earned being placed to the reserve fund, and a balance of £2,371. 9s. carried forward to next year.

The directors and auditors having been re-elected.

Mr. Robert Boyle, the Managing Director, in acknowledging the vote of thanks unanimously accorded to the directors, said:—In thanking you for the very flattering manner in which you have received and recorded your approval of the report your directors have submitted to you, I can only say that no effort has been spared to bring affairs to the satisfactory state in which you find them, each year showing a substantial increase of business on the previous one, the year ended having been the most prosperous since the formation of the Company; and I am pleased to say that I have good reasons for believing that this progress will continue in the years to come, there being a growing demand both at home and abroad for the ventilating and sanitary appliances manufactured by the Company, upon which improvements are being made from time to time, rendering them more efficient and valuable. This has especially been the case with the air-pump ventilator, which I have recently still further perfected, and when the whole of the experiments and tests are finished I hope to produce a ventilator that will be as nearly perfect as it is possible for an automatic ventilator to be. The present form of the air-pump ventilator is made of the best rolled-steel plates, galvanised and painted with enamel paint, whilst the workmanship is of the highest class; and though in every way greatly superior to the forms previously manufactured, is now sold at about 50 per cent. less in price. This, as you will understand, naturally reduces our profit on each ventilator to a minimum, but the great increase in the sales which has resulted enables us to pay each year a 12 per cent. dividend; and this year, after placing one-sixth of the profits to the reserve fund, to carry forward the substantial balance of £2,371. 9s.

## A MINISTER OF FINE ARTS.

SIR,—When any evil takes place, one naturally looks for the counterbalancing good; and if, as in the case of St. Albans Abbey, this is difficult to find, one should try to make good grow out of the evil. The way to do this is, it appears to me, to have a Minister of Fine Arts. If the spoiling of the Abbey leads to this, Lord Grimthorpe will not have lived in vain. As you say in your Note last week:—"In France such a thing would be impossible, for popular opinion, to say nothing of State regulation, would not allow it."

How unfortunate that where State regulation is not required, there it should be, and here, where it is needed, we have it not.

C. F. M.

## BAD BUILDING IN BOARD SCHOOLS.

SIR,—It is not surprising that a member of the London School Board should utter such a wall as appeared in the *Daily Telegraph* of the 27th ult., but it is to be hoped that the public will not suppose from this that the majority of buildings in London and its neighbourhood are built in the manner so graphically described by Mr. Lobb.

There are many architects who design good buildings, but unfortunately, there are some who appear to be ignorant of the first principles of construction. It will be admitted that the key to the appearance of a building will be found in the design, whereas the key to the quality of the work will only be found in the specification, and this is so frequently lost sight of.

When good work is not described, the architect will surely be to blame; where it is, and the builder from any cause whatever fails in his duty, it is difficult to plead that the architect should go scot-free; every competent architect knows very soon after the works have been commenced if the builder means to do his duty, and if architects would in all cases make the delinquent builder smart a few times, they, as well as the public generally, would greatly benefit.

I enclose my card, but subscribe myself under the three cardinal points of good building,

BOTTOM, TOP, &amp; TIE.

## PAVING-STONES IN THE PARIS EXHIBITION.

SIR,—My attention has been drawn to your articles of June 15 and Oct. 19, 1889, the above subject, and also to the letter of Nov. 2 commenting upon your articles.

The table itself, which was, I believe, copied from the stand in the Ville de Paris Pavilion, is very misleading, and cannot be held to furnish any data valuable to practical men.

It would be curious to learn from whence the samples were obtained which were operated on, and how much they differed in size and shape.

I am not aware that in the case of my own stone any samples were applied for or furnished direct.

But a very much wider question is involved in the sensible remarks contained in your article,—viz., Is there any really reliable test for the comparative values of different stones—1, for macadam; and 2, for paving sets? This question is well worth careful discussion.

It is abundantly clear that the comparison of crushing strains of different classes of stone is entirely misleading; indeed, though it has been largely used for trade purposes, it is probable that no one who has really studied the subject attaches any value whatever to the results.

If proof of this be required I need go no further than point out that the crushing strain of slates,—tested, of course, in the flat way of the grain,—is higher than that of any granites, and I suppose that no one would gravely suggest that our London roads should, therefore, be repaired with slates.

I presume that the Paris Municipal authorities, seeing the unsatisfactory nature of the above test, have substituted the two following tests:—

(1) As a test for macadam,—by rotating a certain weight of the stones to be tested in a "trundle," and comparing the weight of the detritus with that from an equal weight of a known rock which has been rotated an equal number of revolutions. This is, as you justly remarked, not nearly so satisfactory a test as the following:—

(2) For paving-sets.—A single cube of the material to be tested is pressed with a certain known pressure against a revolving metal disc, and the abrasion is compared with that produced on a known material.

Now, of course, this is a test of durability, and of nothing else, and it leaves out of account all such matters as the resultant polishing of the surface, the quality of the mud produced, and also the regularity of the wear upon different sets in the streets. These latter points are often more important than the amount of wear upon the surface.

Is there, then, no really satisfactory test which can be applied to all materials for the repair of roads?

I would reply—none so satisfactory as the results of absolute trials in the streets.

In the Geological Museum in Jermyn-street, London, there are, amongst many other specimens of granite, some 6-in. cubes of different sorts of pavement, with the following data inscribed upon them:—

*Aberdeen Granite*.—Forty years' traffic, at the rate of about 300,000 tons per annum, produced an abrasion of six inches in this stone.

*Guernsey Granite*.—Forty years' traffic, at the rate of about 300,000 tons per annum, produced an abrasion of two inches in this stone.

*Herrn Granite*.—Forty years' traffic, at the rate of about 300,000 tons per annum, produced an abrasion of three inches in this stone.

Such facts as these, as also the following, which is within my own knowledge, are worth very much more than the results of any mere laboratory experiments. Long Acre was paved with Mountsorrel setts six inches deep. After these had been in the street for twenty-five years they were taken up, and relaid by the same firm who laid them down originally. Exactly one inch was worn off the face in that time, and so regularly was this done that every sett was used again as a 5-inch stone.

It would appear from the above data that Guernsey granite will stand three times as much wear as Aberdeen—being, in fact, of about the same endurance as Mountsorrel; and here I would point out what is evidently a slip of the pen in your remarks of Nov. 2. I do not contend that Mountsorrel stone is better for road-metalling than Guernsey, but Aberdeen granite cannot compete with either for a single instant in this respect, being about one-third as enduring as a paving-sett, and as a macadam there is not even a profession of rivalry.

Hoping that this letter may be the means of eliciting more opinions upon this important matter, —I am, Sir, your obedient servant,

R. F. MARTIN.

Mountsorrel Granite Quarries,  
near Loughborough.

**The Christiania Building Commission.** The Christiania Building Commission is to be reformed, the number of chief inspectors being reduced from four to two, whose salary is to be doubled, but they are not to be permitted to carry on other occupation. It is anticipated that this will render the Commission more efficient.

## The Student's Column.

WATER-SUPPLY.—XXIII.  
TOWN SUPPLY (continued).

IT may now be useful to give a few typical examples of water-supply to cities abroad. One of the most interesting, perhaps, is that of Liège, in Belgium, where the system of obtaining the water is entirely different to that of any town to which we have hitherto had occasion to refer. It may be called the "galerie de drainage" method. In this, long tunnels and headers are driven through hills into water-bearing strata lying at a considerable elevation above the city, having manholes to the surface at convenient distances, the tunnels having a gentle slope towards the point of outflow. The three principal Liège collecting galleries are arranged in a T-shaped form in the hills to the north of the city. The western arm of the T commences at Hognoul, and, dipping slightly, runs as far as Lantin; the eastern arm begins at Liers, being also slightly inclined, joins the western at Lantin, the water of both being conveyed and augmented by the southern or principal gallery to Ans, a western suburb of Liège, where the reservoir is situated, and whence the water is distributed. The eastern and western sections are driven entirely in chalk, which yields a copious supply, but the delivering tunnel, in order to arrive at the necessary gradient, is partly made in the underlying coal-measures, and this section, in consequence, is partly unproductive. These works have only recently been constructed. Formerly the city was dependent on small springs, minor collecting-drains, and largely on wells sunk into the water-bearing alluvium of the Meuse. It will be seen that, as the water derived by the new method is mainly rain which has found its way, in the ordinary manner, into absorbent strata, it requires no filtration, any more than does the water usually found in wells. The percolation through the strata has naturally accomplished filtration, but we may point out that, where this scheme is adopted, it must be a *sine qua non* that the galleries be made at sufficient depth from the surface, and under such geological conditions as to guarantee that no surface drainage or obnoxious matter can get into them. In some instances where these conditions cannot be easily, or only partially, complied with, it is very necessary to re-filter before distribution, and in consequence it may often be questioned whether this source of supply is the most suitable that can be found. One of the main features is to be able to distribute by gravitation, and, generally speaking, this mode of securing a supply is especially useful where a town has elevated water-bearing strata in its vicinity.

Brussels is another good example of the drainage-tunnel method, and the student is referred to an article on the water-supply of that city in the *Builder* of last year,\* for a detailed account of the varied sources drawn upon.

The water-supply of Paris is tolerably well-known, but in the following particulars it may be useful to enlarge on the construction of the wells of the public service, as they are of great interest in general questions of well-supply. The city derives its water from the river Vanne, near Villeneuve, and from springs in the neighbourhood, the river Dhuis near Château Thierry, the river Marne, artesian wells, the Ourcq Canal, and the river Seine. A considerable proportion of the water, especially from the two last-mentioned sources, is utilised by the municipal authorities for street-watering, fountains, &c. Three artesian wells contribute to the public supply, situated at Grenelle, Passy, and the Place Hébert respectively. The oldest, that at Grenelle, was begun in 1833, and bored to a depth of 1,795 ft., being completed in 1841, when it yielded about 748,300 gallons per day. In 1852, the pressure of the surrounding beds of clay (perhaps through the employment of improper material) crushed the well-tube, which was 6.69 in. in diameter, and this was replaced by a new tube only 3.94 in. diameter. The supply subsequently available was only 198,000 gallons per day, and this was reduced to 177,000 gallons almost immediately after the completion of the Passy well. At the present time the daily yield at the summit of the delivery-pipe is only about 73,700 gallons. The student may contrast this with the amount available from it in 1841.

\* Vol. liv. (1889), p. 295.



The well at Passy, commenced in 1855, was finished in 1861, being pierced to a depth of 1,939 ft. and at first yielded 4,400,000 gallons per day. Owing to being partially choked up by sand, &c., it has, within the last few years, only given out 1,352,240 gallons per day.

The Place Hébert well has become quite famous in the history of underground water supply; it was twenty-two years under construction.\* The first 459 ft. of the tertiary beds were difficult to deal with. From the very commencement the sinkers were beset with troubles, having to cope with much water of inferior quality, to get rid of which they lined the well with a second cylinder 63 in. in diameter. The chalk was met with at a depth of 1,640 ft., and the numerous beds of flint in a portion of this formation, offered much obstruction to the boring tools. Below the chalk came sandy clay and then gault. Whilst this last clay was being pierced the cylinder collapsed, but after long delay the water-bearing greensand was found at 2,813 ft., and the well was finished at a depth of 2,859 ft., the horizon yielding an abundance of water. In consequence of the accident to the cylinders the lower portions of the great well were reduced to 41.7 in. in diameter. The student will perceive the similarity of the general sequence of the beds passed through in the Place Hébert boring, and those of certain deep wells of the London basin.

The water-supply of Constantinople having recently been improved, we may now allude to the alimentation of that city. The supply of water had for many years been limited; the chief works, which were constructed by the Romans, have lasted until the present time. They consist of "bends" or reservoirs situated at Chies, Pergos, Belgrade, &c., the water being conveyed thence to service-reservoirs in the city by means of aqueducts. These "bends" are formed on the slopes of the south-eastern prolongation of the Balkans, and Mr. F. Briffault, Assoc. M.Inst.C.E., referring to them, says:—"The works were carried out under the later Roman Emperors, and, both in design and in construction, they compare favourably with any work of recent date. . . . It is only in the details of the distribution that the constructors appear to have shown any ignorance." Owing to the scarcity of water from this source, however, many of the larger houses draw from great marble cisterns which occupy the whole area of the basement, into which the rain-water drains.

In 1882 a Parisian company was formed to procure a supply from the fresh-water lake of Derkos, about thirty miles from Constantinople, and near the port of Karabouroun, on the Black Sea. This lake varies from 12 ft. to 20 ft. in depth, with an area of about 10,000 acres, being cut off from the Black Sea by sand-dunes. The narrow channel which formerly existed has now been blocked by dams, and the sea kept out, whilst the general level of the lake has been raised. Several equilibrium and service reservoirs have been constructed to supply villages and different suburbs of the city, &c. The distributing pipes in the city itself vary from 13.8 in. to 24 in., and the quantity of water thus provided seems rather small as compared with the population, but, as Mr. Briffault says, this may be accounted for from the circumstance that no industry worthy the name is carried on. "No breweries nor works of any kind require large supplies of water, the only consumers being the hotel and restaurant proprietors, and a fair supply for the Sultan's palaces." A great number of the inhabitants do not take this water. The works of Lake Derkos were begun in the spring of 1883, and finished in January, 1885.

Two other important water-works, completed in recent years and worth mentioning, are at Port Elizabeth, in South Africa, and Karachi, in India. The first of these towns was originally supplied from a small stream, known as Shark's River, and also from private rain-water collecting tanks. These having produced water small in quantity and of questionable quality, the authorities eventually had the present water-works constructed. These consist in taking the water of Van Staaden's river at a point high in the White Klip Mountain, about twenty-eight miles inland from Port Elizabeth. The main dam was constructed to carry 840,000 gallons per diem, the water from this source being distributed in 1881. Neither storage nor

filtration was thought necessary. As an instance of the influence of water-supply in selecting sites for houses, it may be stated that, on completion of the works, the town immediately extended up-hill, instead of along the low ground as before.

Karachi is supplied from two wells situated on the right bank of the River Malir, and which are about sixteen and a half miles from the city. This river is dry for the greater part of the year, yet water is readily obtainable at any time in the saturated sandy bed by digging down a few feet below the surface. At a depth of 10 to 30 ft. below the bed, water is plentiful, hence, instead of taking it from the river when the latter is full, and storing it for distribution in times of drought, the public supply is drawn from the wells sunk down to this level. Particulars of this very interesting case have been written by the engineer, Mr. J. Strachan, M.Inst.C.E.\* The system is especially applicable to town supplies in certain parts of the tropics.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

18,743, Uptake for Fireplaces. O. Chester. This invention relates to an attachment for fixing to fireplaces at the back or sides, and extending upward into the chimney, which is provided with a guard, baffle, or cowl, to create a perfect up-draught, and to ensure entire combustion of the fuel. The openings to this uptake are to be constructed of iron or suitable material.

18,865, Improvements in Water-closets. T. W. Twyford.

The improvements which are the subject of this patent are (1) making the spreader out of, or in one piece with the rim; (2) the formation of the open mouth, or top of the basin. The spreader is made in the form of a depending lip forming a hanging basin of the rim in the rear of the basin opposite the flush neck or arm, which is partially throttled at its exit by a pierced wall extending upwards in such a manner that the flush is directed in and around the inside of the rim and basin. The open mouth of the basin is gathered in and curving itself to the back and enlarged part, less flushing is required to remove the soil.

16,285, Window Sash-holder. J. T. Nicholls. This invention relates to a mechanical contrivance applicable to window sashes, sliding doors, and shutters acting vertically, adapted for holding open or closed, to any extent required, the sashes, doors, or shutters to which it is applied. It is strong and simple, not easily put out of order, and acts by wheels and wedges, without the use of sash-lines, weights, pulleys, &c.

304, Window Sash-fastener. J. L. Sutcliffe. In order to prevent the catch of the ordinary sash-fastener being pulled back or pushed back with a knife or wire, a small tripping spring-block is provided by this invention, and it locks the lever or catch as it passes over it.

11,922, Composition for Covering Walls. J. G. Mardt (Copenhagen).

The composition which is the subject of this patent is made to resemble porcelain in appearance, and is capable of being painted or otherwise decorated. It is prepared with kaolin and magnesia, and is applied moist, afterwards hardens in the same manner as porcelain.

15,336, Ventilating Apparatus. J. B. and F. C. Howarth.

This apparatus is principally designed for ventilating the holds of ships, cattle steamers, &c., and consists of a blower or fan worked in an upright shaft by means of a donkey-engine.

### NEW APPLICATIONS FOR PATENTS.

Nov. 18.—18,368, A. Thurman, Door-springs and Checks.—18,384, A. Fitton, Automatic Draught Excluder for Door.—18,421, F. Lane, Marking Timber.

Nov. 19.—18,449, A. Braid, Connecting and Joining Plates.—Slabs for Lining Walls, Ceilings, &c.—18,455, A. Braid, Fire-resisting Plates, Linings for Walls, Ceilings, &c.—18,474, G. Arnold, Sanitary Flushing Apparatus.—18,480, G. Buffham, Ventilators for Windows, Sashes, and Doors.—18,487, H. Lake, Construction of Brickwork.—18,493, H. Lake, Bricks.

Nov. 20.—18,533, N. Aston and J. Clackson, Connecting Door Knobs, &c., to Spindles.—18,556, H. Grefen, Door Locks.—18,557, E. Edwards, Spout Protector for Houses and Buildings.—18,559, J. Millard, Backing Silvered Glass.

Nov. 21.—18,603, J. Balmforth, Sash-cord Fastener.—18,622, M. Davidson, Floor and Pavement Lights.—18,653, M. Carter, Decorating in Bas-relief.—18,658, F. Hollmann and P. Maruschke, Fireplaces.

Nov. 22.—18,744, C. Abel, Artificial Stone for Building, &c.

Nov. 23.—18,765, G. Hall, Brick-making Machinery.—18,789, R. Webb, Sash-fasteners for

Windows and Casements.—18,809, J. Kaye, Securing Latch Handles and Knobs to Doors.—18,846, F. Phillips, Mortising Machines.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

5,648, S. Francart, Construction of Arches.—15,639, W. Baglish, Warming Rooms and Buildings.—16,029, P. Justice, Chimneys and Fireplaces.—16,177, H. Cole, Automatically Retaining in Position Windows and Doors.—17,372, J. Mander, Sash Fasteners and Openers.—16,621, H. Jolly, Attachment for Augers.—16,720, W. Scott-Moncrieff, Syphon Cisterns for Flushing Water-closets, &c.—16,975, A. Bland, Gully Traps.—17,094, T. James, Windows and Casings.—17,183, J. Edelbaum, Chimney Cows.—17,191, J. Holmes and J. Crabtree, Weather Bars for Doors, &c.—17,299, R. Aitken, Method of Making Double-hung Sash-windows open inwards like a Door.—17,422, F. Podany, Clearing Timber of Sap.—17,453, F. Baker, Flush Bolts.—17,497, F. Cowley, Attaching Door-knobs as Handles to Spindles.—17,670, C. Grimmer and J. Simpson, Fasteners for Window-sashes, &c.—17,775, E. Killick, Drying Chambers of Kilns.—17,923, W. Scott-Moncrieff, Valve Water-closets.

### COMPLETE SPECIFICATIONS ACCEPTED.

#### Open to Opposition for Two Months.

639, G. Jennings, Waste-water Apparatus for Supply of Water to Water-closets, &c.—5,756, A. Macnaughton, Window-sashes and Doors.—13,383, H. Perry, Cornices for Rooms.—14,733, D. Nicoli, Waterproof Slabs and Blocks for Structural Purposes.—15,518, W. Sturmy, Mortice Locks and Latches.—16,363, J. & A. Duckett, Clay Mills.—16,536, H. Hall, Tiles for Lining Walls and other Surfaces.

## RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

Nov. 25.—By G. NEWMAN.

Limehouse—63, Three Colt-st., c. r. £30 p.a. .... £300

By EASTMAN BROS.

Forest Hill—20 and 22, David-st., u. t. 87 yrs., g. r. £20 ..... 450

South-rd.—"Argyle Lodge," u. t. 71 yrs., g. r. £12 ..... 445

Peckham Rye—2, Brooklyn-Hill, and 38, Barry-rd., f. .... 450

Nov. 26.—By DEBENTHAM, TAYSON, & CO.

Lombard-st.—No. 82 and 83, u. t. 33 yrs., g. r. £250 ..... 2700

Leadenhall-st., No. 77—Fruit rental of £57, 10s., u. t. 17 yrs. .... 150

Hackney, Mare-st.—F. g. r. of £130, with reversion in 98 yrs. .... 3,310

By RICHARD, LINDSAY, & HOLMES.

St. Luke's—41, Mitchell-st., f. r. £30 p.a. .... 305

4, Ironmonger-passag., f. r. £45 p.a. .... 165

Hampstead Heath—18, South Hill-pk., gardens, f. r. £35 p.a. .... 1,180

Brighton—44 to 48, Lavender-st., and 2, Essex-st., f. r. £80 p.a. .... 1,050

By RUSSELL, SON, & VINE.

Bethnal-green—16, Mape-st., f. r. £25 p.a. .... 890

West Ham—66 and 68, Vicarage-rd., u. t. 40 yrs., g. r. £25, 10s., f. r. £30 ..... 200

By BLAIR, BURNETT, & CO.

Leightonstone—F. g. r. of £30, with reversion in 93 yrs. .... 600

Walhamston—F. g. r. of £28 5s., with reversion in 97 yrs. .... 1,620

F. g. r. of £21, with reversion in 79 yrs. .... 445

F. g. r. of £26, with reversion in 80 yrs. .... 1,320

F. g. r. of £36, with reversion in 80 yrs. .... 720

Hackney—F. g. r. of £80, 10s., reversion in 92 yrs. .... 1,635

Wimbledon—21 and 23, Palmerston-rd., u. t. 88 yrs., g. r. £10 ..... 265

17 and 19, Palmerston-rd., u. t. 88 yrs., g. r. £10 ..... 265

Nov. 27.—By DURN & SOMER.

Belgravia—24, Walton-st., u. t. 40 yrs., g. r. £25 ..... 1,560

By DAVEY & DALLAS.

Islington—F. g. r. of £24, with reversion in 36½ yrs. .... 1,670

F. g. r. of £64, with reversion in 36½ yrs. .... 1,950

Gordon-st.—F. g. r. of £25, 2s. 6d., with reversion in 36½ yrs. .... 745

A peppercorn, with reversion in 36½ yrs. to o. r. of £110 p.a. .... 185

Nov. 28.—By H. J. BROMLEY.

Brooklyn—30, Barefield-rd., u. t. 83 yrs., g. r. £25, 10s., f. r. £30 ..... 410

By BLAKES & DANFORTH.

New Cross—13, Brockley-rd., u. t. 65 yrs., g. r. £25, 3s., f. r. £28 ..... 300

21 and 23, Brockley-rd., u. t. 56 yrs., g. r. £20, 4s., f. r. £28 ..... 610

By H. NEWSON.

Lee Bridge-rd.—A plot of f. land, f. r. £5 ..... 205

F. g. r. of £5, with reversion in 81 yrs. .... 115

F. g. r. of £15, with reversion in 43 yrs. .... 385

F. g. r. of £16, with reversion in 60 yrs. .... 175

F. g. r. of £16, with reversion in 65 yrs., renewable every 60 yrs. .... 160

4, "Alpha Cottages," f. r. £30 p.a. .... 320

Kilfold, Stanley-rd.—A plot of f. land ..... 45

By NEWSON & HARDING.

Barnsbury—23, 25, and 27, Half Moon-crescent, f. r. £60, 2s. p.a. .... 720

Hackney—1 and 3, Lamb-rd. North, f. r. £26 p.a. .... 980

Balls Pond—23, Baxter-rd., u. t. 70 yrs., g. r. £5, 5s., f. r. £34 ..... 300

Hoxton—22 and 24, Harvey-st., f. r. £75, 8s. p.a. .... 510

By E. STRICKLAND.

Nunhead—25, 27, 41, 43, and 45, Tapscott-rd., u. t. 87 yrs., g. r. £23, 15s. .... 285

67, 69, and 61, Banstead-rd., u. t. 87 yrs., g. r. £14, 5s. .... 160

Peckham—74, Lausund-rd., u. t. 99 yrs., g. r. £30, 5s. .... 290

Clapham—2, 4, and 6, Newcome-rd., f. r. £57, 4s. .... 730

Buttress—20 and 24, York-rd., f. r. £25 ..... 650

Clapham—20, Northcote-rd., u. t. 87 yrs., g. r. £20 ..... 520

\* *Revue Scientifique*, vol. xli. (1889), p. 741.

\* *Min. Proc. Inst. C.E.*, vol. lxxvii. (1889), p. 332.

\* *Id.*, p. 339.

\* *Min. Proc. Inst. C.E.*, vol. lxxiv. (1888), p. 130.

\* *Min. Proc. Inst. C.E.*, vol. lxxviii. (1889), p. 333 et seq.



Brixton—7 Lowden-rd., u.t. 76 yrs., g.r. £55s. ....	£200
Walworth—95 to 101 (odd) Eased-st., and 241 East-st., u.t. 25 years, g.r. £29 .....	690
Forest Hill—22 to 28 Dulwich-rd., u.t. 74 yrs., g.r. £14 .....	42
Battersea—64 and 66 High-st., f.r. £57 4s. ....	655
Nov. 29th.—By T. R. WESTACOTT.	
Kentish Town—The lease and goodwill of 54 Malden-rd., term 151 yrs., g.r. £24, r. £55 .....	157
47, Malden-rd., 59 yrs., g.r. £24, r. £55 .....	590
66, Malden-rd., 51 yrs., g.r. £28, r. £54 12s. ....	520
39, Prince of Wales Crescent, u.t. 94 yrs., g.r. £5, 6s., r. £54 .....	300
By RICHMOND AND STEVENS.	
Barnes—45 and 46, High-st., c., r. £29 .....	270
Chelms—132 and 134, Pimlico-rd.; 15, 16, and 17 Turk's-row, and other premises, u.t. 29 yrs., g.r. £30, r. £350 .....	3,850
By T. G. WHARTON.	
Forest-hill—Two houses in Vancouver-rd.; 10 and 12, Elsinore-rd.; and 24, Kilmorie-rd., g.r. £27, 1s., r. £169 .....	1,350
Walhamston, High-st.—House and shop, u.t. 78 yrs., g.r. £25, 10s. ....	615
By BALL, NORRIS, & HADLEY.	
Hammersmith-rd.—Nos. 198, 200, and 202, f. ....	5,000
Hammersmith, Elm-grove—A plot of land, area 1,247 ft., let at £20 u.s. ....	1,685
Wolverton-gardens—Eight plots of land, area 14,635 ft., let at £88 p.a. ....	

[Constructions used in this list—F.g.r. for freehold ground-rent; L.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

SATURDAY, DECEMBER 7.

Association of Public Sanitary Inspectors.—Mr. E. C. Robins, F.R.A., on "Reasons for the Adoption of a uniform title of 'Sanitary Inspector,' and Suitable Test Examinations." 6 p.m.

MONDAY, DECEMBER 9.

Surveyors' Institution.—Further discussion on Mr. E. Hyde's paper on "The Tithe Question, with suggestions for the Redemption of the Rent-charge." 8 p.m.

TUESDAY, DECEMBER 10.

Institution of Civil Engineers.—Professor Osborne Reynolds, F.R.S., on "The Triple-Expansion Engine and Engine Trials at the Owen's College, Manchester." 8 p.m.

WEDNESDAY, DECEMBER 11.

Society of Arts.—Mr. H. Freeman Wood, M.A., on "The Paris Exhibition." 8 p.m.

Sanitary Institute.—Mr. W. Santo Crisp on "The Disposal of Sewage." 8 p.m.

University College, London (Archæology).—Mr. H. Wallis on "The Ceramic Art of Spain under Mohammedan Rule, and the Influence of the so-called Arab Art on European Ceramic Art up to the Renaissance." 5 p.m.

Society of Engineers.—Annual Dinner, Holborn Restaurant. 6.15 p.m.

THURSDAY, DECEMBER 12.

Edinburgh Architectural Association.—Mr. G. S. Aitken on "By-paths in Architecture." 8 p.m.

St. Paul's Ecclesiastical Society.—Exhibits. 7.30 p.m.

FRIDAY, DECEMBER 13.

Architectural Association.—Mr. Reginald T. Blomfield on "Drawing." 7.30 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. J. Hale on "Hydraulic Station Machinery of the North London Railway." 7.30 p.m.

Junior Engineering Society.—(1) Mr. Sidney B. Beale on "The Application of Theoretical Principles to Architecture." (2) Mr. M. de Ville on "Pumps; with description of the Blake direct-acting Steam-pump." 7.45 p.m.

SATURDAY, DECEMBER 14.

University College, London (Archæology).—Demonstration at the British Museum. 11.3 a.m.

Royal Institute of Architects of Ireland.—Annual General Meeting and Annual Dinner.

## Miscellaneous.

**The North Sea-Baltic Canal.**—The work on the North Sea-Baltic Canal is carried on with great energy. This is particularly the case at Grünthal, where huge basins are to be constructed at the request of the German Admiralty for the shelter of warships during war. Here a bridge is also being constructed, 128 ft. above the level of the canal, the width between the pillars being 780 ft. Under it the largest ships in the German Navy will be able to pass without lowering their masts, and along it will run the main road and railway between Neimünster and Heide. The work on several of the locks is also being prosecuted with great energy, particularly on the Elbe and Holsten locks, the two mouths of the canal. It is expected that early in 1893 the old Eider Canal may be closed. A large number of ships are engaged in bringing stone blocks from the quarries at Melsen, in Saxony, down the Elbe to Hamburg, and further on to Brunsbüttel, to be used in the construction of the quays. The *Deutsche Bauzeitung* adds that the wages paid are unusually high for Germany, being from 2s. 8d. to 3s. a day for a common labourer, and 4s. a day for piecework, whilst foremen and engineers earn upwards of 10s. a day.

**The Civil and Mechanical Engineers' Society.**—The first ordinary meeting of the Civil and Mechanical Engineers' Society for the new session was held at the Westminster Palace Hotel, on Wednesday evening, Dec. 4, when Mr. Henry Adams, M. Inst. C.E., Professor of Engineering at the City of London College, delivered his opening address. After alluding to the responsibilities which the presidential chair involved, he reviewed the work of the Society during the past year, indicating the chief points of merit in the papers which had been read, and using each as the text for some practical remarks. With regard to technical education, he laid down the qualifications for good engineering draughtsmen, and said that, although the supply was commonly thought to be greater than the demand, every engineer at times found considerable difficulty in getting competent assistants. In describing the visits made by the members, reference was made to the City and Southwark Subway, the Locomotive and Carriage Works of the London and South-Western Railway Co., and Messrs. Kirkaldy's testing works and museum. In connection with the visit to the London and South-Western Railway works, the president gave some results obtained with the Vortex blast pipe, of which he is joint inventor and patentee with Mr. W. Adams, the Locomotive Superintendent. By its use this railway company alone have saved nearly £50,000 on its coal bills, in addition to reaping other advantages. The work of the Council was alluded to, and mention was made of a recent alteration in the rules of the Society admitting engineering pupils without entrance fee. The position of the Society financially was stated to be sound, and a hope was expressed that the roll of members would be largely increased during the coming year.

**Liverpool.**—The statue of the late Alexander Balfour, erected in St. John's Churchyard, was unveiled on Saturday afternoon by Canon Ellison in the presence of a large gathering of the citizens of Liverpool. In a community favoured in an exceptional degree with philanthropic and public-spirited men, few can be found who have so untrifling and so unostentatiously laboured for the elevation of their fellows as the late Mr. Alexander Balfour. It was most fitting that there should be some memorial of a life thus devoted to the public good, and very soon after Mr. Balfour's death, some three and a half years ago, a movement to carry out this object was inaugurated at a meeting representative of all parties and sects in the city. A committee, of which Mr. James Beazley was chairman, was appointed, and public subscriptions were invited for the erection of a statue of our late distinguished citizen. The work was entrusted to Mr. Albert Bruce Joy, and the sculptor has succeeded in producing a striking and faithful likeness of his subject. The statue is in bronze, and is of colossal size. It represents the deceased in an easy and natural posture. The head, which is bent slightly forward, is uncovered, and in the left hand is held a manuscript, while the right hangs by the side. The figure stands on a high pedestal of grey granite, designed by Mr. A. Waterhouse, R.A., on which is the following inscription:—

ALEXANDER BALFOUR,  
Merchant and Shipowner,  
Born Sept. 2, 1824.  
Died April 16, 1889.

His life was devoted to God in noble and magnificent efforts for the benefit of sailors, the education of the people, and the promotion of all good work.

This statue, erected by public subscription, was unveiled on the 15th day of November, 1889.

—*Liverpool Daily Post.*

**Maidstone Surveyorship.**—The Maidstone Local Board at their meeting on Wednesday, the 27th ult., proceeded to the election of a surveyor in place of Mr. F. J. C. May, now Borough Surveyor of Brighton. The following seven candidates were selected out of the 144 applicants to appear before the Board, viz.:—Messrs. Case, Maidstone; Chrisfield, Assistant-Surveyor, Sittingbourne; A. Dryland, Borough Surveyor, Deal; W. Scoones, Assistant-Surveyor, Beckenham; Spencer, Maidstone; J. Siddals, Borough Surveyor, Tiverton; Wilson, Surveyor, Ashford Local Board. The Board proceeded to the election on the exhaustive voting system, when the names were struck out in the following order:—Case, Wilson, Chrisfield, Siddals, Spencer. The issue then rested between Messrs. Scoones & Dryland, the former of whom obtained a majority of votes, and upon his name being finally put to the meeting he was declared unanimously elected.

**The Society of Engineers.**—At a meeting of the Society of Engineers, held at the Town-hall, Westminster, on Monday evening, December 2, Mr. Jonathan R. Baillie, President, in the chair, a paper was read by Mr. Perry F. Nursey (Past President) on "Fox's System of Solid Pressed Steel Wagon Frames." The author first pointed out that the invention grew out of Mr. Samson Fox's corrugated boiler-flues, which have so largely added to the efficiency and endurance of marine boilers. It was in connection with the flanging of these flues that Mr. Fox gave his attention to hydraulic pressing, and this in time led him to the production of locomotive side-frames and the under-frames of rolling-stock generally. This is effected by powerful hydraulic presses of large size, which produce and reproduce with perfect accuracy all kinds and shapes of frames from Siemens's steel produced at the works. The plate to be flanged is operated upon simultaneously over the whole of its surface, and the flanges are formed either inwards or outwards, as may be required. The author then briefly described, so much of the Leeds Forge Works as relates to the manufacture of pressed plates. Summing up the practical advantages of the system, the author observed that while the ordinary wood and iron frame weighed 4 tons 14 cwt., Fox's pressed frames only weighed 3 tons 14 cwt. Hence a saving of 1 ton or 20 per cent. per wagon of dead weight hauled, the lighter wagon being well able to carry what the heavier one did. Another advantage was that whereas wood frames were valueless at the end of the wagon's life, the value of the steel frames as scrap was always that of pig-iron. Other advantages were interchangeability, duplication of parts, and longer life in rolling-stock on account of the elasticity of the frames. Fewness of parts was also an important feature; there being only about fourteen parts in one of Fox's frames as against forty-seven in frames as ordinarily constructed. He concluded by observing that Mr. Fox's invention marked very definitely an important and a far-reaching epoch in railway rolling-stock construction.

**New Building Restrictions in Stockholm.**—Some new restrictions upon building have been adopted by the Stockholm municipal authority. They refer, in the first instance, to the drying of new houses by fires, for which various stipulations have been made, and also to the internal finishing of new houses, it being decided that the latter shall not be taken in hand until four months after the Building Board has surveyed and approved the house. The question of exterior finishing has been referred to a committee. Another stipulation is to the effect that all balconies and roofs shall be fitted with proper gutters. The Building Board and the Sanitary Board of the city had recommended the prohibition of building operations in winter, but the recommendation was rejected. However, the following new enactment referring to architects is, perhaps, the most important:—"Houses of brick and stone more than one story in height must not, under a penalty of from 200 to 300 kronor, be erected by others than those who hold certificates from a recognised school of building or other corresponding technical academy, showing them to have the necessary architectural knowledge. However, the Building Board is empowered, if recommended, to dispense with such qualification. Ground-owners are compelled, under a similar penalty, to furnish the name of the architect employed by him in writing to the Board before the work is begun, and stating that the latter assumes full responsibility in respect of the work."

**Lectures on Timber.**—The City and Guilds of London Institute for the Advancement of Technical Education, announce a course of six lectures on timber, its nature, varieties, uses, and diseases, with numerous lantern illustrations, to be delivered at the Central Institution by Mr. H. Marshall Ward, M.A., F.R.S., F.L.S., F.H.S., Professor of Forest Botany at the Royal Institution Engineering College, Cooper's-hill, on Monday and Thursday evenings at 7.30, December 12th, 16th, and 19th, and January 23rd, 27th, and 30th. The object of this course is to explain as simply and clearly as possible, and by means of numerous illustrations, the nature, properties, varieties, and uses of the ordinary timbers used in construction and to give an intelligible account of dry-rot and the allied diseases of timber. The fee for the course is almost nominal. Tickets may be obtained on application to the Dean, Central Institution, Exhibition-road, S.W.



**The English Iron Trade.**—Considering the fluctuations experienced in the pig-iron trade, and notably in the warrant business, the English iron market has remained remarkably steady during the past week. Transactions in pig-iron have been largely checked by the great drop in warrants, which at one time were forced down 8s. per ton for Cleveland, while Scotch warrants have only been partially depressed. There have been some reductions in Scotch makers' iron, but, on the whole, producers in Scotland are very firm. Cleveland No. 3 is now 1s. a ton cheaper with makers for prompt delivery. Bessemer pig in the north-west is 1s. 6d. a ton higher, but this may, to some extent, be accounted for by the growing scarcity of the ore used in its manufacture. In other districts there is no giving way in crude iron, a fact which is very significant, and may be ascribed to the growing certainty of a long-continued prosperity of the iron trade. While finished iron, in sympathy with pig metal, is weaker in the North of England, there is no giving way in the Midland districts; on the contrary, the rise of 10s. declared in black sheets by Staffordshire makers, leads us to expect further advances shortly for other descriptions. Steel also is stiff in price, and rails have this week been put up in the north-west 2s. 6d. per ton. A striking activity continues to characterise the ship-building trade. All the branches of engineering keep also briskly employed.—*Iron.*

**Liverpool Engineering Society.**—The fifth ordinary meeting of the sixteenth session of the above Society was held at the Royal Institution, Colquitt-street, on Wednesday evening, the 27th ult. Mr. F. Huddleston, Assoc.-M. Inst. C.E., Vice-President, in the chair. The principal event on the evening's programme was the adjourned discussion of a paper read on the 13th ult., by Mr. George Farren, Assoc.-M. Inst. C.E., entitled "The Stability of Earthwork and Masonry Dams." Mr. Farren first gave a brief résumé of his paper, and the chairman then opened the discussion, which was continued by a large number of the members present, the majority of whom dwelt upon the advantages of gravity over circular dams. Mr. Charles H. Darbishire read some interesting particulars from an American source of the mode of construction and cost of the Bear Valley dam in America, which had been referred to in the paper. The whole of the speakers concurred with Mr. Farren in his opinion as to the great stability of the Vyrnwy dam. Upon the termination of the discussion Mr. Farren replied to the various points which had been raised. A vote of thanks was afterwards unanimously accorded to him for his valuable paper.

## PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.	£. s. d.
Greenheart, B.G. ....	7 0 0	7 15 0	0
Teak, S.E. ....	12 0 0	14 0 0	0
Sesquios, U.S. ....	8 0 0	8 0 0	0
Ask, Canada ....	3 0 0	4 5 0	0
Birch " ....	3 0 0	4 15 0	0
Elm " ....	3 10 0	4 15 0	0
Riv. Danish, &c. ....	2 0 0	3 10 0	0
Oak " ....	2 10 0	4 10 0	0
Canada " ....	5 10 0	7 0 0	0
Fine, Canada red " ....	2 10 0	3 10 0	0
Do. " yellow " ....	3 0 0	5 5 0	0
Lath, District " ....	4 10 0	5 10 0	0
St. Petersburg " ....	5 0 0	6 10 0	0
Walnut, Riga, &c. ....	2 15 0	4 5 0	0
Deal, Finland, 2nd and 1st, &c. ....	11 0 0	12 0 0	0
" " 4th and 3rd " ....	7 0 0	8 15 0	0
" " 2nd " ....	7 0 0	9 0 0	0
St. Petersburg, 1st yellow " ....	11 0 0	14 0 0	0
" " white " ....	6 10 0	10 0 0	0
Swedish " ....	8 0 0	10 0 0	0
White Sea " ....	9 0 0	17 0 0	0
Canada, Fine, 1st " ....	18 0 0	26 0 0	0
" " 2nd " ....	11 0 0	17 10 0	0
" " 3rd, &c. ....	8 0 0	10 10 0	0
" " Spruce, 1st " ....	8 0 0	11 0 0	0
" " 3rd and 2nd " ....	7 0 0	9 0 0	0
New Brunswick, &c. ....	6 0 0	8 10 0	0
Baltic, all kinds " ....	6 0 0	17 0 0	0
Flooring Boards, 4 1/2 in. Prepared, First " ....	0 11 0	0 14 0	0
Second " ....	0 8 0	0 10 8	0
Other qualities " ....	0 6 0	0 7 6	0
Cedar, Cuba " ....	0 0 4 1/2	0 0 5 1/2	0
Honduras, &c. ....	0 0 4 1/2	0 0 5 1/2	0
Mahogany, Cuba " ....	0 0 5 1/2	0 0 6 1/2	0
St. Domingo, cargo average " ....	0 0 5 1/2	0 0 6 1/2	0
Mexican, cargo average " ....	0 0 4 1/2	0 0 5 1/2	0
Tobacco " ....	0 0 4 1/2	0 0 5 1/2	0
Honduras " ....	0 0 4 1/2	0 0 5 1/2	0
Rox. Turkey " ....	15 0 0	20 0 0	0
Bahia " ....	14 0 0	18 0 0	0
Satin, St. Domingo " ....	0 0 9 1/2	0 1 1 1/2	0
Porto Rico " ....	0 0 9 1/2	0 1 1 1/2	0
Walnut, Italian " ....	0 0 4 1/2	0 0 5 1/2	0

METALS.	£. s. d.	£. s. d.
Iron—Bar, Welsh, in London ..	7 5 0	7 15 0
" " at works in Wales ..	7 0 0	7 5 0
" " Staffordshire, in London ..	8 10 0	9 10 0
COPPER—		
British, cake and ingot ..	55 0 0	58 0 0
Best selected ..	56 0 0	57 0 0
Sheets, strong ..	65 0 0	66 0 0
Shells, bars ..	60 0 0	60 0 0
Yellow Metal ..	10 0 0	10 5 1/2
LEAD—Fig. Spanish ..	14 15 0	0 0 0
English, comb. brands ..	14 15 0	0 0 0
Sheet, English ..	16 5 0	16 10 0
Tin—Banco ..	99 10 0	0 0 0
Billiton ..	98 0 0	0 0 0
Straits ..	98 10 0	0 0 0
Australian ..	97 0 0	0 0 0
English Ingots ..	101 0 0	0 0 0

METALS (continued).	£. s. d.	£. s. d.
Tin (cont.) ..		
Bass ..	102 0 0	0 0 0
Refined ..	103 0 0	0 0 0
OILS.		
Lined ..	20 15 0	20 17 6
Cocunut, Coochin ..	26 0 0	26 10 0
Ceylon ..	23 5 0	23 10 0
Palm, Lagos ..	25 10 0	0 0 0
Basted, English pale ..	34 0 0	0 0 0
" brown ..	32 10 0	0 0 0
Cottonseed, refined ..	33 10 0	0 0 0
Tallow and Oleine ..	21 0 0	40 0 0
Lubricating, U.S. ..	5 10 0	6 10 0
" refined ..	7 0 0	12 0 0
Tar—Stockholm ..	1 8 0	0 0 0
Archangel ..	0 15 0	0 15 0

## COMPETITION, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

### COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
New Police Buildings ..	South Shields Corp. ...	50l., 30l., and 20l. ...	Feb. 15th	i.

### CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Supply of Stores, &c. ....	St. Mary (Islington) Vestry ..	Official ..	Dec. 9th	ii.
Keving, Tarpaving, Metallizing, &c., Works	Lewisham Bd. of Wks. Hackney Bd. of Works	do. do. J. Lovegrove ..	Dec. 10th	ii.
Cast-iron Lamp Posts ..	Met. Asylum Board ..	Keith D. Young ..	Dec. 11th	ii.
Bathing, &c., Accommodation, S.W. Hospital	St. George (Hanover Square) Vestry ..	G. Livingstone ..	Dec. 12th	ii.
Works and Materials ..	Southern Local Board	P. Dodd ..	Dec. 14th	ii.
Broken Granite and Flints ..	Manchester Corp. ....	G. H. Hill ..	Dec. 17th	ii.
Works at Outlet and Roads, Virulence Wks	City of Pretoria Wks.	Pritchard & Co. ....	Not stated.	x.
Lap-welded Steel Water-pipes ..				

### PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Junior Assistant in Surveyor's Office ..	Blackpool Corporation	60l. ....	Dec. 11th	xvi.
Drainage ..	Hornsey Local Board	100l. ....	Dec. 13th	xvii.
Land Surveyor and Valuer ..	School Bd. for London	500l. ....	Dec. 14th	xvii.
Chief Surveyor of Main Road and Bridges..	Essex County Council	500l. ....	Dec. 17th	xvii.
County Surveyor ..	Glanorgan C.C. ....	750l. ....	Dec. 24th	xvii.
Assistant Engineer ..	London County Council	600l. ....	do.	xvii.
Clerk of Works ..	St. Helens Corporation	2l. 10s. weekly	Not stated.	xvii.

### TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

**ABERLEFFENNY (Wales).**—For new roof and other work to mill for Messrs. Ashton Green, Mathews, & Co. — W. Jones, Corris (accepted)..... £235 15 0

**BRIGHTON.**—For galvanised roofing, repairs, &c., to goods warehouse, Brighton, for the London, Brighton, & South Coast Railway Co. — Arthur M. Deacon, West Norwood, S.E., and Hayward's Heath, Sussex\* £258 0 0  
\*Accepted.

**BRISTOL.**—For erecting new shop, dwelling-house, and premises, Lawrence-hill, Bristol, for Mr. J. W. Lane. Messrs. James Hoddell & Co., architects, Clvedon

W. Colston ..... £285 10 0  
O. Nicholas ..... 847 10 0  
F. Walters ..... 775 10 0  
H. A. Forre ..... 760 0 0  
Tamblyng Bros. .... 685 0 0  
L. A. McLane ..... 522 11 8  
W. C. Paisley (accepted) ..... 590 0 0  
[All of Bristol.]

**LEWISHAM.**—For the erection of the Lewisham Grammar School for Girls, at Rushey-green, Catford, Mr. Albert L. Guy, architect, High-street, Lewisham, Quantities by Mr. A. R. Brede, Theobald-road, W.C. — Higgs & Hill ..... £10,160 0 0  
Stevens & Son ..... 9,510 0 0  
D. & R. Kennard ..... 9,290 0 0  
W. B. son & Son ..... 5,452 0 0  
Kirk & Randall ..... 5,203 0 0  
S. J. Gerrard (accepted) ..... 8,269 0 0

**LEWISHAM.**—For new billiard-room and stabling at "The White Hart," High-street, Lewisham, for Messrs. H. & V. Nicholl, Limited, Mr. Albert L. Guy, architect:—Robson ..... £1,089 0 0  
Jerrard ..... 940 0 0  
Pritchard ..... 950 0 0  
Kennard (accepted) ..... 648 0 0  
Bennett ..... 639 0 0

**LEWISHAM.**—For new boiler-house and entrance-gates at the Anchor Brewery, for Messrs. H. & V. Nicholl, Limited, Mr. Albert L. Guy, architect:—E. Hoare, Lewisham (accepted) ..... £167 0 0

**LEWISHAM.**—For alterations and additions to No. 65, 67, 69, High-street, Lewisham, for Mr. G. Stroud. Mr. Albert L. Guy, architect:—Salter, Lambeth (accepted) ..... £285 0 0  
Christie (gas-fittings) (accepted) ..... 68 0 0

**LEYTONSTONE.**—For the erection of two cottages for Mr. J. Needham:—Edwards ..... £245 0 0  
Burgess & Algar ..... 393 0 0  
J. & F. Banc ..... 392 0 0

**LONDON.**—For completing four houses on Lost's Estate, Brixton, for Mr. J. Lost, under the superintendence of Mr. W. E. Eve, architect, 10, Union-court, E.C. —

Hiller ..... £1,080 0 0  
Balsam ..... 1,006 0 0  
Aker ..... 979 0 0  
Mimack ..... 900 0 0  
Potterton ..... 898 10 0  
Cogwell ..... 700 0 0  
Parker ..... 700 0 0  
Black ..... 675 0 0  
Clark ..... 570 0 0  
Myring ..... 625 0 0  
Williams ..... 594 0 0  
Channing ..... 570 0 0  
Watts & Long, 181, Crystal Palace-road, S.E. (accepted) ..... 480 0 0

**LONDON.**—For completing houses on Lost's Estate, Brixton, under the superintendence of Mr. W. E. Eve, architect, 10, Union-court, E.C. —

Balsam ..... £2,077 0 0  
Cogwell ..... 2,010 0 0  
Watts & Long ..... 1,730 0 0  
Clark ..... 1,710 0 0  
Williams ..... 1,694 0 0  
Hiller ..... 1,680 10 0  
Parker ..... 1,675 0 0  
Mimack ..... 1,660 0 0  
Black ..... 1,640 0 0  
Myring ..... 1,500 0 0  
Crook ..... 1,410 0 0  
Potterton, Cavendish-road, Clapham-park (accepted) ..... 1,398 0 0  
Channing ..... 1,375 0 0

**LONDON.**—For erecting iron building on the site in Ancona-road, Plumstead, for the School Board for London. Mr. T. J. Bailey, architect:—

North & Son ..... £500 0 0  
Jones, W. .... 495 0 0  
Harbrow, W. .... 477 0 0  
London Iron Building Company ..... 463 0 0  
Smale, J. W. .... 460 0 0  
Richards, J. J. .... 449 0 0  
Pocock, A. W. .... 445 0 0  
\* Recommended by the Works Committee for acceptance.

**LONDON.**—For alterations and repairs at the "Wellington" Hotel, Bignor-crescent, Notting-hill, W., for Mr. Bishop. Messrs. Furniss & Thorpe, architects:—Tomes ..... £1,125 0 0  
Gould & Brand ..... 1,059 0 0  
Anley ..... 1,070 0 0  
F. Voller ..... 1,049 0 0

**LONDON.**—For alterations and repairs at the "White Horse," 237, Rotherhithe-street, for Mr. Henry Vesey, Mr. A. Steining, architect, 121, Cannon-street, E.C. — Stewart & Co. 37, Penrose-street, Walworth-road (accepted) ..... £125 15 8



LONDON.—For alterations at the "Audley Hotel," Audley-street, W., for Mr. R. H. Barnes. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W.

R. T. Lambie, Kentish-town .....	£1,243 0 0
S. Golden, Bryant-on-square .....	1,215 0 0
Drew & Cadman, High Holborn .....	1,167 0 0
H. & E. Lea, Regent-street .....	1,157 0 0

\* Accepted.

LONDON.—For premises at the rear of Nos. 416 to 429, Holloway-road, for the trustee of Mr. Harding, under the superintendence of Mr. W. Eve, architect, 10, Union-court, E.C. —

Farnham .....	£505 0 0
Clark .....	436 0 0
Burill .....	409 2 6
Wilshe .....	365 0 0
Taylor, 490, Kingland-road, London, E. (accepted) .....	337 0 0

LONDON.—For completing three houses in Hermitage-road, under the superintendence of Mr. W. Eve, architect, 10, Union-court, E.C. —

Williamson, Green Lanes .....	£482 0 0
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LONDON.—For additional warehouse accommodation at Deptford, for Messrs. Carter, Paterson, & Co., Limited, under the superintendence of Mr. W. Eve, architect, 10, Union-court, E.C. —

Harris & Wardrop .....	£194 0 0
Godfrey & Son .....	180 0 0
Johanson, St. Anne's Wharf, Limehouse (accepted) .....	139 0 0
Holland (withdrawn through omission) .....	120 0 0

LONDON.—For building retaining walls on the site of the proposed "Lavender Hotel," Lavender Hill, Wandsworth, S.W., for Messrs. Kevington & Earle. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W. —

W. Hammond, Battersea (accepted) .....	£118 7 9
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LONDON.—For alterations and additions at the "Foresters' Arms," High-street, Peckham, Mr. E. E. Niblett, architect, Hackney: —

Burman & Son .....	£889 0 0
Dearing & Son .....	869 0 0
Spencer & Co. .....	829 0 0
W. & F. Crocker (accepted) .....	747 0 0

LONDON.—For alterations and additions at the "Avenue Arms," Avenue-road, Camberwell. Mr. E. E. Niblett, architect, Hackney: —

Burman & Son .....	£765 0 0
Dearing & Son .....	759 0 0
Spencer & Co. (accepted) .....	737 0 0

LONDON.—For alterations and additions at the "White Hart," Old Kent-road, S.E. Mr. E. E. Niblett, architect, Hackney: —

Spencer & Co. .....	£517 0 0
Dearing & Son .....	503 0 0
Burman & Son (accepted) .....	495 0 0

LONDON.—For alterations and additions to stables and loose boxes, St. Albans-road, Highgate, for Mr. W. Burdett-Coutts. Mr. G. S. Strevens, architect, 30, Grove-terrace, Highgate, N.W. —

W. G. Sparks .....	£798 0 0
R. J. Smerdon .....	790 0 0
J. W. Dixon (accepted) .....	745 0 0

YORK.—For the erection of the Shipton-street schools, Clifton, York, for the York School Board. Messrs. Demaine & Brierley, architects, York: —

Low & Sons, Barton-on-Trent .....	£5,290 0 0
Ives & Son, Shipley, near Leeds .....	5,200 0 0
Thorp & Son, Leeds .....	4,930 0 0
Keswick, J., York .....	4,904 0 0
Kidd, G., York .....	4,844 0 0
Biscomb, J. & T., York .....	4,780 0 0
Bellamy, W., York .....	4,788 0 0
Farker & Sharp, York .....	4,780 0 0
Wilson & Son, York (accepted) .....	4,765 0 0
Grantham & Whelan, York .....	4,590 0 0

\* Withdrawn.

SUBSCRIBERS IN LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (or 4s. 6d. per quarter), can ensure receiving "The Builder" by Friday Morning's post.

## TO CORRESPONDENTS.

E. W. (shall have attention).—T. J. O.—W. F. F. (no space).—W. B. (no small).—G. & Son (no space this week). All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses. York.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications. Letters or communications (beyond mere news items) which have been duplicated for other journals, are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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Each additional line (about ten words) .....

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### Notes from Athens.



OW that Athens has begun to settle down again to its normal condition, after the festivities of the late wedding, it is possible to get some idea of what work has been going on during the last few months. The excavations on the Acropolis were practically brought to a close before summer. The Turkish approach and the gatehouse have now quite disappeared, and although, perhaps, this clearance was rather needless, the results, in the form of inscriptions, &c., found, hardly justifying the destruction of a picturesque corner, still it has considerably opened up the view of the Propylæa from the south-west, which is now only marred by the ugly enclosing railing under the Niké bastion.

We cannot yet say whether we may gain any further knowledge about the original approach to the Propylæa, as the surface of the ground has not been completely cleared. The later casings to the walls of the towers on either side of the Boulé gate have also been removed. A little excavating is at present going on immediately inside this gate, but nothing of importance has as yet been brought to light.

To the north of the Parthenon, the picturesque piles of fallen blocks have unfortunately been rearranged somewhat symmetrically, as had been done previously on the south and east sides. This is to be regretted, as there now no longer exists any of that natural disorder—huge drums of columns, great architrave stones lying just as they had fallen—which it was so refreshing to find on the Acropolis of a few years ago.

The collection in the larger Acropolis Museum has at last been arranged in a more permanent form.

The first two rooms on the left as we enter are occupied by the Poros stone sculptures. The latest one fixed is a large blue bull being attacked by two lions. The lions' claws are embedded in its flesh, and from the wounds red streaks of blood show, very realistically running down its side. The position of the bull, with its head down in a last struggle for life, is full of energy. Here, also, we find two snakes from another pediment, with

vigorously-modelled heads, erect in the attitude of defence, and bodies in diminishing coils filling in the ends of the pediment. These snakes have gorgeously coloured and carved scales. Close to these is the three-headed monster with its human bodies and inter-twining snake tails which has been named Typhon. Its heads, with their dark blue beards, attracted much attention when found about a year and a half ago. Here, also, are various other pieces of pediments, including the smaller ones illustrating some of the labours of Hercules. In the same rooms are remains of one or two figures in Poros stone. The garments have been completely coloured in these, and the ornament on the borders is cut in as well as painted. This, we must assume, was the earlier method employed on the softer material, and when marble came to be more generally used, the ornament was merely drawn on and then painted. This would also apply equally to the coloured ornament on architectural mouldings, &c. Portions of a large archaic pediment filled in with an incised decorative design in various colours have also been lately pieced up and fixed.

The third and fourth rooms contain principally cases of vase fragments, terra-cotta figures, and fragments of small marble sculptures; but, in addition to these, there are a number of architectural pieces consisting of coloured cymati in marble and terra-cotta, a few antefixæ, and several pedestal capitals.

In the next two rooms we come to the very fine series of archaic figures which are so well known. Additional fragments have been found belonging to some of these, and they have recently been fixed on to them.

Several interesting reliefs have been found comparatively recently. One fine work of about the end of the fifth century B.C., represents Athena leaning on a spear, beside a plain stele, in an attitude of mourning. There are also one or two new heads, including one, very well preserved, of a gorgon with very flat features and protruding tongue; this has probably formed part of an architectural decoration.

In another room have been fixed the very beautiful slabs of the Phidian frieze which remain at Athens, excepting, of course, those which are still in situ on the west end of the Parthenon, and beside them are arranged casts of the ones in the British Museum, and of the pediment sculptures. These have been presented to the Greeks by our museum authorities.

The head of Iris, found last spring, has been fitted on to the east of the slab to which it belongs, the original of the slab itself being in London.

Still another room is occupied by the fine sculptured slabs forming part of the balustrade in front of the Nike temple, and by the figures from the Erechtheum frieze.

The last room is devoted to the collection of bronzes. One of the newest things in this room is the figure of a gorgon cut out of a flat bronze plate, with the details filled in by incised lines; this is attached to a bar, which again is connected to a circular bronze ring, the whole probably forming part of a shield, the remainder having been of some other material, perhaps hide.

In the smaller museum the miscellaneous things have been collected in shelves and somewhat roughly arranged for the use of students. Here are to be found the architectural fragments in "Poros" stone belonging to early temples and shrines; a large number of gutter-fronts and cymati, both in marble and terra-cotta; the interesting early pedestal capitals which we have spoken of before; and many other pieces of architectural detail found from time to time in various parts of the Acropolis.

There is a proposal to surround the whole Acropolis area, including the Areopagus, the museum and the two theatres, with a wall-trailing, and form it into a kind of sacred enclosure. Steps have already been taken in this direction by the construction of a new road from the lower part of the town near the railway-station to the museum. Nothing has yet been done in connexion with the proposed excavations along the base of the Acropolis rock on the north side, with the exception of clearing away some of the earth thrown over from above, and pulling down a few houses. The unsightly sloping masses of loose earth, the result of the excavations on the Acropolis, still remain and disfigure the whole appearance of the rock on the north and east sides. It is to be hoped that they will soon be cleared away, and once more allow the whole face of the rock to be seen, and the caves and grottoes which are at present hidden behind them.

A road has been opened up from the Arch of Hadrian to the monument of Lyciscrates. This monument, which is situated a short distance east of the Acropolis in the midst of a labyrinth of houses and narrow streets, will now be more easy of access. By the removal of some houses a small open square has been formed beside it, and the



surrounding ground has been lowered several feet to the level of its base.

During the summer the remains of a large building of Roman times have been brought to light, to the north of the Temple of Jupiter Olympius, and near where about two years ago were unearthed parts of what was supposed to have been a Roman bath. These consist of the foundations and a portion of the walling of several chambers grouped round two courts, which are connected with one another. The walls are of two kinds, those regularly built of flat Roman bricks with wide mortar joints and others of rough rubble. The larger court is almost square, and measures about 95 ft. by 85 ft. between the columns. The longer side has ten bays. The bases of the columns rest on a continuous marbled threshold, raised, probably, one step above the garden in the centre. Several very florid Ionic capitals, belonging to the pillars, have been found. The stoa round the court is about 17 ft. wide, and has an elaborate marble mosaic floor of intricate and varied design, and which is similar to the other floors of this nature discovered already in this suburb of Hadrian's time. Chambers of various forms and sizes, some octagonal, others square, and others, again, longer and with apsidal ends, open off this court. In the centre of the west side is a square room, considerably larger than any of the others, which has a very complete mosaic floor, and the remains of panelled marble lining to its walls; this has been in two colours, green and white. The smaller court, of semi-circular form, lies to the south of the larger one, and is connected with it by an opening or door. It is over 50 ft. in diameter. In the centre is a marble floor with a broad border of blue slabs round the edge, and inside this a simple pattern in three colours, arranged round variegated squares.

The bases of the pillars rest as before on a threshold, and between each pillar there has been a marble balustrade, the sill in one instance being still in position. The capitals to the columns are of Corinthian form of the early type seen in the doorways of the Tower of the Winds. The floor of the stoa round this court is of mosaic, and it is curious to notice that where the drain from the inner open court cuts across under this floor in an oblique direction, its line is clearly shown by the return of the borders of the pavement on each side, and it has probably been covered over with slabs to allow of easy access.

Across the straight end of this court are traces of what seem to have been two tiers of fish-tanks, a narrow one at level of court with a marble front, and a wider one behind and raised a foot higher. Round the walls are traces of a dado of narrow, upright, green slabs. On the plastered walls of some of the smaller chambers behind are remains of colour decoration, principally in plain bands and squares. We find also many drains, mostly about 8 in. square inside, and built of the long Roman tiles to sills and sides, and covered with marble slabs. There are also one or two manhole chambers for access to these.

At the Dipylon Gate and the Ceramicus a good deal has been done in the shape of clearing away the ridges of earth left on the site after former excavations, and the whole place has been enclosed by a wall and railing and is now properly looked after, instead of being a deposit for half the refuse of the town as formerly seemed to be the case. Additional excavations will shortly be undertaken here by the Greek Archaeological Society, and with this view the small church of the Holy Trinity, which is, however, of no architectural value, will be pulled down.

Progress is being made with the arrangement of the various collections in the National Museum on the Patissia-road, the building of which has only recently been finished.

In the Polytechnic Museum the additional things found at Mycenæ by the Greek Archaeological Society during their excavations there last year, when more tombs were opened, are now on view, although they have not yet been properly arranged. Here may also now be seen the frescoes from the prehistoric

palaces at Tiryns and Mycenæ. The recent discoveries in a tomb at Vaphio, near Sparta, which vie in interest with Schliemann's Mycenæ treasures, will not be exhibited until they have been published by the Society in their Journal.

The most typical and interesting of the Byzantine slabs and carvings which had been built into the houses and other buildings that formerly stood on the Acropolis, and which since the removal of these buildings were gathered together in the courtyard of the old entrance, have been recently removed to the National Museum, where a Byzantine Court is being arranged. Although it is not unlikely that many of these carvings had been taken from buildings in the town, and used up in later buildings on the Acropolis, still we think it would, perhaps, have been more interesting to have left them where they were found, especially as a covered shed could so easily have been formed beside the Museums to receive them. The idea, however, seems to be to collect all the Byzantine relics together in one place.

The ground round the Kapnikarea Church, which is situated in one of the main streets, has been lowered several feet, and it is now possible to judge the true proportions of this interesting little Byzantine building, which till quite recently was buried three or four feet by the accumulations of the centuries. This excavation verifies the theory that the later western addition was originally an open porch, as the jambs of the openings run down to the ground level. A similar improvement is about to be effected round the church of St. Theodore.

The Christian Archaeological Society of Athens are just now busy with the remains of the convent and church of St. Andrew, near the metropolis. The people who inhabited the old conventual buildings have been provided for elsewhere, and interesting researches and excavations are now being made. Already several underground cellars and passages have been discovered and some inscriptions and architectural fragments have been unearthed; under the church itself several vaults have been opened, and these were found to contain bones. In the old refectory an interesting fresco of a Tree of Jesse, which had been covered with whitewash, will be cleaned and preserved. We believe it is proposed to form a small museum of Christian antiquities in two of the old rooms.

At present a very interesting collection of Christian relics is to be seen at the house of Dr. George Lambakis, a learned archaeologist, and formerly Ephor of Christian Antiquities here. This includes a large variety of objects connected with the ritual of the Church, such as chalices, pattens, knives for dividing the sacred bread, spoons for the holy wine, various forms of crosses, lamps, incense burners, and a curious assortment of vestments, besides a number of architectural fragments both in stone and wood, and many miscellaneous objects.

Nothing further has been done with regard to the proposal to remove the mosaics from the dome at Daphne, and bring them into the museum here. They have been made temporarily secure in their present position, and the scaffolding is still up. We trust that the scheme will eventually be abandoned, and that they will be allowed to remain where they are, additional precautions being taken to ensure their preservation. Dr. Lambakis has just published a monograph on this interesting church and monastery, but we have to refer to it again at a future time.

Dr. Schliemann has procured another firm from the Porte, and is at present at Hisarlik, making arrangements for further extensive excavations during the spring on the site of ancient Troy, with a view to establishing his claims beyond a doubt, and silencing all unbelievers.

The archaeological schools are again in session. Three students have already come out to the British School, and others are expected shortly. It is hoped that they will muster nine or ten within another month or

two. The school may probably undertake some excavations in Greece in the spring, but nothing has yet been fixed with regard to this. Meanwhile two students go to Cyprus shortly to commence work on the important site of Salamis, under the auspices of the Cyprus Exploration Fund, while two others have already started into the interior of Greece to examine the mediæval remains.

Several valuable and necessary architectural works have been added to the library of the School since last session, but many more are still wanted to make it of any practical value, for reference purposes, to students and architects travelling in Greece.

#### A TECHNOLOGICAL DICTIONARY.\*

**T**HIS work, in three thick volumes, in which each of the three languages concerned takes the lead in its turn, is a truly gigantic labour. The editors, whose names we have not space to give at length, are no less than eighteen in number, and it aims at giving, in three languages, the technical terms in connection with all the branches of scientific industrial and constructional work named in our footnote below. Such a work could perhaps hardly ever be really complete, for the subject is practically endless, and the terms employed in various branches of work are continually being augmented as new developments produce new and special nomenclature. But there is no doubt that, as claimed for it in Herr Karmarsch's preface, it contains "a remarkably rich store of carefully-collected material." A great number of the expressions introduced into such a work are of course not found even in very good and copious dictionaries of languages; they are not words in ordinary literary use, and are unknown to the compilers of ordinary dictionaries, though it may be noted that of late years there has been a great deal more attention paid, in dictionaries of language, to technical words than was formerly thought necessary.

The principal use which is contemplated for the dictionary here spoken of is to facilitate correct and precise translation of technical descriptions from one language into another. That assistance of this kind is very much required is evident when we see how vague and deficient in precision such translations often are. In some cases this precision of expression in another language is hardly possible without considerable circumlocution, as it sometimes happens that where one language has a precise term embodied in a single word, another has no corresponding term, and the idea can only be expressed in a sentence. These are exceptional cases, however, and possibly another edition of the dictionary will further reduce their number.

The dictionary does not profess to define scientific terms further than by giving their equivalent in another language. Thus "Ab-scissa" receives no definition beyond "der Abschnitt" and "Abscisse." To have attempted to give a definition in terms as well as a translation would of course have extended the size and scope of the book enormously, and it was better not to attempt it; we only mention it to make clear what kind or degree of information is to be looked for in the dictionary.

We must confine ourselves here to a few remarks on the architectural terms presented. We fear there is a good deal to be done yet before these are free from confusion. The dictionary does not, for instance, clear up the matter of "moëllon" and "pierre de taille," which in French dictionaries are constantly

\* Technological Dictionary (English-German-French: Deutsch-Englisch-Französisch). Francis & Taylor, London. (a) of the terms employed in the arts and sciences; architecture, civil military and naval; civil engineering, including bridge-building, road and railway-making; mechanics; machine and engine-making; ship-building and navigation; metallurgy, mining and smelting; artillery; mathematics; physics; chemistry; mineralogy, &c. Edited by E. Althaus, L. Bach, F. C. Glaser, &c., &c. and published by Erich Schallier, with a preface by Karl Karmarsch, late chief director of the Polytechnic School in Hanover. Third edition, completely revised and corrected. Wiesbaden, J. F. Bergmann; Paris, J. Baudry; London, Tribner & Co.; New York, B. Westermann & Co.



both translated as "ashlar," whereas they certainly are not the same thing. We take a sentence from a French architectural paper which describes a building as "construite entièrement en pierre de taille et en moellons." A French architect to whom we definitely put the question describes "pierre de taille" as a masonry of large stones dressed and laid in even courses, and "moellon" as a masonry of small and more roughly dressed stones of uneven sizes. It would appear from this that "moellon" really corresponds pretty nearly to ragstone, and "pierre de taille" is the proper translation of ashlar in the sense in which the word is commonly used in England. Gwilt certainly defines ashlar (Italian *asciare*, "to chip") in the first instance as "common or freestones as brought from the quarry of different lengths and thicknesses." But his second definition, "the facing given to squared stones on the front of a building," is nearer the ordinary acceptation of the term; and this smooth or rubbed work, "plain ashlar," we take to be the proper equivalent of "pierre de taille."

Some of the English terms in the book are curious, and look rather as if this portion had been revised by Germans without the help of an English editor; and there are in fact none but German names in the list of editors on the title-page. In the French edition we find "moellon ebouziné" (?) done into English as "refreshed ragstone," a term with which we are certainly not familiar. It is given again in the English volume, but with the French equivalent given this time as "eboussiné," so that both in English and French the compilers seem rather at sea. Both spellings are wrong; "pierre" is feminine, and the correct word is "ebouzinée." Under the head "Strut," in the English edition, "angle-brace" and "angle-tie" are added as if equivalent expressions, which it is needless to say they are not, a strut being a member in compression and a tie a member in tension. One of the French equivalents given is "étanche," which we do not find in a French dictionary; there is "étançon," translated as a "stanchion" or a "shore" in the literary dictionaries. However, "étanche" and "étançon" are both given in the French volume of the technological dictionary, with the same meaning, and we presume therefore they are both in use. In the German equivalents, "Strobe" and "Band" are mixed up, just as "strut" and "angle-tie" are mixed up in the English; "Strobe" being a prop and "Band" having much the same meaning as in English. When we look among the "Angles" we find "angle-tie" again coupled with "angle-brace" as under the same heading, but in that case what is it doing as an equivalent to "strut"? As the confusion occurs in the German equivalents to "strut" as well as in the English, this seems to be a case in which the editor engaged has been deficient in constructional knowledge and has confounded together two opposite things.

We have often wanted a neat equivalent for the French "chantier," but we do not find a satisfactory one here. It is given as "timber-yard" and "carpenters' yard"; but "chantier," we need not say, has a wider meaning than that. "Building yard" is perhaps the best English equivalent, but it is a somewhat clumsy paraphrase, and in fact this is one of the cases in which a word in one language finds no corresponding word in another.

"Acroter, acroterion" we find in the English volume. There is no such word as "acroter" used in English: the hand of the German again is visible. "Amphiprostyle" does not appear, but this is perhaps not regarded as an English word, being really Anglicised Greek: though as "hypotrachelium" is included we do not see why "amphiprostyle" should be omitted. "Bolection" moulding, though an old-fashioned phrase now, is one for which a German or French equivalent may be wanted, but it is not known in the dictionary. "Baluster, bal-

uster, or balister" (last two forms not English) is not known either in this country as applied to "the vase of a fountain." The primary meaning, "a little rail-column" is quaintly but correctly given. A baluster form is no doubt sometimes used to support a fountain, or a sun-dial, but it has no recognised signification in that respect. "Cantalever" (wrong spelling) and "modillion" are bracketed together as if they were the same thing, which they certainly are not. "Column" and "columnar" appear, but not "columniation," a word for which a German or French equivalent may certainly be wanted. "Hip—see Pinnacle" is an item that excites one's curiosity: it should seem that the editors have confounded it with "hip-knob," an old-fashioned expression for the finial to a hipped gable. "Dolmen" is not in the dictionary, but "menhir" appears, Germanised as "der celtische Steinpfeiler."

These examples are sufficient to show that the dictionary has suffered from the want of an English coadjutor, by whose assistance all the mistakes and omissions here noted, with others which we have observed, might easily have been avoided; and in all probability a French critic would be in a position to say the same about the French volume. As the ultimate appearance of a further edition or editions is confidently predicted in the preface, we recommend the learned German editors to obtain, before the issue of any further edition, the assistance of some English and French specialists in collating the dictionary, and thus save their book from errors which they would no doubt be the first to regret were they aware of them. It should be added, however, that these slips form a very small proportion of the whole, and that the book, with whatever imperfections it is at present to be charged, is a mine of information in regard to parallel technical phrases in the three languages with which it deals, and will be a most useful addition to the libraries of those who have to study German or French works on technical subjects.

## NOTES.

THE London County Council, as we have already mentioned, are seeking to amend the Metropolitan Building Acts in several important particulars. We print in another column the text of their proposals with regard to this matter, which are contained in Sections 61 to 70 of the "London County Council (General Powers) Bill." We cannot here refrain from incidentally expressing our regret that no attempt has yet been made to codify and consolidate the now rather numerous Acts relating to building in the metropolis. The complexity of the existing Acts will be only further added to by the proposed new legislation interlined in a "General Powers" Bill. We trust that when the County Council gets more thoroughly into harness it will give its early attention to this subject of the consolidation of metropolitan building law. With regard to the question of the definition of the general line of frontage, which has hitherto been in the hands of the Superintending Architect, from whose decision there has been no power of appeal, Clause 61 of the Bill proposes what will be deemed by many a fairly satisfactory tribunal of appeal,—viz., one member of the Royal Institute of British Architects, one member of the Surveyors' Institution, and one member to be appointed by the Council. When this clause came before the Council on Tuesday last, Mr. Brereton moved an amendment to the effect that the member to be appointed by the Council should not be an officer of the Council, but this amendment was lost, so that if the clause as it now stands becomes law, there would be nothing to prevent the Council appointing its own Superintending Architect to serve on this tribunal. But, for the reason which we enunciated more than a year ago,—viz., that the tribunal of appeal

should be entirely independent of the official from whose decision the appeal is made,—we trust that the Council will rarely, if ever, exercise the power which this clause, if passed, will confer upon them with regard to this particular point. Another amendment was moved to the effect that the appeal from the decision of the Superintending Architect should be to the whole Council, but this amendment also was rejected, after some few words from Sir John Lubbock and Dr. Longstaff, the last-named gentleman saying that the Council as a body would be the worst possible judge in difficult technical questions of that kind. Clause 70, restricting the height of buildings, is one which is greatly needed.

ON the Railway Rates Inquiry being reopened this week, considerable opposition was manifested on the part of the traders to the carrying out of the suggestion to which we referred last week, as to verifying the figures relating to the sixteen representative stations selected by the London and North-Western Company. The traders are divided on this subject, some agreeing to Lord Balfour's proposal, while others dissent; and Mr. Balfour Browne represents so many different interests that he finds it difficult to act so as to satisfy all. After a discussion which approached more nearly to "warmth" than has been the case at any previous sitting, Lord Balfour intimated that the Court adhered to the opinion that the terms of reference already suggested fairly met the case, and that the appointment of a skilled person to carry it out would be proceeded with. This point being disposed of, the chief goods manager of the North Western was examined. Among the papers put in was a statement showing that certain of the proposed new maximum rates were so favourable to the public that the latter would gain by their being substituted for the existing charges. These must be very exceptional cases, for of numerous examples from actual carriage accounts, which have come under our own notice, none have been of this nature, and we are convinced that the search for those discovered must have been anything but an easy task. We notice, however, that the revisions resulting from the recent conferences between the companies and the traders include a few substantial reductions. Several articles have been removed from Class B to Class A,—which has hitherto contained coal, coke, iron-ore, and slag only. The additions thus made to the lowest class include clay, limestone, and stone, and undressed material for road repair. There are other instances of traffic being removed to lower classes, in which they are merely restored to the position they previously occupied in the Railway Clearing House classification. Undressed granite, in blocks, for example, and common roofing and paving tiles, are moved back from Class C to B, and several other descriptions of traffic have been similarly restored to their original class.

THE Duke of Westminster's letter in Monday's *Times* on "Overcrowded Cemeteries," though the main points in it are such as are familiar to those who have given any attention to the sanitary aspect of the subject, emphasises one point which is certainly not prominently enough before the public mind, viz.: that all the evils of overcrowded cemeteries arise really from the futile desire to preserve the remains of the dead, or at all events, from a system which could only be reasonably employed on the supposition that preservation was the object. What other explanation could be offered, as the Duke suggests, for the system of "spending much upon a mischievous durable coffin, often richly upholstered and mounted as if intended for use in daily life?" The embalming system of the Egyptians was logically in accordance with their peculiar belief as to the future of the body; but the enlightened Christians of a scientific age certainly own nothing in their creed which could give them a logical ground for an endeavour

\* The "Dictionnaire Général et Grammatical des Dictionnaires Français" définit *moellon* as "pierre du remplace aux murs de pierre de taille."

\* See *Builder*, Nov. 17, 1889, p. 353.



to preserve the body as long as possible; without taking into account how very short after all is that possible time. The system advocated by the Duke of Westminster is that which fulfils the most practically the spirit of the words "earth to earth"; leaving the deceased body free to combine in the quickest manner with the natural earth, instead of boxing it up to germinate poison. A good many years ago, when public attention was especially called to this view of the subject by doctors, this journal stated its adoption of the earth-to-earth theory of burial as the right one. At that time, however, the possibly superior advantages of cremation had not been discussed and brought forward as they have been since; and it now remains, we think, to consider whether cremation is not the real solution of a painful problem after all. The essential difference between the two is, of course, only between a rapid or a slow decomposition of the elements of the body; but there may be some question whether even the laying of numerous dead bodies in close contact with the earth, within a comparatively restricted area, affords an entire escape from their insidious effect on the living. It seems to be held that cremation does afford this immunity. But cremation has never yet been tried on a large scale. If it were introduced as the sole system for a large cemetery with numerous burials every day, the air may probably be laden with particles of matter given off during the conflagration. Which is least injurious, to have such particles distributed in the air around us or in the earth beneath us? That is the question which physicians and chemists have to answer for us.

IN a short letter published in another column, Mr. T. G. Jackson protests against the suggestion of "C. F. M." in our last that a Minister of Fine Art should be created in order, among other things, to protect national monuments from being played with for private amusement as St. Alban's has been. With the spirit of Mr. Jackson's closing remark, that "the hope of art lies in the enlightenment of public taste and the awakening of public interest," we are quite in agreement; we remarked only a week or two back that the real cause of all this defacement of St. Alban's being possible is "the total want of a cultured public opinion about architecture on the part of the English press and the English public." But this opinion does not exclude the idea of the existence of a Ministry of Fine Arts (rather than Minister) as a means whereby an enlightened public opinion may practically express itself in regard to national work. That a Minister of Fine Arts appointed under present circumstances might be an utterly unfit and mischievous man we know by the history of the appointments to the office of Commissioner of Works, which is the nearest approach we have to a Minister of Fine Arts, and to which we have seen Mr. Ayton and Mr. Shaw-Lefevre appointed in turn. But with a better-educated public opinion such unfit people would not be appointed at all to such a position; the appointments themselves would be affected by public opinion, which they would more or less represent. That the "Ministère des Beaux-Arts" in France is in the main a beneficial institution we have little doubt; but it is so because it is the representative of a public interest in art more general and better instructed than is to be found in England.

A PUBLIC appeal has been made by the Bishop of Rochester for the restoration of St. Saviour's, Southwark. The choir and lady chapel, the only ancient portions of the church, were restored, in a very conservative spirit and with every regard to durability, under the direction of Gwilt. The restoration scheme therefore really means the removal of the bad modern Gothic nave, built 50 years ago, and the substitution of a better one. The existing nave is as contemptible a piece of architecture as it is said to be; but if the object

is to replace it by a nave which is to look exactly as if built in the thirteenth century, we very much question whether the game is worth the candle. Something beyond mere imitation Gothic ought to be attempted, at all events.

MR. CHARLES WALL, one of the contractors whose name has been prominent recently in connexion with the complaints in regard to the bad construction of London School Board Schools, wrote to the *Times* of Saturday last in regard to some of the charges made against him, to the effect that the whole of the drains laid by him at Park-walk schools were inspected and passed by the Board's officers before they were covered up, and that with regard to no provision having been made for ventilation, nothing was specified; "if a ventilating-pipe has been fixed at all, it was an after consideration, as there were none included in my contract." Mr. Wall adds:—

"Before the public form any opinion as to the drainage of schools built a few years ago, and of those which are now being erected, they ought in fairness to compare the respective specifications. The whole system of drainage is now everywhere being entirely revised, and that in use by the London School Board and other large institutions at the present day is entailing a far greater expenditure than the old style, but as a builder, and also as a ratepayer, I quite agree with the outlay."

As no denial of these statements on the part of the architectural authorities of the School Board has appeared, we presume they are correct, and if so, they confirm us in the opinion we had already begun to form, that the contractors have been to a great extent made scapegoats for evils mainly due to an inefficient system and a dangerous desire for economy.

IN another column we print the reply sent in to the London School Board by Mr. Warren, the Clerk of Works who was dismissed from the employment of the Board on account of alleged neglect of duty in regard to the construction and materials of Woodland-road School. We observed a fortnight ago that the Clerk of Works' reply, both in fairness to him and as an additional means of getting at the truth, ought to have been made public. In some respects the reply does not make a very good case. In regard to the important question of the mortar, Mr. Warren denies any use of "burnt ballast and half-burnt clay" as a base for the mortar, stating that until the building was nearly finished there was no such stuff on the ground; but we observe he does not deny that the sand was not the best for the purpose, the chief defence being that it was the same as was being used by the London, Brighton, and South Coast Railway Company at the new buildings at Gipsy-hill Station. These buildings, however, are of slight and unimportant character, ordinary small station buildings, and certainly could not be taken as a rule for what should be required in the construction of a large school building. About the tiles and some other matters it appears to us that the explanations given are satisfactory; and the statement of the writer that he had charge of two other schools at the same time, one two miles and the other six miles off, goes further to confirm what we have said above, that the Board's own system, of making one person do the work of two, is to a great extent responsible for the opportunities, at least, which were left for the smuggling in of bad materials and bad work.

WE print the following circular which has been issued by Messrs. Peto Bros., the contractors, to their foremen and workmen. As an attempt to put the relation between employer and working man on a ground which gives them a community of interest in the carrying out of the work, the document is worth public attention:—

"Messrs. Peto Brothers having been selected by the London County Council to carry out the building of the Cane Hill Asylum (Extension), on the existing recognised rates of wages, consider the opportunity a favourable one for giving effect to a system they have been considering for some time of

identifying as far as possible their interests with those of their workmen.

They therefore propose to give the men one quarter of the whole net profits on the contract, which will be paid in addition to the wages before named.

All the men engaged by Messrs. Peto Brothers on this contract will be entitled to their share of profits, which will be calculated at a percentage on the wages earned, as shown by the weekly time-sheets (as for example, on a 10,000l. contract, assuming the wages earned to be 3,000l., and the profit 1,000l., there would be 250l. to divide amongst the men, equivalent to 8½ per cent., or 1s. 8d. on every 11. of wages).

All right to participate in the profit will nevertheless be forfeited (a) By any who earn less than a total amount of 5l. in wages on this contract. (b) By any who may individually or in combination do anything tending to diminish the profits on the contract by neglecting their duties, misconducting themselves, wasting their time, or by joining any strike for shorter hours, or for wages above the existing recognised rates of wages, on which the tender for the above-mentioned contract was based, whether the strike be general or otherwise. (c) By anyone who may do anything tending to damage the character of the firm for good and honest work.

The shares of any men so forfeiting their claims to be added to the shares of the others.

Payment of the men's shares of profit will be made as soon as the accounts for the job are settled, and will be paid only to them individually or their legal representatives, and the date will be advertised by notice in the newspapers, and at the works at Gillingham-street.

Each workman must see that he has a printed ticket given him by the timekeeper, signed and dated by him, and countersigned by the general foreman of the job before commencing work, giving his name, number, trade, rate of wages, &c., and again signed, dated, and countersigned by them on his leaving.

This ticket must be produced when claiming share of profits, and no claim will be entertained unless such ticket is so produced.

The men are invited to nominate a competent representative to attend at the office of the firm and examine the accounts relating to this contract and to sign a balance-sheet of the same, which will be prepared by Messrs. Peto Brothers' regular auditor, Mr. J. R. Reynell, of 8, Adelphi-terrace, Strand.

This offer being a purely voluntary one on Messrs. Peto Brothers' part, they reserve to themselves the full and absolute right to decide any question which may arise in connection therewith, and to make any further rules or regulations that they may deem necessary from time to time. Their decision to be final and without appeal.

Should this attempt to unite the interests of employers and employed be as successful as Messrs. Peto Brothers hope, they intend to apply it, so far as may be found feasible, to all works undertaken by them in the future, having full confidence that it will be to their mutual advantage if it has the hearty co-operation of the workmen.

The men engaged on this contract have therefore not only their own interests in their hands, but those of their fellow-workmen."

AT the meeting of the Southend Local Board on the 3rd inst., it was resolved that the salary of the Surveyor, Mr. P. Dodd, be increased, as from Christmas next, by 50l. per annum. The *Southend Standard*, in reporting this incident, heads it "Extraordinary Liberality!" Whether this is meant as the *Standard's* deliberate opinion of the matter, or whether it is its way of twitting the Local Board with a departure from the even tenour of a parsimonious policy, we do not know, as there is no editorial utterance on the subject, except the heading in question. Neither are we informed of the existing salary of the Surveyor. But the report of the discussion on the motion is, as such reports are apt to be, somewhat amusing reading, though the amusement temporarily derived therefrom quickly gives place to a feeling of astonishment that members of local authorities should be found so deluded as to suppose that by haggling about a few pounds a year in the salary of so important and essential an officer as a Surveyor and Building Inspector they are studying the interests of the ratepayers, or, as Mr. Pawley put it, "the benefit of the place." That the Surveyor of Southend has plenty to do is apparent from the remarks of the Chairman of the Local Board, who said

"At every meeting you find we keep increasing the work of our Surveyor in every direction. We have just now called upon him to carry out a very large sewerage scheme. I hold that every servant is worthy of his hire, and I think it is our duty to increase our Surveyor's salary by 50l. a year at the least. He is at work from six o'clock in the morning



kill ten o'clock at night. I think we really work our officer too hard, and it is incumbent on us to recognise his work in the only way we can, by compensating him in the shape of increasing his salary."

In opposition to the proposal, Mr. Pawley said he "could not see why the Surveyor's salary should be increased." In justice to Mr. Pawley, it must be said that while (according to the report) he really thought that the Board would "not get any more [work understood] done" by "rising" [sic] the Surveyor's salary, he was for the appointment of "a building inspector," so as to relieve the Surveyor. Mr. Pawley disclaimed any idea of speaking against the Surveyor: he spoke, he said, "for the benefit of the place." There may be something in Mr. Pawley's contention, but a "building inspector" or any such officer is not very likely to be a thoroughly competent and reliable man unless he is offered a decent salary. South-end is a large and growing place of residence and an increasing seaside resort, and, in the interests of residents and visitors alike, it should not be niggardly in remunerating officers responsible for maintaining its health. Other and more important marine resorts than Southend have ere now had to learn the bitter lesson that cheeseparing in such matters is the very reverse of an economical policy in the long run.

DR. SPEAR'S report to the Local Government Board (dated October 26) on the prevalence of typhoid fever in the Urban Sanitary District of Longton, Staffordshire, is, owing to the peculiar circumstances of the case, less definite in its conclusions than most of these reports. The water supply of the district appears to be from several sources, the water being a good deal mixed in distribution; and though some of the samples of water analysed were not immaculate, there does not seem to have been sufficient fault in the water to account for an extensive prevalence of typhoid: nor is the general system of drainage charged in the report with such defects as would probably give rise to disease. The origin most clearly pointed to by the investigations is what is described as "a barbarous system of excrement disposal." The houses referred to as visited by the disease all have cesspool privies, "roughly constructed and no doubt leaky"; and elsewhere it is observed that the histories of the cases investigated "point to defective local sanitation, or more particularly to the storage of excrement about dwellings." The following recommendations are appended to the report:—

1. The Sanitary Authority should adopt measures for the removal, as promptly as possible, of all excremental and other filth from the vicinity of dwellings. To this end—(a) Water-closets should be adopted throughout the borough as universally as circumstances permit; and at houses which, at present, cannot be served by water-closets, the Authority should not allow the contents of privies to accumulate longer than a week. (b) Careful inspection should be made to discover defects of drainage as well as pollution of soil by excrements; and means for the abatement of such defects should be adopted without delay.

2. The Sanitary Authority should be on the watch for any sources of contamination of the water supplies of the borough, both at the origin of any supply and in the course of the distributing mains. The indications afforded in this report of impurity at certain reservoirs, and also of dangers that may arise to water within the pipes, should be impressed on the North Staffordshire Water Company; and other steps should be taken, if these became necessary, for securing the inhabitants of the borough from danger of all pollution to their water supplies."

SOME American admirers of Goethe in New York have formed themselves into a Committee for the purpose of erecting a monument to his memory in Central Park. Mr. Henry Baerer has been commissioned to execute the work, which will cost 30,000 dols. The design consists of a statue considerably above life-size, upon a pedestal, at the four canted corners of which are groups of two figures, namely, Faust and Marguerite, Orestes and Iphigenia, Herrmann and Dorothea, and the Harper and Mignon.

AMONGST the tenders that were printed in our columns on November 23 last was a list of those for an extensive rebuilding at the "White Hart," Windsor. It is believed that a portion of the old premises which will be pulled down is a relic of the "Garter Inn," wherein Falstaff says, "I sit at ten pounds a week," and is called by mine host "an Emperor, Caesar, Keisar, and Pheazar." Shakespeare lays several scenes of "The Merry Wives of Windsor" in the Garter Inn, and the text of that play shows he was well acquainted with the town and the locality. The Garter Inn is cited in a schedule of the rents, resolves, &c., belonging to the Corporation, under date July 21, 1662. In that year "mine host" was Richard Gallys, mayor, and one of the two Borough members. The name occurs in other local accounts for 1633, 1636, and 1663. An entry in Theodore Randue, the chamberlain's, accounts for receipt of rent, in 1689, is noteworthy as fixing the inn's situation. That entry stands thus:—

"Clarke, Isaac, for the fronte of the	White Hart	...	...	01	00	00
More, for the fronte of the two	next houses, anciently the Garter	Inne	...	...	01	00

The Garter Inn, in fact, stood next to the White Hart, in High-street, westwards of Garter's Tower, Lower Ward, and Castle-hill. The two inns, together with their signposts and cross-beams, are clearly delineated in Norden's plan, *à vol-d'oiseau*, of Windsor Castle, 1607 (Harl. MSS. 3749).

LADY students have taken a remarkably prominent place among the Royal Academy prize-winners this year, the Turner medal, the Creswick prize, and the prize for decorative painting having all been taken by ladies. The paintings for the Turner medal are of better quality than in some previous years, showing more reserve and refinement and less striving after "powerful" effects: but the prize is gained by Miss Ursula Wood for the one painting which seems out of keeping in subject and character with the idea suggested by the words "Turner medal," inasmuch as it is a foreground study of farm buildings with morning light on the walls and a cock crowing (the subject being "Ifail smiling Morn"), whereas the "proxime accessit" work (21) by Mr. F. Dickson, a tenderly-treated early morning effect, seems much more the kind of thing Turner desired to encourage. No. 19 showed a bright treatment of foreground and water, but the artist had not succeeded in getting light into the sky. Miss Elizabeth Nichol's painting which gained the Creswick prize is a very good work, nearly equally by Miss Helen Flew, "proxime accessit." The subject for the gold medal for a figure painting was "An incident of the Deluge"; among the works submitted want of imagination and of any realisation of the scene intended is the failing nearly everywhere; they are mostly simply figure studies. Mr. H. J. Draper's painting which gained the prize is the best and most forcible in conception; it represents persons who have taken refuge in a cave outside which is seen a tremendous downfall of rain; the best figure is the woman crouched in the foreground with a scowl on her face. Miss Gertrude E. Demain Hammond's design for decoration, "Harvest," is a warmly-coloured painting in frieze style, with a row of early Doric columns in the background, which has a good decorative effect though a little stiff in the drawing; the full-size cartoon of three of the figures is very good. Among the life-size cartoon figure studies (subject "Lady Macbeth") Mr. Montford's, though it is not Lady Macbeth, undoubtedly merited the prize it has received as the best drawn and most reasonably conceived design; some of the figures are in the wildest melodramatic vein. The sculpture prize (subject "Parting") is rightly given to Mr. W. Goscombe John for his finely-modelled and pathetic figure of an old man seated with his apparently dying child (or grandchild) with

hands clasped in his; but the expression is somewhat too painful for sculpture, and the composition and idea of No. 267, "proxime accessit" by Mr. Fehr, is finer and more sculptural; the group consists of husband and wife seated, a child in front throwing its head back towards them; a helmet tells the tale of another parting of Hector and Andromache. The architecture, we regret to state, is far the weakest show; the gold medal has not been awarded, and the 25<sup>th</sup> prize "for a set of architectural designs" is very easily won. Mr. G. H. Jacques, the winner of the first silver medal for architectural drawing, shows some careful measured drawings of the Hall at Hampton Court. The drawings of the travelling student abroad in 1888, which are hung, are however a fine collection, especially some detail studies from St. Marks.

THE Winter Exhibition of the Society of Painters in Water-colours loses a good deal through the non-appearance of Mr. Hunt and one or two other leading members, and drawings are hung in places of honour, apparently more on account of their size than for any other reason, which do not reflect equal honour back on the Exhibition. The most remarkable work there is Mr. Burne-Jones's decorative painting of "Allegorical Statues in the Wall of the Garden of Idleness" (224), an architectural screen with coloured marbles and carvings and niches, and a series of remarkably-conceived bronze statues of various vices and miseries, very powerfully drawn. Mr. Bulleid's "A Suppliant" (285) is a remarkable drawing of statuettes and a marble background, with a girl's ivy-wreathed head relieved against it. The late Mr. F. Tayler's studies of horses are of much interest. Among the best works are Mr. R. W. Allan's "French Peasants arriving for the Vintage" (66), a semi-impressionist work in dabs of bright blue; Mr. Pilsbury's wonderfully-finished landscape (102); Mr. Cuthbert Rigby's "Glimpse of the Esk" (113), a lovely landscape in pure water-colour; Mr. Tom Lloyd's "Barley" (137); various figure sketches and studies by Mr. Walter Crane; Mr. Arthur Hopkins's "On the Jetty, Monks-haven" (279), with an admirably-studied group of figures in the foreground; "Study of Argyll's Bowling-green, Loch Goll" (282), by Mr. Colin B. Phillip; "Flourie" (292), and "Near Sandown" (298), by Mrs. Allingham,—the latter especially beautiful; Mr. G. A. Fripp's "West Coast of the Island of Sark," a study (196); and Mr. A. Goodwin's two little drawings of the "Falls of the Rhine" in autumn and spring (326 and 363).

IT appears as if the Sheffield competition conditions were at present to be regarded as a kind of bible or sacred book of statutes for promoters of competitions. At all events the conditions for the competition for new baths on the Montpellier estate at Harrogate, just sent to us, exhibit a touchingly devout study of the Sheffield conditions. The same description of drawings are required to the same scale; the drawings are to be accompanied by a sealed envelope containing the author's name and address, and "when each case is unpacked, it, and its contents, will be marked by the Corporation authorities for identification, but no distinguishing mark, or motto, or device is to be put on the drawings." Imitation is the sincerest flattery.

The Battersea Polytechnic.—The *Morning Post* says that Mr. Evan Spicer, the Chairman of the executive committee for the establishment of Polytechnic institutes in South London, has signed an agreement for the purchase of a site for the proposed Battersea Polytechnic. The site is between the Battersea Park-road Board School and the grounds of the Albert Palace, thus having a long frontage to the Battersea Park-road. Of the 60,000<sup>l</sup>. required to carry out this scheme and secure the endowment of it by the Charity Commissioners, only 12,000<sup>l</sup>. remains to be collected, which the Committee expect to secure within the next few weeks.

\* See Tighe and Davis's "Annals of Windsor." 1868.



## LONDON STREET TABLETS.

THERE are comparatively few of these remaining at the present time. Corner sites have been largely rebuilt, and the old panel has been removed, perhaps, to a builder's yard, and its place has either been taken by a painted name or an enamelled plate. In some of the older parts of London, where streets of the last century have remained undisturbed, the old tablet is still to be seen.

The end of the seventeenth and the beginning of the eighteenth centuries seems to be the period at which they were put up. There are two in the Guildhall Museum. One from Gardiner's-lane, Upper Thames-street, dated



From the Guildhall Museum.

1670, was presumably a gardener of the period, with a formidable looking spade. It measures about 2 ft. 3 in. by 1 ft. 9 in., and is slightly arched at the top. The second is a good white marble tablet about 2 ft. by 1 ft., with the name



At the Guildhall Museum.

Stewkeley's-street, 1668, carved in a bold style. The marble is set into a darker stone, giving a 3 in. margin at the sides and bottom. The lettering itself is about 2 in. high, and the capitals in proportion. There is also an example from Broad-street-buildings, dated 1737, a slate slab with large lettering.



No. 2, Aldbrook.

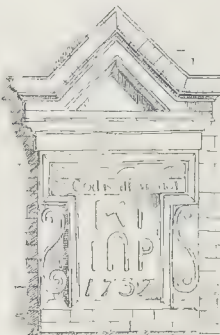
In the middle of Walbrook, between two windows on the first floor, is a very good panel, dated 1668. This is perhaps not a street tablet, but simply refers to the date of the house on which it is placed.

In the neighbourhood of what is now called "Mount-pleasant" are two or three examples in brick. The first is in the lower part of the street, opposite the end of Elm-street. It is a plain, square stone, with "Dorrinton-street, 1720," carved in ordinary Roman capitals. The stone is placed in a brick frame, with a moulded hood, and the whole corbelled out from the wall about 1½ in. Higher up the

street, nearly opposite the jail, are two more, one of the same design as the one just de-



scribed, and bearing the name, "Baynes-street, 1737." Over this is a much more elaborate example, also in moulded brick, with a pediment. The panel itself has an inscription,



From Mount Pleasant.

"In God is all our trust," and below are some signs, one of which seems to be a T-square and the date, 1737. A panel somewhat similar to this occurs in one of the old streets at Gravesend.

There is another form, later in date, and of more elaborate character, of which one or two examples still remain. Generally speaking, it is a convex shield of irregular outline, surrounded by the scrolls so often used in the seventeenth and eighteenth centuries,—more particularly the latter. The best is perhaps that at the north end of Great James-street, dated 1721. The house has been recently



"done up," and the tablet has unfortunately received a coating of paint, which has not improved its appearance. Another is built into a house in Princes-street, Westminster, and was once in Princes-court hard by, but was probably removed when the corner house was rebuilt. A third example is built into the corner house of Cecil-street, Strand, but is too high up to be properly seen.

It is to be regretted that when corner sites are rebuilt in the present day some place is not left in the design for the name of the street. At a convenient height from the ground, to be easily seen by passengers on foot, and by those in charge of vehicles in the streets, it would be a decided improvement on the present treatment. In a great many cases the name of the street is partially hidden by the top of the shop-front, and in others is so high up as to be almost useless,—quite so in foggy weather. That there is a great variety in the way which these tablets may be treated is hardly to be questioned, and, with the revival of taste for Renais-

sance work in our street architecture, they would be in accordance with their surroundings. The examples which have been given have, some, it is true, been archaeological rather than architectural,—such as that from Gardiner's-lane. Others might be called commonplace, and perhaps ugly; but there seems to have been at that time a genuine attempt to make the street-corner both useful and ornamental,—an attempt which we should do well to imitate at a time when London is being so largely altered and rebuilt,—especially in the west.

The same argument applies equally to the tablets put up in many places to commemorate the birthplace or residence of famous men. These, again, are at present all of nearly similar design,—if design it can be called,—and in many places, like the street names, too high up to read.

## SIR FREDERIC LEIGHTON ON SPANISH ARCHITECTURE.

SIR FREDERIC LEIGHTON, P.R.A., distributed the prizes to the students of the Royal Academy on Tuesday evening last. In the course of the address which he subsequently delivered, he said (as reported in the *Times*):—

Let us now glance briefly and in order at the fortunes of the several arts in Spain, and first let us consider its architecture. The limits of our time must necessarily restrict me to the merest outline of our subject. We are, however, concerned not so much with special examples with general phenomena of artistic evolution, and these may, I hope, be made fairly clear without excessive elaboration. Fortunately, also, those who desire further acquaintance with the architecture,—at least with the Gothic architecture,—of Spain have access to it in the work of an artist of genius and a man of learning, in whom the Academy not long ago lost an honoured member, Mr. Street. In using his work, however, you must make allowance for a vehement impatience of whatever does not fall within certain forms of art, and must not be unduly terrified by the word "Pagan." You will there read how, from the earliest times, a foreign influence was stamped on the work of the church-building Spanish race, an inspiration sometimes Romanesque and sometimes Byzantine in character, sometimes Aquitanian and sometimes Burgundian; Lombard Italy, too, we shall find here and there contributing a feature. In Leon we see later on a cathedral more purely French in character and design than any other in Spain; yet later, German elements, especially in ornament, are everywhere met. Finally, the Renaissance movement, to Italy the source of her highest achievements, but to Spain a baneful influence enough, asserted itself here as elsewhere. Now, you have observed in this summary enumeration that the dominant influence in Spanish architecture up to the sixteenth century was French, and this early French supremacy will not surprise you when you consider that the boundary of Spain was not then, as now, the Pyrenean range, and that the Spanish clergy was largely recruited from France. I call your attention to this circumstance as contrasting with the preponderating influence of Flemish art which we shall note when we speak of Spanish painting, and as marking the absence of any definite indigenous impulse. And of this want you will be made further conscious when, on closer examination of the chronology of Spanish architecture, you mark the simultaneous erection of buildings denoting in their character different periods, and when you see details of different and antagonistic styles picturesquely but incongruously elbowing one another in the same edifice, and become aware of the absence of any such continuous and organic development of a style as you witness, for instance, in the Gothic architecture of your own country. Nevertheless, while the Spaniards lacked the originating impulse in art, their ecclesiastical architecture was, even at an early date, often beautiful and always striking. Palomino, pious man, lays down in his "Museo Pictorico" a proposition concerning the origin of art in Spain which may here find a place, a proposition, however, on which you may feel disposed to suspend your judgment in the absence of further evidence. "St. James, the Apostle," he says, "when he came to preach Christianity in Spain, brought with him a number of images, the work of the glorious Evangelist, St. Luke; although those," he continues, "which were carved or in the round were, it is said, from the hand of Nicodemus, tinted only



by the Evangelist, of whom authors affirm,"—and here, in a note, a long array of Patristic authority,—"that he was only a painter, though I see no difficulty in his having been a sculptor also." Well, whatever may be the extent of our direct obligation to St. James, we owe to him indirectly the earliest of the great cathedrals which are the just boast of Spain, the Church of Santiago de Compostella, the work, however, not of a Spanish, but of a French architect, and, in fact, the twin design of St. Sernin at Toulouse. A cast of its famous "Portico de la Gloria" is familiar to you at the South Kensington Museum. I have drawn your attention to the fact that we much miss in Spain any definite process of architectural evolution; an exception should, however, to some extent be made in Catalonia, where a local style of pointed Gothic was formed of a distinctive and striking character. Again, there is in Castile a group of churches in which the addition of external open arcades,—sometimes, as in the case of San Vicente at Avila, on one flank, sometimes, as in the churches of Legovia, on two,—has the happiest effect, and may be said to constitute a type proper to this region. And it should be added that the Spaniards, whatever their aesthetic limitations, seized with an incomparably more powerful grip on the Gothic idea than ever did the Italians. I know of few things more curious than the absolute inability of the latter,—the most shrewd and subtly-gifted people of their day, and saturated with the artistic sense,—to grasp the spirit of Gothic architecture. Certain Gothic forms, indeed, they adopted; they pointed the openings with which, in obedience to their native instincts, they sparsely pierced the broad spaces of their walls; they made liberal use of crockets and unmeaning pinnacles; they accepted the vault, which is called the formative principle of Gothic building; but to the seed of life that lay in the principle of the vault they remained blind. An organism sustained by the balance of living forces, clothed in forms arising out of and expressing its constructive principle, and enriched with decoration emphasizing it, must not be sought at the hands of the Italians; indeed, in the matter, especially of external decoration, the use of the style seemed at times to paralyse their wits; for let no delight of mellow marbles, no glamour of age, no perfume of pleasant association blunt your sense to the unfathomable foolishness, for instance, of their too frequent treatment of the façades of churches,—witness, amongst others, that of San Michele at Lucca, which, towering by a third of its height above the building it masks, fitly expresses the vertical division of that building by innumerable rows of small colonnades piled in horizontal profusion one on the top of the other. Well, though you do not find in Spain the superbly logical development of this Frankish style that characterises the country of its birth, you do find the Spaniard alive to its vital conditions, and treating it as a plastic malleable thing; and you find him further imparting to it,—for good or for evil,—a strong impress of his own idiosyncrasy. The churches which mark the first centuries of the partially recovered independence of his country are instinct with the gloomy ferour and the masculine sobriety of his race. I know no two churches in any land in which this quality of masculine sobriety has more powerfully impressed me than the cathedrals of Tarragona and of Avila. The former is artistically the completer work in its more perfect balance of vigour and elegance, of unadorned spaces and enrichment; but it may be doubted whether the church in Avila, with its apsidal end carved bodily out of a bastion of the old town wall, is not even more impressive. The simplicity of these early churches is, of course, missed in the churches raised or completed during the days of heightened national self-consciousness and greater material prosperity, and gives place often to an unpruned exuberance of ornamentation in which the craving for the excessive, a craving unchastened by restraint of delicate taste, which was rapidly becoming a distinctive Spanish attribute, is strikingly displayed. We feel, however, that if in their sacred edifices the Spaniards fell into decorative incontinence, they were prompted, in part at least, by the impulse to give without stint whatever they thought their best to the exalting of their faith; and if their tendency to extreme enrichment led to regrettable excesses,—to the abuse of gold, for example, and to absolute orgies of gigantic bosses, of flaming

crockets, and of exorbitant armorial bearings,—we owe to it a decorative feature unique in its kind, always striking, and often of great splendour, the retablos. These structures, rising tier upon tier from the backs and flanks of the consecrated table, present in their blending of architecture, sculpture, and painting, a decoration sometimes, no doubt, barbarous, but often in a high degree impressive. To this tendency also we owe the development of the rejas, the noble metal screens which in a Spanish church close not only the choir and the capilla mayor, but also every recessed, lateral chapel. These screens, frequently admirable in design, rich and elegant in form, and judiciously relieved with colour and the precious metals, are an absolutely original creation of Spanish art, and conspire with the sumptuous retablos to give to Spanish cathedrals that gorgeousness of aspect in which all others lag far behind them. But if the churches of Spain are gorgeous in their aspect, their splendour is often tempered with a solemn gloom. The withholding of light seems to me to have been an object of study with the Spanish ecclesiastical architects, for it would, I think, be a very superficial view to regard the darkness of their churches as aiming solely at shady coolness. And I must, even at the risk of seeming fantastic, believe that under an impulse both characteristic and poetic, this gloom was occasionally produced and gathered up with definite intent to enhance the mystery of the sacrifice at the High Altar. In the cathedral of Barcelona, a church in which, according to Catalan custom, the lights are very restricted, a lantern is raised over the western bay of the nave, which bay, being made square, in order to carry the octagon, is, of course, larger than the others. The result is that the worshipper, entering from the west, finds himself in a broad, illuminated space, beyond which, as his gaze is drawn on towards the capilla mayor, brooding shadows seem to increase and thicken, intensifying that deep solemnity of coloured darkness which marks this church even amongst the most impressive in Spain. Nor is this the only instance I could quote of a similar effect produced, as I must believe, intentionally. But I may not linger unduly over one branch of my subject, and, with a few words on the effect of the Renaissance movement in Spain, I will pass on to other topics. This movement resulted first in a style known as the "Plateresque," the silversmith's style, which bore fruit in some very picturesque, if not very pure, specimens of architecture, but which did not supersede the intricate half-Gothic at that time in force. On the contrary, the two styles joggled on side by side, often by a friendly compromise, and in most admired confusion, on the surface and in the structure of the same building. Later on a more severely classic style began to assert itself, but never with results wholly satisfactory; its efforts were frequently feeble and generally unscholarly. One artist, Diego de Siloe, sought in a vast cathedral to blend classic forms with Gothic construction, and those who wish to see what disastrous results may attend such an attempt in the hands even of a capable man are referred to the cathedral of Granada. On the other hand, if you would see how much a man of mediocre gift may, obeying, perhaps unconsciously, the spirit of his age, embody of that spirit in a pile of stone, you will be inclined to view with more interest than is generally vouchsafed to it by artists, the palace-convent of the Escorial. A huge, forbidding block of buildings, turning a blind, blank back on the world, which seems to stretch out indefinitely below it, raised on a slope hemmed in on three sides by an amphitheatre of barren rocks, admitting light through fewer and smaller openings than ever pierced so large a surface, rigorously bare of any adornment, it seems to me to gather up in its expression the very essence of crushing, silent, inexorable tyranny. When, in due course, the "Rococo" in art began everywhere to reign, the Spanish itch for the excessive seized on it with avidity, and in the palace of the Marques de dos Aguas, in Valencia, you may see the supreme effort of its most lunatic vagaries.

**The New Opera-house in Stockholm.**—Three designs have been invited and furnished for the new Opera-house to be built in Stockholm, but none has as yet been selected. It is to be situated in the market-square of Gustavus Adolphus, and the work will shortly be taken in hand.

#### PROPOSED AMENDMENTS OF THE METROPOLITAN BUILDING ACTS.

THE London County Council, in their General Powers Bill, which is to be submitted to Parliament next Session, are seeking to make certain amendments in the Metropolitan Building Act. We give the text of the sections in which the new powers are sought:—

"60. *Approval of Plans under 'Metropolitan Building Act,' 1855.*—The approval by the Council of any plans or particulars under the provisions of the 'Metropolitan Building Act, 1855,' or any Act amending the same, shall be signified by writing under the hand of the Superintending Architect of Metropolitan Buildings and countersigned by the Chairman or acting Chairman for the time being of the Building Act Committee of the Council or by any other person appointed for that purpose by the Council.

"61. *Appeal against Certificate of Architect as to General Line of Buildings.*—The Superintending Architect shall within fourteen days after certifying the general line of buildings in any street, place, or row of houses, cause a notice of his certificate to be given to or served on the Vestry or District Board of the Parish or District and to be given to or served on the owner of the building or land in reference to which the general line of buildings has been certified, and on the owner of the next adjoining houses or land upon each side of the building or land in reference to which the general line of buildings has been certified. And such notice may be given or served in accordance with the provisions of Section 98 of The Metropolitan Building Act, 1855. The Vestry or District Board, or any person deeming himself aggrieved by the certificate of the Superintending Architect, may, within fourteen days after notice of such certificate has been given or served, appeal to a tribunal to be constituted as hereinafter provided:—One member to be from time to time appointed by the Council; one by the Royal Institute of British Architects; and one by the Institution of Surveyors; and every such appeal shall stand referred to such tribunal, who shall have power to confirm or reverse or vary such certificate, and the decision of such tribunal, whether it confirms, or reverses, or varies such certificate, shall finally determine the general line of building, and such tribunal may order any costs of any such appeal to be paid to or by the Vestry or District Board or person appealing.

"62. *Power to authorise Larger Buildings without Party Walls.*—Notwithstanding anything contained in 'The Metropolitan Building Act, 1855,' section 27, sub-section 4, a warehouse or other building used wholly or in part for the purposes of trade or manufacture may, with the consent of the Council, contain any number of cubic feet exceeding 216,000, but not exceeding 450,000, without being divided by party walls, or if consisting of more than one division, every or any division thereof may, and with the like consent, contain more than 216,000 cubic feet, provided it do not contain more than 450,000 cubic feet.

"63. *Centre of Roadway.*—The term 'centre of roadway' in relation to any passage or way not formed into a road shall mean the centre as determined and laid down by the Council, and the centre of the roadway when so determined and laid down, or the centre of the roadway of any road, passage, or way which has been formed as a road, shall not be altered without the consent of the Council.

"64. *Power to Council to make Bye-laws with respect to Materials for Plastering, and within 3 ft. of Sites.*—The Council may from time to time make, alter, and repeal such bye-laws as they may think expedient with respect to the following matters:—(1) The description and quality of the substances of which plastering is authorised to be made; (2) The mode in which and the materials with which any excavation made within a line drawn outside the site of a house, building, or other erection, and at a uniform distance therefrom of 3 ft., shall be filled up; (3) The duties of District Surveyors in relation to such plastering or excavation, and the regulation of the amounts of the fees to be paid to such District Surveyors as part of the duties imposed upon them by any such bye-laws; all the provisions contained in Sections 202 and 203 of 'The Metropolis Management Act, 1855,' as to the making, publication, and evidence of by-laws and as to penalties for breach of the same, and the remission of such penalties, shall extend and apply to the making,



publication, and evidence of by-laws made by the Council, under the authority of this Act, and the penalties for breach of any such by-laws and the remission of such penalties.

65. *Use of Houses, &c., as Public Buildings.*—It shall not be lawful to use or to convert or alter into a public building any building erected for a purpose other than a public purpose, without the consent in writing of the Council, and the Council may give their consent, subject to such regulations and conditions as they may think fit. Any person using as, or converting or altering into a public building, any building erected for a purpose other than a public purpose, without the consent of the Council, or without the observance of all the terms and conditions on which such consent has been given, shall be liable to a penalty not exceeding £1. for every first offence, and to a further penalty not exceeding 40s. for every day on which such offence shall continue after the day on which the first penalty is incurred, to be recovered by summary proceeding.

66. *Notice to be given to the Vestry or District Board of building or demolishing any house, building, or wall.*—Every person who shall intend to build or take down any house, building, or wall, within 30 ft. of any public thoroughfare shall give notice of such intention to the Vestry or District Board of the parish or district in which such house, building, or wall is situate, and shall, before commencing to build or take down any such house, building, or wall, cause to be put up such board or fence, with a convenient platform and handrail, if there be room enough for the same, to serve as a footway for passengers outside of such board or fence as the Vestry or District Board may think to be proper and sufficient, and shall continue such board or fence and such platform and handrail standing and in good condition to the satisfaction of the Vestry or District Board during the building or taking down of any such house, building, or wall, unless the Vestry or District Board shall give their consent in writing to its previous removal, and shall, when required so to do by the Vestry or District Board, cause such board or fence and such platform and handrail to be well lighted during the night. Every person who fails to give such notice to the Vestry or District Board, or who commences to build or take down any such house, building, or wall without causing to be put up such board or fence, with or without such convenient platform and handrail, or who does not continue such board or fence, with or without such convenient platform and handrail in good condition, to the satisfaction of the Vestry or District Board, as aforesaid, or who does not, when required so to do, cause such board or fence, with or without such platform and handrail, to be well lighted during the night, shall, for every such offence, be liable to a penalty not exceeding £1. and a further penalty, not exceeding 40s., for every day on which such offence shall continue after the day on which the first penalty is incurred, to be recovered by summary proceeding.

67. *Buildings Abutting on more than one Street.*—The Superintending Architect to the Council, for the time being, shall, in setting out the general line of building in any street, place, or row of houses, decide, so far as affects any building, structure, or erection to be erected after the passing of this Act, and which will abut on any other street or streets, place or places, or row or rows of houses, the general line of building in such other street or streets, place or places, or row or rows of houses, and no building, structure, or erection to be erected after the passing of this Act shall, without the consent in writing of the Council, be erected beyond the general line of building, in such other street or streets, place or places, or row or rows of houses, in case the distance of any such general line of building from any highway does not exceed 50 ft., or within 50 ft. of any highway, when the distance of any such general line of building therefrom amounts to or exceeds 50 ft., notwithstanding there being gardens or vacant spaces between the general line of buildings and any highway; and in case any building, structure, or erection be erected or be begun to be erected or raised after the passing of this Act, without such consent or contrary to the terms and conditions on which the same may have been granted, the owner or occupier of the premises, or the builder, shall be deemed to be engaged in a work contrary to the provisions of Section 75 of 'The Metropolis Management Act, 1862,' and it shall be lawful for the Council, the Vestry of the Parish, or the Board of Works

for the District in which such building, structure, or erection is situate, to take proceedings against such owner or occupier or builder under the provisions of the said section.

68. *As to Extension of any part of a Building within certain distance from centre of road.*—No person shall, after the passing of this Act, extend any building, structure, or erection upon a site not previously occupied in whole by a building in such manner that any part of the external wall of such extension shall be in any direction at a less distance than 20 ft. from the centre of any roadway used as a carriage-way, or than 10 ft. from the centre of any footway used for foot traffic only (not being an approach road, passage, or way to a single private dwelling-house), without the consent in writing of the Council; and the Council may give their consent subject to such conditions and limitations as the Council may think proper to prescribe. If any person shall, without the consent in writing of the Council, extend or begin to extend any such building, structure, or erection in such manner that any part of the external wall thereof shall be at a distance less than 20 ft. from the centre of any roadway used as a carriage-way, or than 10 ft. from the centre of any footway used for foot traffic, any passage or way, or without conforming to the conditions and limitations which the Council have thought proper to prescribe, he shall be liable to a penalty not exceeding £5, and to a further penalty not exceeding 40s. for every day on which such offence shall continue after the day on which the first penalty is incurred, and to be recovered by summary proceedings.

69. *Laying-out of new Carriage-ways.*—No road, passage, or way which will not directly communicate at both ends with a public carriage-way shall be formed or laid out for the purposes of a public carriage-way without the consent in writing of the Council, and in giving their consent the Council may prescribe all such conditions as they may think fit. Any person forming or laying-out any such road, passage, or way, without the consent in writing of the Council, or without complying with all such conditions as the Council or the Arbitrator may have prescribed, shall for every such offence be liable to a penalty not exceeding 40s., and to a further penalty not exceeding 20s. for every day on which the offence is continued after the day on which the first penalty is incurred. Provided always that in case any person intending to form or lay out any road, passage, or way, as a public carriage-way considers that any of the conditions prescribed by the Council are unreasonable, such person may within fourteen days after the receipt of the order of the Council serve notice of appeal against the same upon the Council, and thereupon such appeal shall stand referred to an arbitrator to be appointed by one of Her Majesty's principal Secretaries of State at the request of either party, whose decision shall be final upon the question, and such arbitrator shall have power to make such order as to payment of costs as he may think expedient.

70. *Height of Buildings.*—No building shall be erected after the passing of this Act of a greater height than 70 ft. without the consent in writing of the Council, nor shall the height of any building be at any time subsequently increased so as to exceed the height of 70 ft. without such consent, and in determining the height of any such building the measurement shall be taken from the ground level to the level of the top of the parapet, or where there is no parapet to the level of the top of the external vertical wall. Every person committing any offence under this enactment shall be liable to a penalty of £100, and in case of a continuing offence to a further penalty of £10 for every day during which such offence shall continue after notice from the Council, to be recovered by summary proceedings.

**Rome a Seaport.**—Just as the case has been with Paris and Berlin, a scheme has also been prepared for making Rome a seaport. It has been approved by M. de Lesseps, and is now under the consideration of a committee composed of the Prefect of Rome, a well-known shipowner, a member of the Municipal Council, and two superior military and naval officers. The plan is to construct a canal 50 metres in width and 10 metres in depth from the Tiber in the vicinity of the Church of St. Paul to the sea at Castel Fusano, the length of the canal being about eight miles. An American Syndicate has offered to undertake the work, the cost being estimated at 68 million francs.

## SANITARY INSPECTORS: THEIR STATUS AND QUALIFICATIONS.

THE two first monthly meetings of the present session of the Association of Public Sanitary Inspectors have been occupied with the discussion of the position of Sanitary Inspectors, especially in view of the question of test examinations for their qualifications.

The inaugural address of the session was delivered, as already mentioned, by Mr. Hugh Alexander, the President of the Council. It was mainly directed to the point that the examinations and certificates of the Sanitary Institute continued to be very prejudicial to the interests of sanitary progress. With a body of gentlemen of the highest eminence, and moved by the best intentions, the examinations continued unsatisfactory, and the certificates given as the result of passing the examinations continued unreliable. The question had so important a bearing not only upon one of the leading objects of the Association, which was to raise the status of the Public Sanitary Inspector, but also upon the public health, that he believed the time had come when further action should be taken in the matter. It would be remembered that in February last the Council had by invitation waited upon the Council of the Sanitary Institute to urge that no candidate should be entered for examination who could not give proof that, by previous occupation and practical experience, he possessed the elements of a qualification which might reasonably justify the examiners in believing that he would be fit to discharge the duties of a Sanitary Inspector. In the absence of practical knowledge such as the Association asked for, no such expectation could be justified, and the consequence was that the granting of certificates by the Institute defeated its own end, the tendency of the present system being not to improve the status and the real efficiency of Sanitary Inspectors, but to the multiplication of inefficient, underpaid, and unauthoritative officers.

In consequence of the representations of the Association, a promise had been given last March that, "as far as practicable," efforts should be made by the Council of the Institute to improve the character of the examination in the direction pointed out by the Public Sanitary Inspectors. Nothing had, however, been done answering to the promise given, and the time had come when they should ask themselves whether they ought to feel content to let the good work so well begun by the Association, with the aid of their great president, Sir E. Chadwick, in educating public opinion on sanitary subjects, suffer through the ministrations of an examining body which seemed incapable of introducing such reforms into its examinations as were necessary to prevent its being a pernicious in place of a salutary influence in sanitation. In a letter to the *Times*, an eminent member of the Institute itself, Dr. C. H. Allfrey, had stated perfectly the leading qualifications required, in suggesting that the Sanitary Institute, in virtue of its new charter, should educate for as well as grant a qualifying diploma. He said:—

"The Sanitary Surveyor should be well versed in all the technical and practical details of sanitary engineering and construction, as well as in their theory. He should possess a sound knowledge of physical laws and of applied chemistry. He should be competent to test practically the soundness of drains, connections, &c., and should not be above such work. At the same time, he should be of such social standing as to be above suspicion of being liable to yield to undue influence, or to be a party to jobbery of any sort. It will be a happy day for ratepayers when public bodies awake to the sense of the fact that the judicious investment of income in productive 'brains,' by giving liberal salaries to competent surveyors, pays better by the improvement in the public health, and costs less than an enormous expenditure of borrowed capital sunk in unremunerative 'bricks and mortar.'"

The reply of the Registrar of the Institute that they had done what they could, and citing the establishment of courses of lectures as sufficient evidence of this, neither satisfied the public, that Association, nor even the Council of the Institute, for Dr. Duffield, Mr. Cassel, and Mr. W. R. E. Coles were as little satisfied as Dr. Allfrey, who had, all or some of them, felt compelled to retire from the Council because they found all their efforts to reform its policy met by do-nothing silence. The "Report of the Royal Commission on the Housing of the Working Classes" had in vain recommended the appointment in all cases of persons practically acquainted with building or construction to the position of Sanitary Inspector. This recommendation, together with the opinion of the most eminent experts and the greatest practical authorities, had been disregarded and overturned. Men like Dr. Verdon (Medical Officer of Health of the great Parish of Lambeth) had in vain pointed out the acquirements which in the present day were



demanded as absolutely necessary for the office, for the Institute continued to make it easy for unsuccessful schoolmasters, and even railway porters without pretension to the possession of practical knowledge, to obtain the diploma of the Sanitary Institute. Dr. Verdon pointed out in his last report that the qualifications formerly regarded as sufficient were no longer sufficient qualifications for the aspirant for the position of Sanitary Inspector. He said:—

"Builders, plumbers, and the heterogeneous body of workmen engaged in connexion with sanitary work are not long in estimating at its proper worth the practical ability of the man whose instructions it is their duty to follow; nor are they slow in finding means to evade the supervision and directions of a chief whose opinions they have learned to despise. Although perhaps not deeply versed in sanitary matters, the ratcatchers and the workmen alike look for the presence among them of a man who, having a practical knowledge of his profession, can speak with authority."

The paper ended by enunciating several conclusions, the chief of which were that the influence of the Sanitary Institute tended not to improve, but to retard the improvement of the status of the Sanitary Inspector, to stultify sanitation and retard the development of sanitary science by the facility it gave for obtaining certificates by persons not possessing the necessary qualifications for inspectors, local authorities being thereby misled into appointing inefficient men at inadequate salaries because they were possessed of the Institute's certificate, a certificate which could be obtained by three months' cramming by persons having no practical qualifications whatever.

Mr. Poulson, Mr. Green, and other members, in the discussion which followed, deprecated the continuous attacks made upon the Institute, which had done much to advance sanitary science—but the Chairman's views were endorsed by a majority of the speakers, and, after a vote of thanks had been accorded, a resolution on the subject was put to the vote, and carried on the proposition of Mr. Wootton (St. George's-in-the-East), seconded by Mr. Fairchild.

The resolution expressed regret that in the examinations of the Sanitary Institute for certificates as Sanitary Inspectors, there was not demanded a basis of practical and theoretical acquaintance with building construction as recommended by "The Royal Commission on the Housing of the Working Classes," and deprecating the examinations as tending not to promote the interests of the public health and not to improve the status of Sanitary Inspectors, but rather to the production of a body of underpaid, inefficient, and weak officers.

An amendment proposing the adjournment of the discussion was lost, and the resolution, on being subsequently put, was carried by a small majority.

At the last meeting of the Association, which was held, by permission of the Carpenters' Company, at Carpenters'-hall, London-wall, on Saturday last, a paper of much interest and of great importance at the present moment was presented by Mr. Edward C. Robins, F.R.I.B.A., &c., who, to many other qualifications to take part as an authority in the course of the polemic between the Association and the Sanitary Institute, adds those of a founder of the Association of Public Sanitary Inspectors, a member of the Board of Examiners of the R.I.B.A., and a trusted adviser of the Sanitary Institute. The title of Mr. Robins's paper, "Reasons for the adopting of uniform title of Sanitary Inspector and suitable test examinations," was but little suggestive of its contents, which dealt in the earlier portions with the radical change which the successive steps of progress realised by sanitary science during the last thirty years have effected in the duties and the position of sanitary officers, whether known as Public Sanitary Inspectors, Inspectors of Nuisances, Building Inspectors, or by other titles. The latter portions of the paper, besides dealing with the subject of test-examinations within the Association, goes into its relations with the Sanitary Institute, and its possible relations with the Royal Institute of British Architects and its members, and with members of the medical profession. In many previous addresses and papers the lecturer had evinced not only his complete grasp of all the questions involved, but his interest in and consideration for the Association, and he appealed, probably not in vain, to some of these efforts before administering to the Association, as he does near the end of his paper, what may be regarded as a benevolent reproof of that which is termed "a hasty judgment, based on insufficient and incorrect

data." As early as 1852 the lecturer recognised that eventually the Inspector of Nuisances would have much higher duties to perform than those contemplated by the legislation of that period, and that he would have to cultivate more and more "a better practical and theoretical acquaintance with sanitary science generally." The earlier Sanitary Acts, down to the settlement made by that of Lord Llanover, passed in 1855, only contemplated duties of a simple character, "having relation chiefly to surface cleanliness and the removal of refuse,"—duties which an intelligent policeman might be expected to be capable of having properly carried out. "But," said the lecturer, "we have now come to know that the greatest sanitary evils are not necessarily those which lie on the surface, but, on the contrary, are those which are hidden from view; we have come to know that decomposition of material substances in the open air, though bad enough, is infinitely more deleterious where confined to drains and sewers which become elongated cesspools; that inefficient laying or faulty construction; that the concentration and pressure of foul atmosphere in pipes laid on to the houses of the inhabitants who have no other outfall for waste waters and for solid excreta is a danger to health which is only to be averted by special appliances, which were not thought of at the time the office of inspector was established. For a long time shallow water-traps were considered all-sufficient protectors, and the syphoning of such traps by the use of the apparatus, or the evaporation of the water itself, was not considered or provided for. The ventilation of soil-pipes was a thing unknown, and the introduction of inlets for fresh air, and outlets for foul air, were considered refinements rather than necessities of the system of water carriage in house drainage. The direct laying of pipes from man-hole to man-hole, and the embedding in concrete of pipes under houses, and the separation of the waste, and soil, and water drainage, and their separate ventilation, were things undreamt of in those days. The separation of w.c. and drinking-water cistern services was not even then thought a desirable thing, and the cistern waste was directly connected with the soil drains, and thus the delivery of pure water was a problem left unsolved and uncared-for. The plan of testing horizontal and vertical pipes, when completed, as to their impermeability by air or water, was not formulated and was not practised, and there were no Sanitary Protection Associations with staffs of resident and consulting engineers and surveyors; and ventilation generally was, comparatively speaking, ignored."

Education of the right sort, said Mr. Robins, is what is now needed most in every branch of intelligent inquiry. That is to say, a thorough practical and theoretical acquaintance with all that relates to the special duties undertaken. "Less than best," he adds, tersely, "comes short of modern requirements."

Coming to the points at issue between the Association and the Sanitary Institute, the lecturer declared that in him the Association had an advocate in the Institute, his mind having been exercised, if not biased, in the direction of its views, but he warned the Association that it seemed "to have become intolerant, as well as impatient" in not allowing for the differences of opinion which, naturally enough, existed in the minds of the members of other bodies as to what constituted the proper qualifications of candidates for examination. The suggestion was made that the Association should, itself, institute a test examination of fitness for exercising the duties of the office of sanitary inspector, and should itself draw the line between competent and incompetent men. Following the present practice of the Royal Institute of British Architects, the lecturer asked "Why should you not say that no full members shall have had less than two years' official experience, having previously passed the Sanitary Institute's final examination, or been at least seven years a recognised and efficient sanitary inspector? Why not say that no associate member shall be henceforth admitted to your Association who has not passed the preliminary examination at the Sanitary Institute? And then, when you next make your representation to that body, show your willingness so to rehabilitate your own order that it may embrace the application of the proposed amended system of examinations."

Admitting that there was much to be said in favour of the contention of the Association, that "no man who had not had some experience

of and knowledge of the building trades should be admitted to the privilege of examination for the office of sanitary inspector," he still maintained that that was very debatable ground, and he warned the Association that it was unfair to the 385 gentlemen who had passed the Institute's examinations, and that it would do no good to attack the Institute, to denounce its claims to the confidence of the public, or to hold it up to contempt by passing condemnatory resolutions, deprecatory of its examinations as "not tending to promote the interests of the public health nor to improve the status of the inspectors." Mr. Robins declared himself in entire sympathy with the appeal made by the Chairman of the Council of the Association (Mr. Alexander) in his paper read at Hastings on "The Status of Sanitary Inspectors," which he considered a very able paper, but he pointed out the difficulty, — one which the Institute had done its best to meet,—of deciding upon the nature of a test examination for sanitary inspectors, so long as their salaries ranged from 10*l.* a year to 300*l.* In conclusion, the lecturer said he thought that the Association should accept the Institute's Examination for Inspectors for the 165 offices where the salary is below 150*l.* a year, while the sixty officers with salaries above 150*l.* should pass the examination for "Building Surveyors" of the Royal Institute of British Architects, to which Institute the Association was recommended to appeal to get a definition of their position; and for forwarding an application of this nature, the lecturer offered his willing services.

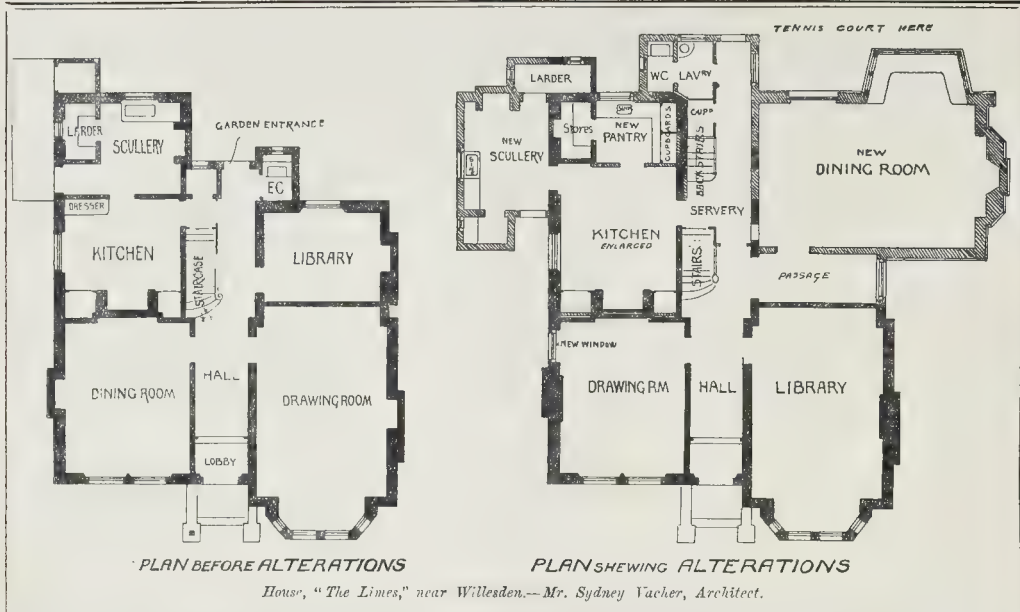
In an addendum to his paper, Mr. Robins admitted, after reading a series of printed reports made by Mr. Alexander to the Medical Officer of his district (Shoreditch), that it was essential for London inspectors, at all events, to possess the qualifications that an architect would require in a clerk of works, or that a builder would require in a foreman. In all probability, he said, the Sanitary Institute would amend the present examination to meet the requirements of the day, and might require from candidates some practical knowledge, and give evidence of earnestness by their constancy of attendance upon the various means provided for his help in the study of sanitary science in its application to the needs of practical life.

A discussion, which it was soon evident would have to be adjourned, was then commenced by the chairman, Mr. Alexander, who pointed out that it was precisely because an inspector whose services might be valued at 30*s.* a week could not be expected to know much about the "hidden causes of disease" that the Association demanded the appointment of those only who possessed a knowledge of building construction. The Association had never denied the value of the examinations of the Sanitary Institute, so far as they went; but they strongly protested against the use made of the pass, which was advertised in such a way as to mislead persons and to induce them to accept as competent sanitary inspectors men who had none of the essential qualifications for the proper discharge of the duties of the office. Nobody would deny the great influence of an Institute, which had amongst its leading members such men as Sir Douglas Galton, Dr. Richardson, and Mr. Robinson; but he did not think that a sufficient reason why they (the members of that Association) should be tongue-tied.

A vote of thanks, on the proposal of Mr. Hearne, seconded by Mr. Wootton, was accorded to Mr. Robins, and expressions of opinion on both sides of the main question were offered by Messrs. Dee, Poulson, Perry, and Green, and the discussion was adjourned to the 21st inst., when Mr. Robins promised to again attend.

**The Projected Channel Bridge.**—A Reuter's telegram from Paris, dated Dec. 5, and appearing in the *Daily News* of the 6th inst., says:—"One of the directors of the Channel Bridge Company yesterday visited the Minister of the Interior, to whom he officially proposed the scheme, at the same time submitting the project drawn up by the engineers, M.M. Schneider and Hersent, Sir John Fowler, and Mr. Benjamin Baker. It appears that in order to remove the objections brought forward against this bridge by the shipping interests in England, it is proposed that a sort of harbour shall be constructed between the two banks existing in the middle of the Channel, and over which the bridge will pass."





### Illustrations.

#### THE CENTRAL LANTERN, CHÂTEAU DE CHAMBORD.

**T**HE Château de Chambord was erected by King Francis I., on his return from his Spanish captivity in the year 1526, in the curious style which is now called after him; a style in which Classic detail is wedded, as in the Elizabethan, to Mediæval grouping, proportion, and features, but is, nevertheless, treated with a delicate good taste and refinement to which the English style cannot lay claim. This lantern is the central feature of a chaos of high roofs, chimneys, and dormers, above which it does not rise sufficiently high for satisfactory grouping. It encloses a spiral staircase of great elegance, but much too small for its important position in the building.

#### GORTON PUBLIC BATHS.

THIS design was submitted in a recent competition, an attempt being made to express outwardly, as far as possible, the internal arrangement. The central block on the ground-floor level is utilised for spacious first and second-class entrances, the check-taker being so placed as to serve for both; the lobbies immediately open into small waiting-rooms, from which a corridor leads right and left to the private bath-rooms in the wings of the main front; these portions are open to the roof, and louvered for the purpose of securing ample ventilation; a small staircase in the rear of this block provides access on the first-floor to a committee-room with retiring-room attached, and on the half-landing to a small gallery to the first-class swimming-bath.

The swimming-baths—first and second class—are planned side by side at right angles to the main front. The buttresses are divisions of solid brickwork between every fourth dressing-box to take the large trusses of the main roof; the boxes themselves being kept low, with a flat over, so that the piers externally may be brought into bold relief; whilst arches are thrown from pier to pier to take the inner wall. Heating and drying-rooms were placed in the basement, with a distinct entrance from the street level. The architects are Messrs. Mitchell & Butler; the view is taken from a drawing hung this year at the Royal Academy.

#### PORCH, ST. PETER'S CHURCH, WALPOLE.

IN Domesday Book mention is made of the parish of Walpole. Its name is derived from the great wall or sea bank raised to defend it, and from a pool of deep water near to that wall.

The porch is one of the finest in the county, although there is, I believe, a very good one at Salle Church. The arms on the front are those of the Danver and Goddard families, quarterly with Goddard's crest. These were probably the chief benefactors to the building of the church.

The bosses to the vaulting are in a good state of preservation, and worth a careful study. The old oak doors are very beautiful, but were equalled, if not excelled, by the door at the west end. Unfortunately, this is now much mutilated.

The room over was formerly used for the village school, and this probably accounts for the modern doorway which leads direct into the porch.

The church is a very lofty and spacious one, consisting of nave, north and south aisles, and chancel. The stairs to the roof-loft are intact, but only the lower portion of the screen remains, on which there are some very good paintings.

The chancel is raised considerably above the nave. This is caused by a beautifully-vaulted passage which passes beneath.

Blomefield, in his "History of Norfolk," says:—"The ascent to the communion-table consists of many steps. Under it is an arch, which will contain many horses for the use of those parishioners who are obliged by the badness and length of the ways to come on horseback to church."

Another reason assigned is that there had always been a public footpath here, and to avoid blocking it this passage-way was made.

According to the same author, the windows of the church were filled with stained glass. There are now only a few fragments left in windows in the north aisle. On the wall of the south aisle, over the doorway, traces of a beautiful fresco, probably St. Catherine, can be seen.

ALBERT W. CLEAVER.

#### ALTERATIONS TO "THE LIMES," DONNINGTON - LANE, WILLESDEN. SKETCH OF DINING-ROOM (INTERIOR).

THIS house, which is of the ordinary speculative builder plan, has just been bought, and is being re-arranged by Mr. I. C. Tennant, builder, of Willesden Green, under the superintendence of Mr. Sydney Vacher, architect.

The plans show the extent of the alterations, which also comprise the entire re-arrangement and relaying of the drains.

#### SIR GEORGE MONOUX'S SCHOOL, WALTHAMSTOW.

THE illustration shows the design accepted, in competition, by the Governors of the Sir George Monoux's Charity. The school-building

is designed to accommodate for the present 240 scholars, and is divided into six class-rooms of equal size; the three class-rooms on the east side of the building can be converted into one large hall by means of revolving shutters.

The plan is so designed that an extension can easily be made to accommodate a further 120 pupils by means of three extra class-rooms.

The elevations are of stock brick with a Staffordshire blue brick plinth, Leicester red quoins, &c., and red Mansfield stone-sills, coping, &c. The roofs are to be covered with green slates, the hall is paved with tiles, and the corridors with Wilkinson's granolithic concrete.

The building is to front Marsh-street, Walthamstow, and adjoins the public recreation-ground.

The contract price is 2,895*l.*, and the builders are Messrs. Green & Lea, of Hackney and Walthamstow. The joint architects are W. Jacomb Gibbon and J. W. Stanley Barnmaster. Certain modifications had to be made in the plan to suit the requirements of the Charity Commissioners, consequently the plan does not quite correspond with the elevation published.

#### OFFICES, WOOD-STREET, NORTH-AMPTON.

THESE offices are the latest addition to the large and increasing bookbinding and account-book manufactory (which, altogether, covers between 14,000 and 15,000 square feet of ground) of Messrs. Birdsall & Son.

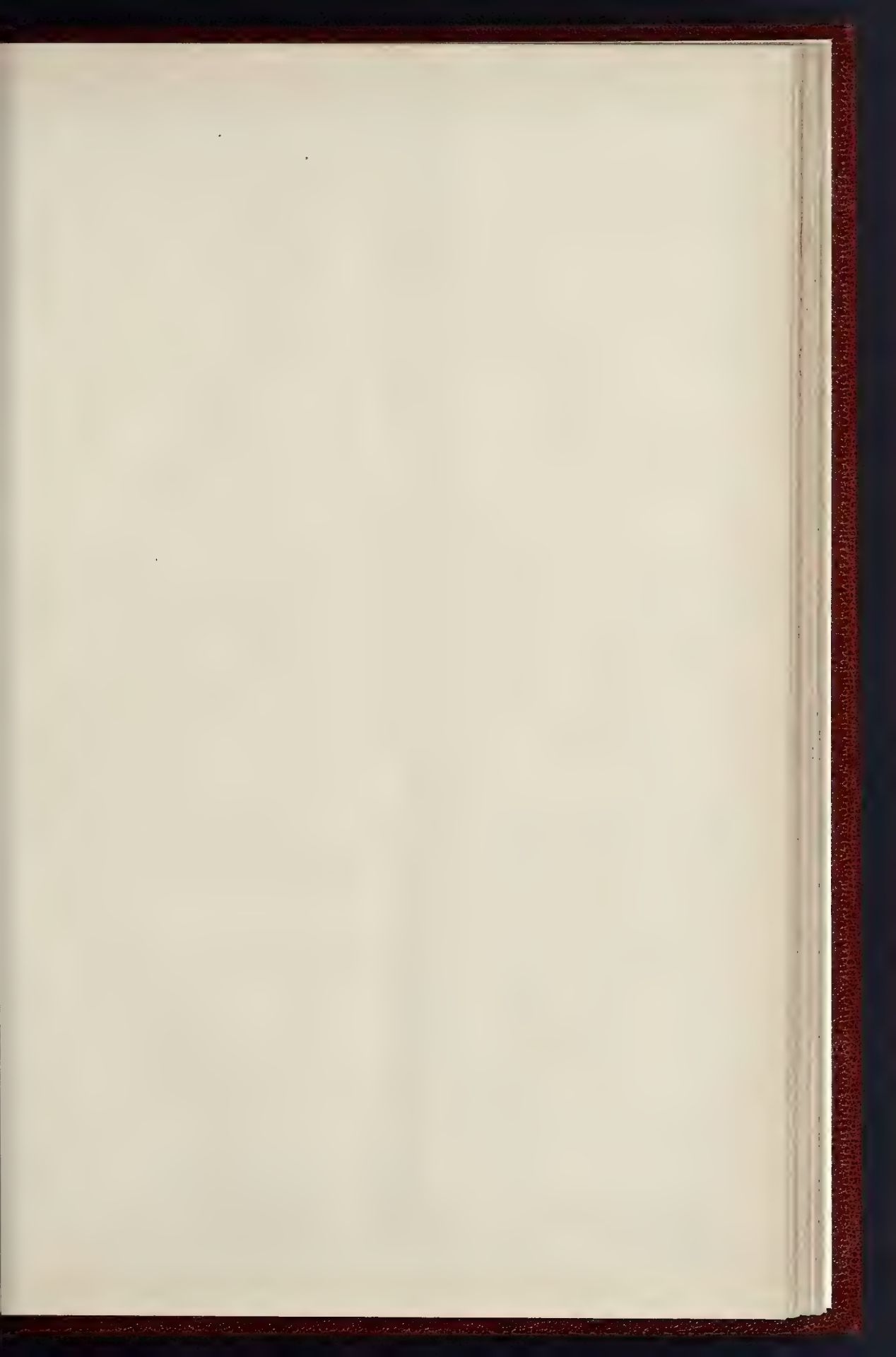
In the *Builder* of January 27, 1883, plans of an addition to this factory were published, specially arranged with a view to obtaining the best possible light for the various processes through which a book has to pass from its collating and stitching, through its "forwarding," to the "finishing" which, in high-class work, is of a most delicate and artistic nature.

The addition made last year has frontages to Wood-street and Union-street of 40 ft. and 80 ft. respectively, the former being the principal entrance front.

On the ground-floor there are binding and stationary show-rooms left and right of the entrance, principals', cashier's, and clerks' offices, whilst the designers' desks are arranged under the windows on the north side. At the extreme end is the workmen's entrance, and adjacent to it a large receiving and packing-room with lift. A fireproof room adjoins the principals' office for the better security of valuable books and documents entrusted to their care. A staircase has been placed in the centre of the new block communicating with the basement and two upper floors, and a second staircase for the workmen in the packing-room.

The basement and top story are almost





\*Imperial Mansions\*

\* Oxford Street W \*

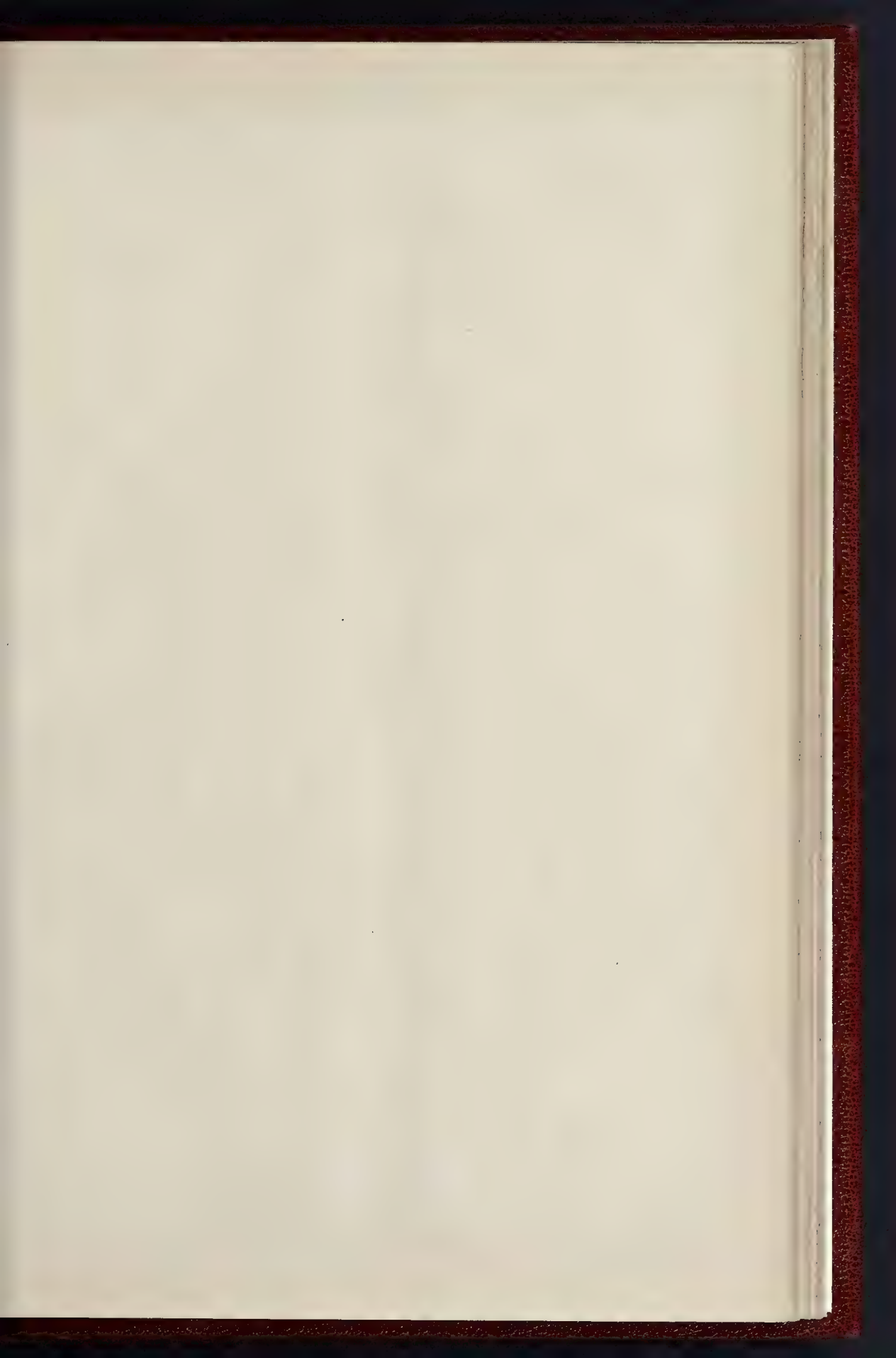
Messrs Martin & Purchase  
Architects

## Architects

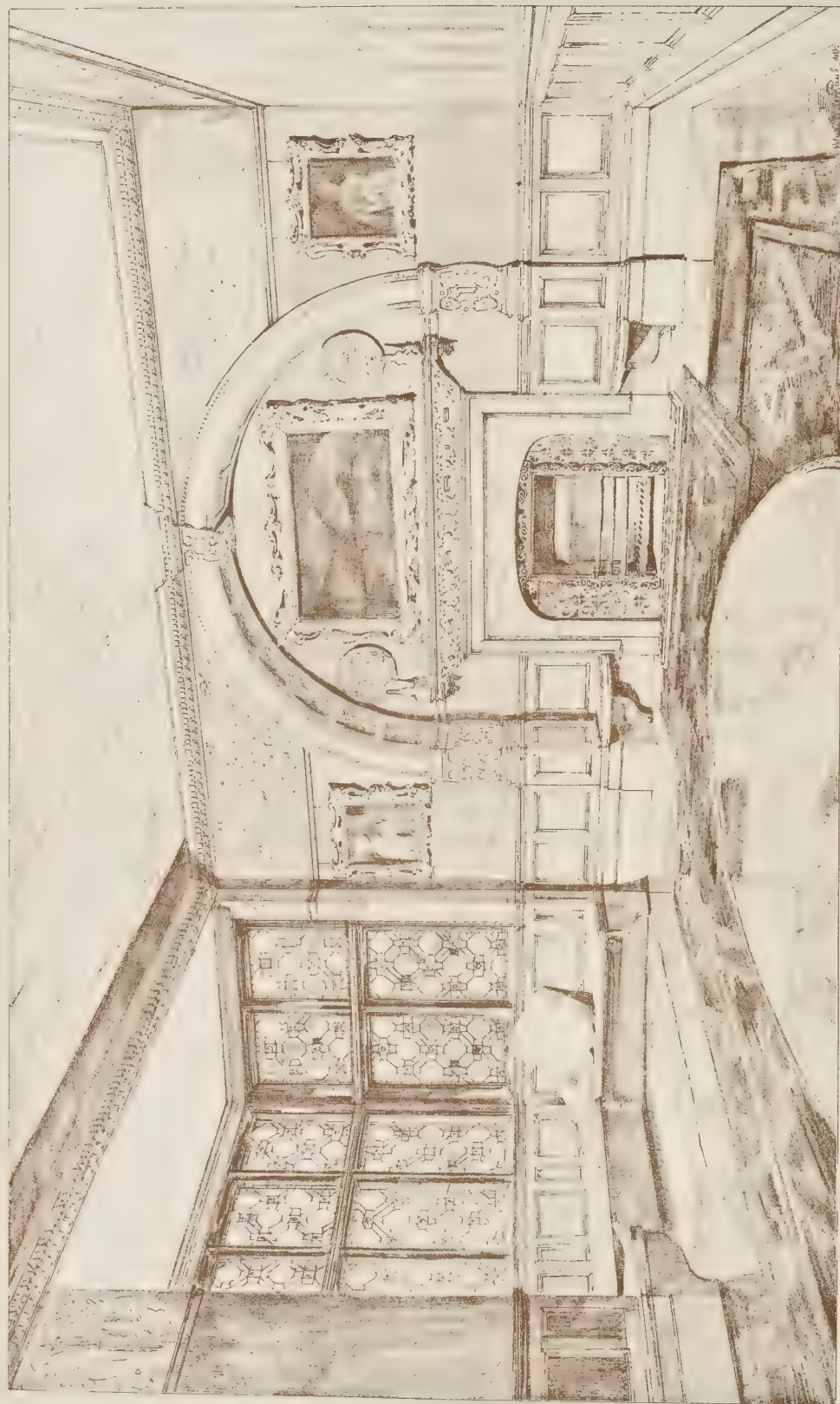
Mission House Chambers E.C.





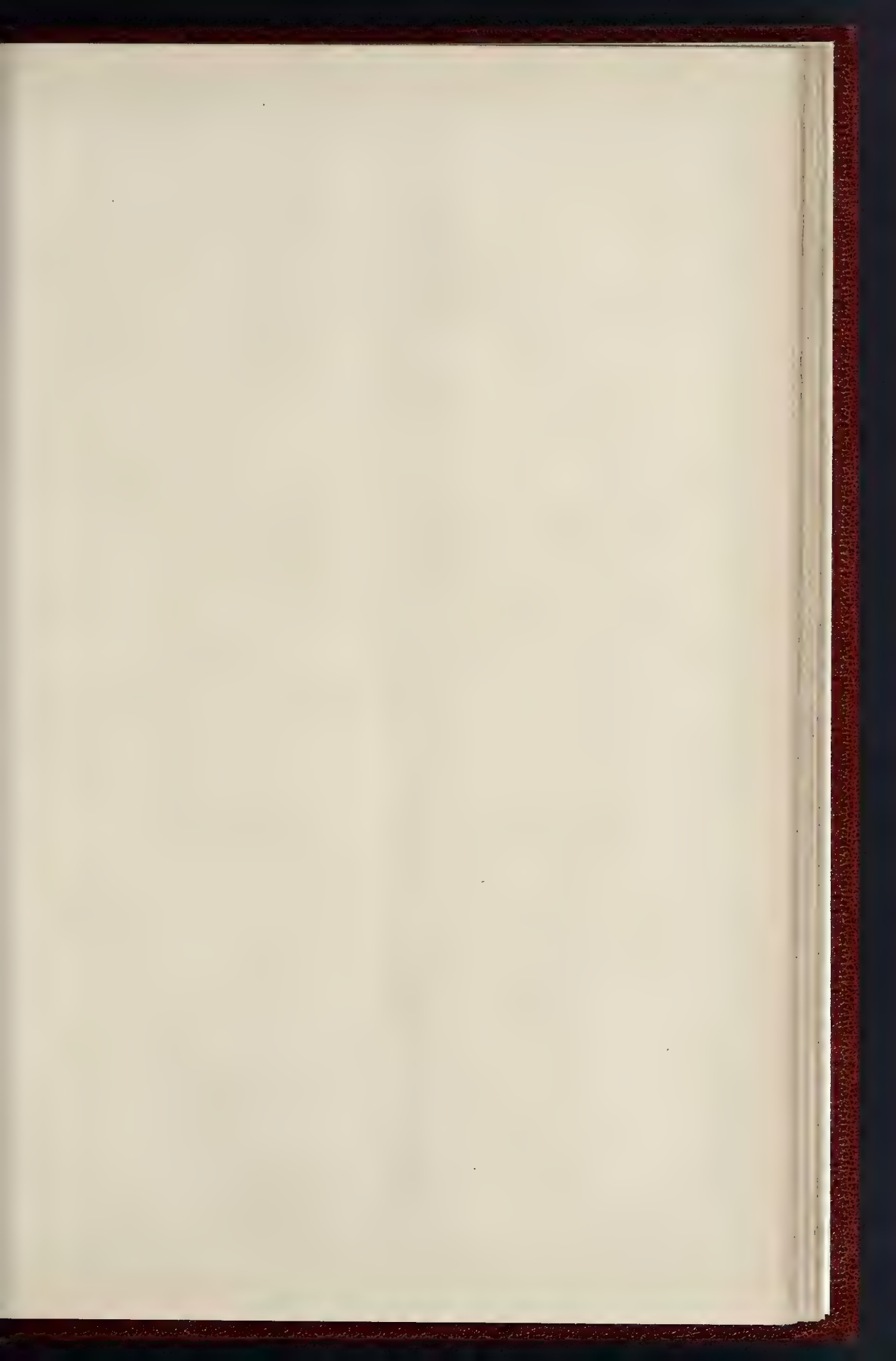


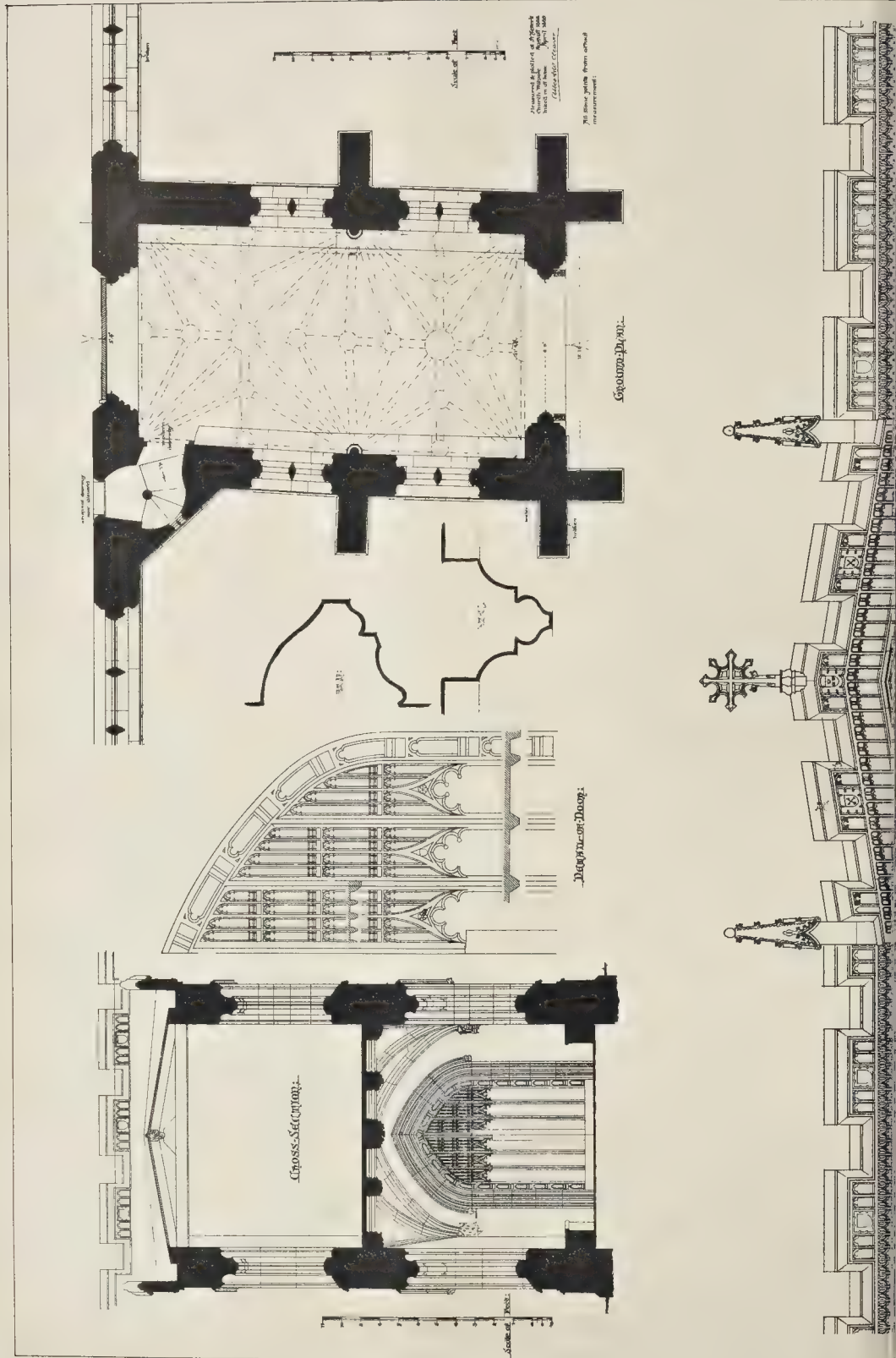
THE BUILDER, DECEMBER 14, 1889



DINING ROOM, "THE LIMES," DONNINGTON LANE, WILLESDEN.—MR. SYDNEY VACHER, A.R.I.B.A., ARCHITECT.





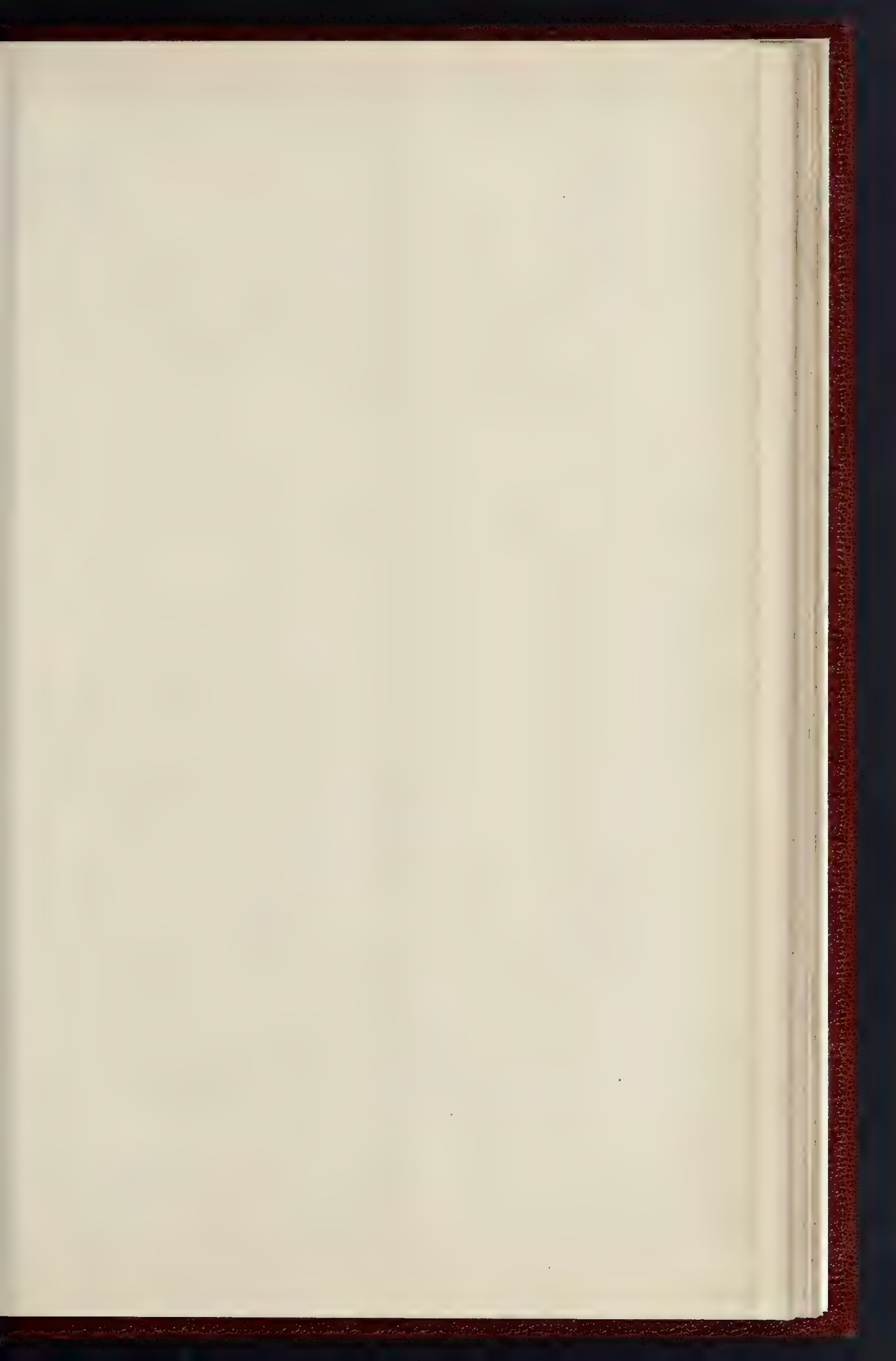




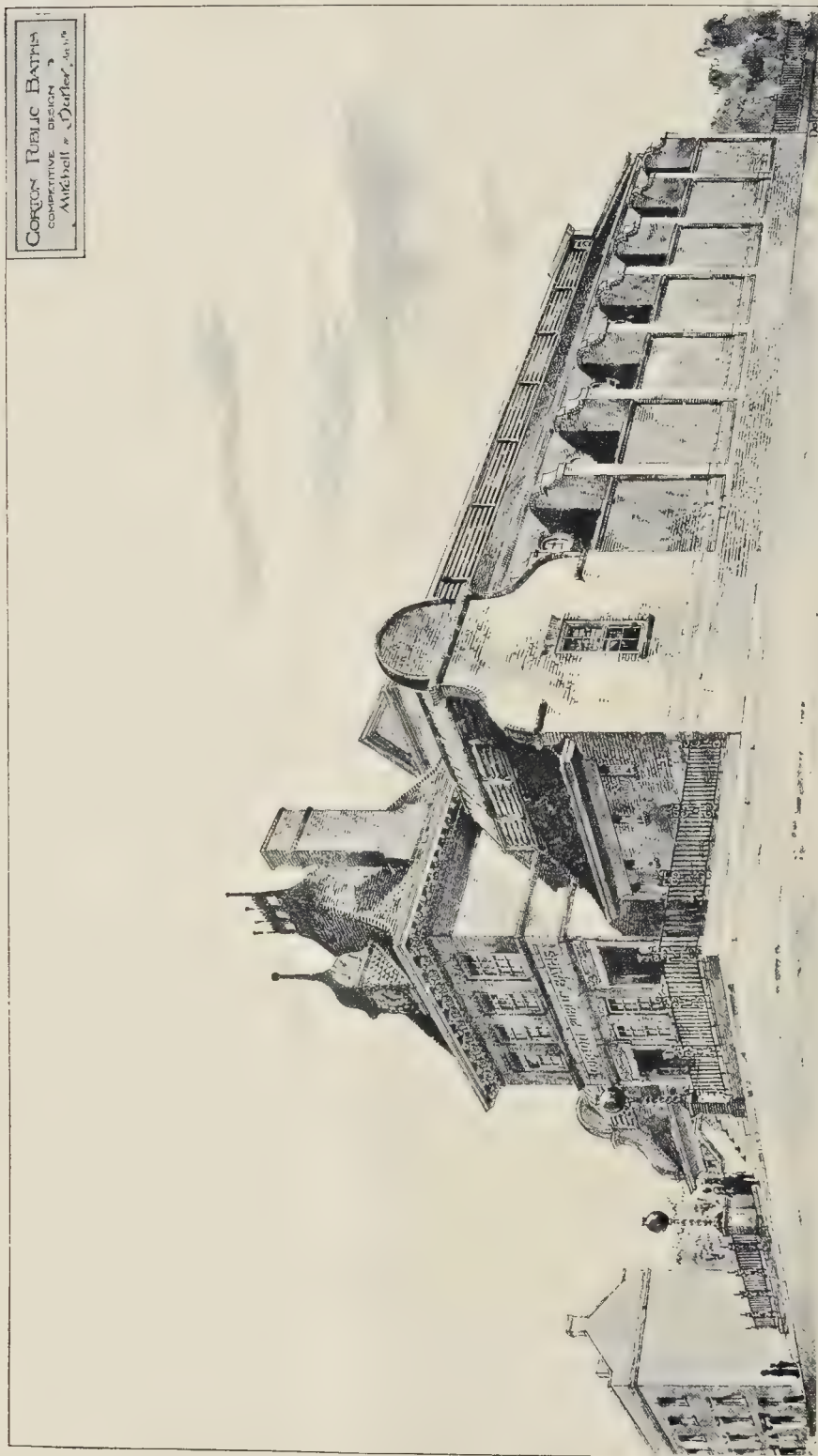








THE BUILDER, DECEMBER 14, 1889.



CORRIGAN TUELLIC BATHS  
COMPETITIVE DESIGN  
MICHAEL & DUFFY, JUNIORS





The Phototype Co., 303, Strand, London.

THE LANTERN: CHÂTEAU DE CHAMBORD.



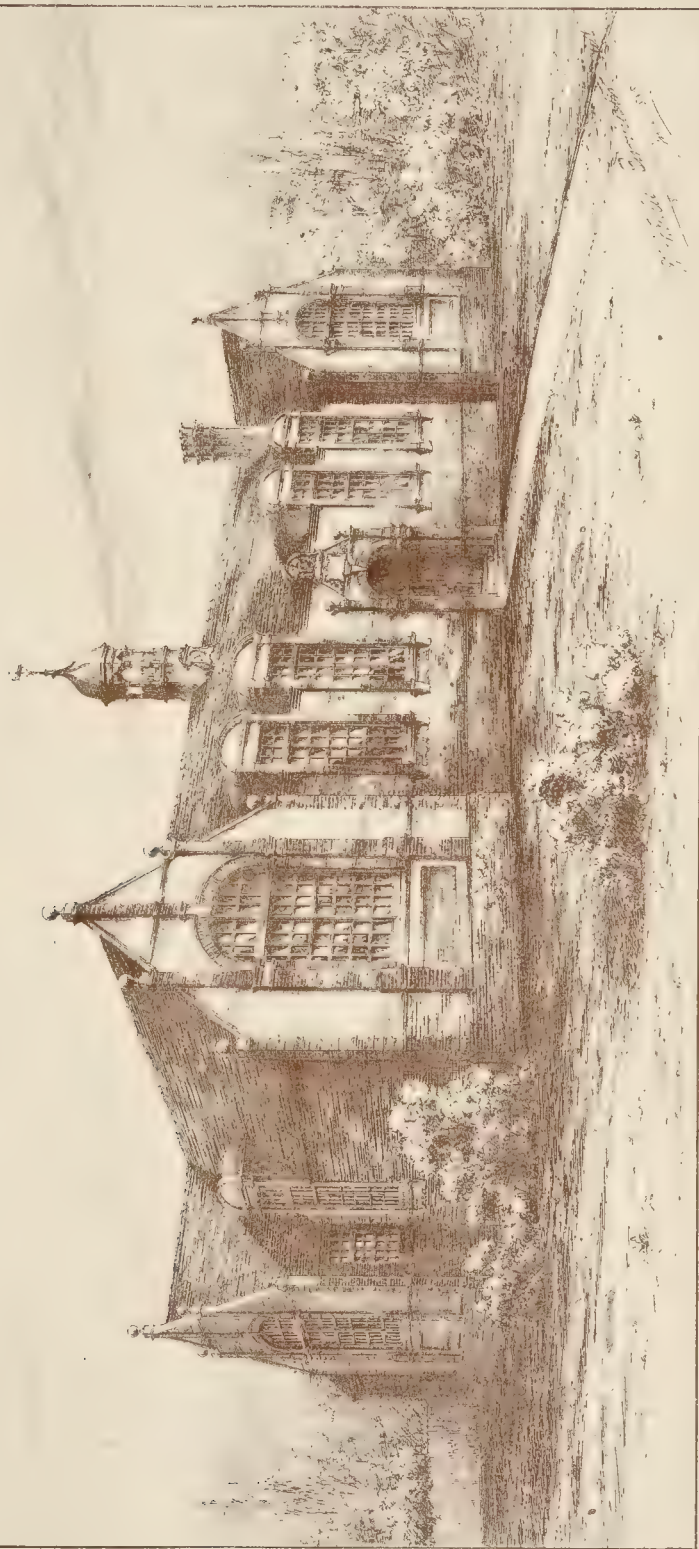


St. George's Church, St. George's, Barbados

1841



Printed by J. M. Smith, Barbados





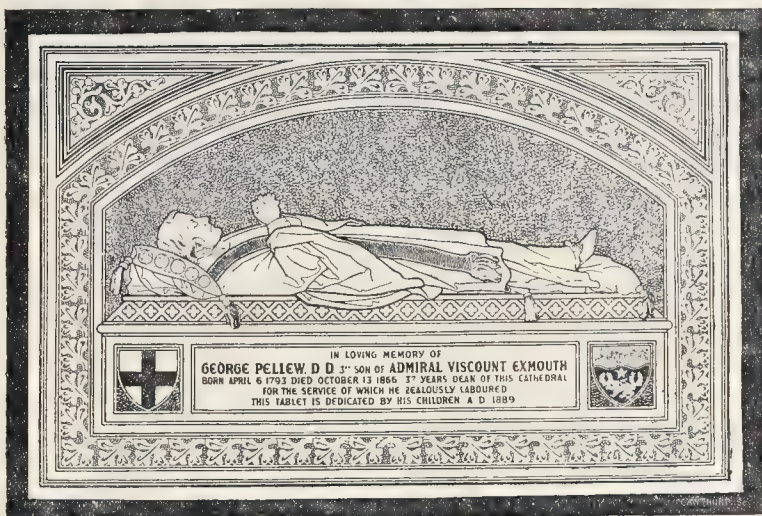




BUSINESS PREMISES, NORTHAMPTON.—MR. T. GARRATT, A.R.I.B.A., AND MR. E. LAW, F.R.I.B.A., JOINT ARCHITECTS.







*Memorial Brass to the Late Dean Pellew, Norwich Cathedral.*

entirely appropriated for warehousing purposes, and the first-floor for additional factory work.

The general design and treatment (more especially of the detail) is based upon the character of work of the buildings of the seventeenth century, found in and about the town and county of Northampton.

An attempt has been made to emphasise the chief features of the entrance front by the colour of the various materials used, the plinth being of strawberry Luton bricks, the central portion and the principal cornice and dressings to arches, &c., of ground Bath stone. The rich brown-coloured local stone (of which the old houses which previously stood upon the site were built) has been freely used in bands and panels, pleasingly harmonising with the general facing of Harlestone red bricks.

The side front is almost entirely of red brick, and the roof covered with Bangor Countess slates.

There was only 50l. difference in three out of the four tenders received. The contract, amounting to 2,428l., was signed on Aug. 10, 1888, and the work completed (with the exception of some fittings and painting) before Christmas. The building works out at 35d. per cubic foot. Mr. J. T. Wingrove, of Northampton, was the contractor, and Messrs. Thomas Garratt, of London, and E. Law, of Northampton, the joint architects.

The original coloured drawing (of which this is a copy in line drawing) was in this year's Academy Exhibition.

#### IMPERIAL MANSIONS, OXFORD-STREET, W.

This prominent semi-circular building, standing at the corner of Charing Cross-road and High-street, Bloomsbury, and directly facing Tottenham-court-road, is constructed so that the ground-floor and basement could be let as a whole, or be divided up into smaller tenements, which latter course has been adopted.

The chambers over are separated from the shops by a fireproof floor, and approached by a private staircase and hydraulic passenger-lift. The rooms are arranged to let singly, in pairs, or in larger suites.

The internal construction is almost entirely of iron, and is carried on stanchions and columns. This was done to save the valuable space which brickwork would have taken up, and also to enable the ground-floor to be let in one large open space if desired, as all the walls on the ground and basement floors, which now form the divisions of the small shops, could at any time be cleared away without interfering with the structure.

The elevation is of red brick and Beer stone, with red granite pilasters to ground-floor. The cost of the building has been about 12,000l.

The design was prepared by Messrs. Martin & Purchase, architects, and the works have been



FIRST FLOOR PLAN



GROUND PLAN

*Imperial Mansions, Oxford-street.*

carried out under their superintendence by Messrs. Perry & Co., the well-known contractors.

#### MEMORIAL TO THE LATE DEAN PELLEW, NORWICH CATHEDRAL.

This memorial is in the form of a "Latten" brass, 5 ft. 4 in. by 3 ft. 6 in., mounted in a 6 in. moulding of Derbyshire fossil marble, and is engraved with a recumbent figure and portrait of the late Dean, within a canopy and border of stiff foliage. In addition to the inscription there are the arms of the Exmouth family and of the Dean and Chapter of the Cathedral. The profile head had to be adapted from a three-quarter face miniature, and, in spite of this difficulty, is said to be a good likeness. The whole was designed and executed by Mr. T. J. Gawthorpe, of London.

#### THE SOCIETY OF ENGINEERS.

The thirty-fifth annual general meeting of the Society of Engineers was held on December 9, at the rooms of the Society, 17, Victoria-street, Westminster, S.W. The chair was occupied by Mr. Jonathan R. Baillie, President. The following gentlemen were duly elected, by ballot, as the Council and Officers for the ensuing year, viz.:—As President, Mr. Henry Adams; as Vice-Presidents, Mr. William Newby Colam, Mr. Joseph William Wilson, jun., and Mr. William Andrew Valon; as other Members of Council, Messrs. Chris. Anderson, R. W. Peregrine Birch, James Henry Cunningham, Henry Faija, George A. Goodwin, Thomas Bell Lightfoot, James Wallace Peggs, and William Schönheyder; as Honorary Secretary and Treasurer, Alfred Williams; as Honorary Auditor, Alfred Lass (Messrs. A. Lass & Co.). The proceedings were terminated by a general vote of thanks to the Council and Officers for 1889, which was duly acknowledged by the Chairman.

The annual dinner was given at the Holborn Restaurant on Wednesday evening last. The President, Mr. Jonathan R. Baillie, occupied the chair, and amongst a large company present were Mr. Benjamin Baker (Hon. Member), Captain Bates, Mr. R. Elliott Cooper, Mr. Henry Adams (President-elect), Mr. W. Newby Colam (Vice-President), Messrs. J. H. Cunningham, George A. Goodwin, William A. Valon, and J. W. Wilson, jun. (Members of Council), Mr. Jabez Chubb, Mr. Charles Gandon, Mr. Perry F. Nursey, Professor Henry Robinson, and Mr. A. T. Walmisley (Past Presidents), Mr. Alfred Williams (Hon. Secretary and Treasurer), and Mr. G. A. Pryce Cuxson (Secretary). The usual loyal and patriotic toasts having been duly honoured,

The Chairman proposed the toast of the evening, "Success to the Society of Engineers." He said that while the objects of the Society were similar to those of the Institution of Civil Engineers, yet, as Mr. Walmisley, President last



year, had said in his address, the Society was not a rival to the Institution. On the contrary, most of the leading members of the Society were members of the Institution, and they all acknowledged the status of that institution. The Society was founded about thirty-five years ago for promoting the study of engineering, which it did by holding meetings for the reading and discussion of papers, and by visits to engineering works in progress. With the toast was coupled the name of Mr. Alfred Williams, the Hon. Secretary and Treasurer, who was spoken of as "the father of the Society."

Mr. Alfred Williams, who was very heartily received, spoke of the good work which had been done and was being done by the Society, and said that it now numbered between 400 and 500 members.

Mr. A. T. Walmisley, in proposing the toast of "The President," said that Mr. Baillie had acquitted himself of the duties of the chair during the past year in a highly commendable manner, and it was a feather in his cap that during his term of office two distinguished engineers had been elected honorary members of the Society, viz., Lord Armstrong and Mr. Benjamin Baker. As he need not remind the company, one of Mr. Baker's latest works was the Forth Bridge. Mr. Baker was universally respected in the profession, because he was always ready to help on and encourage those who had not attained the same eminence as himself.

The toast having been honoured, the Chairman briefly replied, and proposed "The President-elect," Prof. Henry Adams, who also briefly replied.

Mr. Tamburini proposed the "Vice-Presidents and Council," on whose behalf Mr. W. N. Colman responded.

The Chairman next proposed "The Visitors," coupled with the name of Mr. Benjamin Baker, joint engineer of the Forth Bridge.

Mr. Baker, who was very enthusiastically received, made an interesting speech, in the course of which he referred to the camaraderie subsisting between engineers in all parts of the world. With regard to the proposed Channel bridge, in connexion with which his name had been mentioned, he said he was not a promoter of that work in any sense of the word. He had simply had the drawings of it submitted to him by M. Schneider.

In proposing "The Secretary," the Chairman referred in highly eulogistic terms of the services of Mr. Pryce Cuxson, who briefly replied.

#### OBITUARY.

**Mr. J. Mecklen Rogers, A.R.I.B.A.**—In the Times of Wednesday last we regret to see the announcement of the death, on the 7th inst., at Brighton, of this gentleman, at the age of 57. He held an appointment in the Design Branch (Horse Guards) of the War Office. Both inside and outside the architectural profession he was well-known as a dramatic reader, having given readings at social gatherings of the Architectural Association and before many literary institutions. In particular he was noted for his admirable rendering of Dickens's "Christmas Carol." He was elected an Associate of the Royal Institute of British Architects in 1870.

**Mr. James Duneau Doulton.**—We regret to record the death of Mr. James Duneau Doulton, a member of the well-known firm of Doulton & Co., Lambeth, who died on the 28th ult., at his residence, West Brighton, aged 54. He was the youngest son of the late Mr. John Doulton, the founder of the firm, who died in 1870. The deceased gentleman was a brother of the late Mr. Frederic Doulton, some time M.P. for Lambeth, and of Sir Henry Doulton, the present head of the firm. His work lay more in the office than in the factory, but he had a good practical knowledge of the technique of pottery. He was greatly esteemed and respected by all who came in contact with him. He was one of the very first of the local manufacturers to take up the Volunteer movement, in which he took great interest and rendered very effective service as an officer in the 1st Surrey Rifles, retiring a few years ago with the rank of Captain. The funeral took place on the 3rd inst., at the Hove Cemetery, a special train conveying the family mourners, the heads of departments, and about seventy old servants of the firm, some of whom had seen between forty and fifty years' service.

#### WOODLAND-ROAD AND SALTERS-HILL SCHOOLS.

THE following is the reply of the Clerk of Works to the Report sent in by the Repairs Officer of the London School Board in regard to Woodland-road and Salters-hill schools. It may be remembered that we expressed the opinion a fortnight since that the Clerk of Works' statement of his case should have been made public:

"REPLY TO MR. BRADFIELD'S REPORT ON SALTERS-HILL AND WOODLAND-ROAD SCHOOLS, DATED NOVEMBER 15, 1889.

*Salters-hill School.*

There is no question that an error in judgment was committed here in building the gable end wall so close to the school drain, though the consequences have been four years in appearing. I admit my share in that error, which any one might easily have fallen into who saw the trenches opened. I acted as I thought best at the time, and, as I believe, with the full sanction of the architect. In all respects the foundations were laid in accordance with drawings supplied.

*Woodland-road School.*

This school, built on heavy clay, is carried on arches, has slight piers between large and lofty windows, and rises to a great height. After three years' exposure to stress of weather and wear of school-life, there is no symptom of a settlement anywhere, no arch is crippled, no sill nor head cracked. This is strong presumptive evidence that the materials of which it is constructed are not of an inferior kind, nor the workmanship of an inferior order.

**Brickwork.**—There was not a single yard of burnt ballast or "half-burnt clay" on the ground until the play-grounds were being formed, when the building was nearing completion. None, therefore, could have been used in the making of mortar. The grey Dorking lime and Red Red sand used for this purpose were supplied by Hall, Potter, & Co., of Croydon. The same sand was being used at the same time by the L.B.S.C. Railway Company in the new station at Gipsy Hill, near by. The pink colour of the mortar is due to the debris from the cutting-shed where the gauged and moulded bricks were prepared, and the brickbats from the old buildings, which were ground up in the mortar-pan. In a long experience I have found bricks a valuable ingredient in mortar when well ground and mixed. That the mortar in the present instance is crumbling when picked out with a sharp-pointed tool is due, I believe, to the nature of the sand, which lacks the sharpness of Thames sand. I was unable to watch all the mortar made, as I had charge of two other schools in building at the same time, six and two miles off. With regard to the hollow joints, it is always most difficult to make bricklayers properly fill the cross-joints, unless you stand over them. The presence of hollow joints, however, does not prove that the courses were not flushed up; it does show that they were not grouted, in which is a different and effectual operation for filling all interstices. The brick-cope wall from the joints, of which the mortar has washed out, was an oversight which I cannot excuse, as the wall should have been built up in cement in the first instance. I should have expected this to appear in the final report, to which, however, I am unable to refer.

**Portland Stone.**—This was supplied by Stewards, of Nine Elms, who are large Portland quarry owners. Some of the stones now show imperfections, which should have prevented their being used, as a mason in working them must have become aware of their condition. Several stones were removed after setting in consequence of flaws, and those now condemned bore no evidence on the surface when dressed and set of anything being amiss. Had there been, it could not have escaped notice. I am not personally acquainted with the Portland quarries, and cannot determine the beds from which the blocks were taken. The obolitic stones being homogeneous, it is not of vital importance that they should be set in their natural bed. Indeed, it is often very hard to determine what is the natural bed, and long, narrow door jambs are always set up on end. I do not think any stones at the entrances can have been left undoweled, but it is possible the jar of the grate may have cracked the dowel in one instance.

**Roofs.**—The roofs are covered with best Brosely tiles, and were laid by a Brosely specialist; the firm supplying at once tiles and tiles. 'Hung with only one 1½ in. zinc nail.' This expression is misleading. Tiles are not hung by the nails at all. Plain tiles used to be hung from two oak pegs driven through two holes left near the top of the tile for that purpose, upon narrow laths nailed across the roof rafters, and were held in place simply by their own weight. The tiles are now hung by two nbs cast on the top, and hang on feather boarding. As an additional security against shifting, the old peg-holes are turned to the boarding below, but the feather-boarding being very thin, the frequency of the nails, tile after tile, constantly splits it, so that I have found it expedient to use one nail instead of two, and a 1½ in. nail is amply long enough to pass the feather-board.

Another advantage is that there is less disturbance in case of a tile wanting renewal. Some people still consider it better not to have any nails at all.

**Lead and Pipes.**—These were supplied by Farnishes. I am certain that 7 lbs. lead was delivered on the job, and I do not know where else it can have been used than in the gutters. I am, therefore, sceptical as to 6 lbs. being used. It is possible in the schoolkeeper's house the plumber may have cut the lead from the wrong sheet, but the circumstance will doubtless be found in the Final Report, and to have been adjusted accordingly.

The pipes were invoiced at the specified weights. When goods are supplied by a firm of known probity I am content to accept their invoice as a guarantee of correctness.

The zinc flat over infants' cloak-room has sagged, and the water does not run wholly off, but it does not lead to any injurious result.

The depth of a pipe below ground must be to some extent a matter of discretion. Any depth over a foot under a tar paving is a security against frost. The 1½ in. pipe from main to stop-cock box is a survival from the days of intermittent supply. For a constant supply the water company allows, I believe, only a ¾ in. connexion. The oversight of the tar-boxes in the ground and some of the minor items are due to the impossibility of being in three places at once.

**Glass.**—The glass was supplied by Conolly, and invoiced as 28 oz. Has it been weighed or only gauged?

**Ceilings.**—The cracked ceilings are, I fear, due to a too close following of the clause in the specification, 'Each coat to be strongly gauged with fine plaster.' (This is now omitted.)

**Schoolkeeper's house.**—The builder left the air-bricks well above the ground level, but the tarpaulins thought fit to raise the level about the house so that one air-brick is rather low. The absence of concrete over the surface of the site is, I apprehend, due to there being none specified.

The plastering (here and generally) was executed by men of repute in the trade—Parker and Cane. Parker did this work. That the setting coat is giving way may result partly from the artificial drying of the work too rapidly, which was resorted to in order to hasten completion.

**Final Report.**—This usually drastic document was sent in on May 20, four months after the school was opened. I received a copy, together with one of a letter to the builders, which accompanied it. I have no copy now, but my memory serves me to feel sure there was nothing of a serious nature to be corrected under that report.

The completion of this building was followed by copious rains, to which succeeded long and severe frosts, which tore out the pointing of the brickwork and split stonework to pieces all round the neighbourhood, rendering a great deal of reinstatement necessary the following spring; and a great deal of the present condition is due to that severe time.

F. WARREN, C.W.

#### THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday afternoon last in the Council Chamber, Guildhall, Lord Rosebery in the chair.

**Building Applications during the Recess.**—The Building Act Committee's report contained the following paragraph:—

"Your Committee are of opinion that as the Council has resolved to adjourn for four weeks from the 17th inst., and as there will be many applications made during that period under the Metropolitan Management and Building Acts, it is desirable for the convenience of the public that a special meeting of the Committee shall be held during the vacation. They accordingly recommend—

'That the Council do, under the provisions of the Local Government Act, 1888, sec. 28 (2), delegate to the Building Act Committee power to hold a meeting during the recess, for the purpose of considering applications made to the Council under the Metropolitan Building and Management Acts, and at such meeting to act on behalf of the Council, and to grant or refuse such applications; provided, however, that the Committee shall only act upon such decisions as shall be unanimously arrived at by the members present, and that all such decisions shall be reported to the Council at its first meeting after the recess.'"

This was agreed to, but the consideration of the 'corrected regulations for the guidance of builders and others in making building applications to the Council' was postponed.

**The Sewage Sludge Question.**—The Main Drainage Committee reported as follows:—

"Your Committee have considered the report of Mr. Gordon, urging the provision of two more sludge vessels, and have also considered his question as to whether this is the proper way of dealing with the sludge. He had no doubt that it is the least expensive way of disposing of this residuum. Your Committee, agreeing entirely with the Royal Commissioners' report of 1884, that it is neither necessary nor justifiable



to discharge the sewage of the Metropolis into any part of the Thames from the Nore upwards, are of opinion that any process of precipitation and of separation of effluent and sludge must necessarily be carried on where the late Metropolitan Board have engaged their successors in connexion with an outlay upon works of nearly 800,000, for that purpose. Your Committee are convinced that the probable alternative will be found to be the conveyance of the sewage to the sea upon the Essex shore by some such plan as that sanctioned by Parliament in the Act of 1865. But your Committee observe that their immediate and unavoidable duty is to promote the best and most complete use and employment of the works committed to their charge, which are already in a condition to produce as much sludge as four cessals can remove. They therefore recommend—

\*That tenders be obtained for the construction of two sludge vessels upon the model of the older and less costly ship, with certain modifications to be described by the Engineer."

The consideration of this report was deferred until the next meeting of the Council.

**The Strand Improvement.**—The Parliamentary Committee, in the first paragraph of their report, said:—"In accordance with the resolutions passed by the Council on the 1st and 29th of October last, we have prepared a Bill to enable the Council to acquire and remove the south side of Holywell-street, and also sufficient land and buildings on the north side of St. Mary-le-Strand Church, and a portion of the enclosure at the west end of the said church, so as to form a practicable roadway with frontage thereto. The Bill, as ordered by the Council on Nov. 5, contains provision that owners of property within a certain area approved by the Committee, and specified in the Bill, shall be required to contribute towards the expense of the improvement in proportion to the enhanced value of their property due to the improvement. It also contains provision for varying the principle on which compensation should be assessed for property taken, and for enacting that no compensation should be paid for compulsory purchase. The provision relating to compensation for compulsory purchase accords with the terms of the resolution of the Council on Nov. 5. We are advised, however, that the retention of this provision, as contained in the last lines of clause 12, will be opposed by the authorities of the House who are responsible for and have the control of private Bill legislation, and that they will require their omission. We are further advised that the withdrawal of the words after the Bill is deposited will be attended with very considerable expense, and that any costs would probably be allowed against the Council, which might have been incurred by parties appearing on the Bill in consequence of the general notice and who might not have full notice of the withdrawal of the clause, and that, to lessen the cost, notice of the withdrawal of the provision would have to be served on every owner, lessee, and occupier named in the book of reference. Under the circumstances, we have no alternative but to recommend—

\*That the words at the end of Clause 12, "Nor shall any additional allowance be made in respect of compulsory purchase of any lands or premises," be struck out of the Bill."

The Bill was taken clause by clause, and upon clause 12, Mr. Harrison, the Chairman of the Parliamentary Committee, stated that the addition of 10 per cent. for compulsory sale had become much a matter of usage as to be practically equivalent to an unwritten law, and therefore he did not think it would be wise to risk the rejection of the Bill by adhering to the words printed in italics at the end of the clause. After a good deal of discussion, it was agreed to omit the words. The next clause upon which there was any serious disagreement was

\* Clause 12 as it stands in the draft of the Bill reads as follows:—

"12. In settling any question of disputed purchase-money or compensation under this Act, the Arbitrator, Arbitrator, or Jury determining the amount of purchase-money or compensation shall base the same upon what in their opinion would have been the fair market value of the lands or premises if the improvement had not been contemplated, due regard being had to the nature and condition of the property and the probable duration of the buildings in their then state, and to the state of repair thereof, and all circumstances affecting such value. But no sum of money shall be awarded for or in respect of any improvement, alteration, or building which in the opinion of the Arbitrator, Arbitrator, or Jury shall have been made or created with a view to obtaining or increasing compensation under this Act, nor shall any additional allowance be made in respect of compulsory purchase of any lands or premises."

clause 29, of which the following are the first few paragraphs:—

"And whereas the improvement being effected out of public funds belonging to or charged upon the ratepayers of the County of London will or may increase in value lands or property fronting on or in the neighbourhood of the improvement but not acquired for the purpose thereof, and it is reasonable that provision should be made under which such increased value should be reserved wholly or in part for the ratepayers at whose expenditure it has been produced, therefore,

(1) There shall be a rent charge, to be called the Strand Improvement Rent Charge, which shall be fixed, ascertained, charged, and payable in manner hereinafter described. But the total of the Strand Improvement Rent Charge shall not be of any amount which, when capitalised on such basis as the Standing Arbitrator may deem reasonable, would, in his opinion, exceed one-half of the cost of the improvement.

(2) A standing Arbitrator may be from time to time appointed for the purposes of this Act, on the application of the Council, by her Majesty's Principal Secretary of State for the Home Department, and such Arbitrator shall have the powers and proceed in manner hereafter mentioned.

(3) The Council shall, as soon as conveniently may be (not later than three years after the completion of the improvement), cause to be framed a provisional award describing the lands and premises abutting on or in the neighbourhood of the improvement which in their opinion are, or will be, increased in value by, or in consequence of, the improvement, and shall in such provisional award state—

(a) The amount of the increased value which, in the opinion of the Council, will result to the lands and premises described in the said award respectively.

(b) The amount of the Strand Improvement Rent Charge to be apportioned on the lands and premises respectively in respect of such increased value;

(c) The names of the owners, lessees, and occupiers of the lands and premises respectively so far as they can be ascertained;

(d) The person or persons (whether entitled to the rack-rent or in occupation of the lands or premises) by whom such rent-charge shall be payable.

But there shall not be included in such award (or in any final award made as hereinafter provided) any lands or premises not situate within the area described in the schedule to this Act."

The Bill then goes on to prescribe the further procedure in regard to the consideration and approval of the award by the Council, its exhibition and inspection, the lodging of and dealing with objections, the issue of a final award, area, and basis of apportionment of the proposed rent-charge. The area which it is proposed to subject to this rent-charge is thus defined in the schedule to the Bill:—

"An area bounded on the south by the Victoria Embankment, and on other sides by an imaginary line drawn as follows:—

Commencing at the northernmost end of Waterloo Bridge; thence passing along Wellington-street to its junction with the Strand; thence to the southern corner of Catherine-street; thence along Catherine-street to its junction with White Hart-street; thence along White Hart-street, Blackmoor-street, and Clare-street, to the easternmost end of Vere-street; thence westward along Vere-street to its junction with Shildfield-street; thence along Shildfield-street to Portsmouth-street; thence along Portsmouth-street and Portugal-street to Serle-street; thence southward to the southern end of Serle-street; thence along the north-western and southern sides of the Royal Courts of Justice, excluding the land on which the said Courts are built, to the site of Temple Bar; thence along the Strand to the northern end of Essex-street; thence along Essex-street to the southern end thereof; thence following the boundary of the Temple property to the south-western corner thereof, but excluding any part of the Temple; and thence in a direct line to the point where the boundary of the City of London crosses the Temple Pier.

The area above described includes all lands and premises fronting or abutting on the east side of Wellington-street (but excluding Somerset House), all lands and premises fronting or abutting on the west side of Catherine-street, the premises situate in the angle formed by the junction of Brydges-street and Exeter-street, all lands and premises fronting or abutting on the north-western side of White Hart-street, Blackmoor-street, Clare-street, and Shildfield-street, and the lands and premises fronting or abutting on the south side of Vere-street for a distance of 60 yards from the junction of Clare-street with Vere-street, all premises fronting or abutting on the northern side of Portugal-street and on the western side of Serle-street southward of Portugal-street, all lands and premises fronting or abutting on the Strand between the site of Temple Bar and Essex-street, all lands and premises fronting or abutting on the eastern side of Essex-street or lying between Essex-street on the west and Devereux-court and the Temple on the east."

There was a good deal of discussion on these proposals in the Bill, both in regard to the principle involved and the administrative details. To take one of the last-named first, the area laid down by the foregoing schedule as contributory to the recoupment of the cost of the improvement was characterised as unsatisfactory. How could Serle-street, it was asked, be considered as contiguous to the Strand,

when it had no outlet to that thoroughfare? To this objection, it was replied that the area scheduled had been determined by the Architect, the Valuer, and Mr. Vigers, after actual survey and consideration. With regard to the doctrine of "betterment" involved, it was said that, although it was all very well in theory, and very easy to lay down, it would be difficult to apply in practice, although it might be found to work in a new country like America. However, after a good deal of discussion, the draft of the Bill was agreed to.

**Subways.**—The Parliamentary Committee also submitted the draft of the London Subways and Overhead Wires Bill, which was adopted.

**The Building Act.**—The same Committee reported on the subject as follows:—"With reference to the instructions given by the Council on Nov. 12 for amending the Building Act in certain particulars, we have not seen our way, in the absence of a definition of 'tenement houses in the occupation of the working classes,' to draft clauses which would satisfactorily carry out in a private Bill the Council's resolution as regards open spaces at rear of buildings. We therefore recommend—

\*That it be referred back to the Building Act Committee to reconsider the matter, and to bring up some more detailed instructions as to the particular houses to which it is intended the new provisions shall apply."

This was agreed to.

**General Powers Bill.**—The same Committee further reported as follows:—"We have also prepared and circulated to the members of the Council the London County (General Powers) Bill, which includes the following matters:—Alteration of Barking-road-bridge and approaches; the acquisition of Brockwell Park, Lambeth; representation of the Council on the Thames and Lee Conservancy Boards; repeal and consolidation of bye-laws for parks and open spaces; exemption of members of the Council from service on juries; provision of mortuaries; penalty for trespassing in main sewers; procedure and conduct of the business of the Council; powers relating to buildings,\* water supply, and markets, contracts as to payment in respect of County Rate, and power to defray expenses as if incurred under 18 and 19 Vict., cap. 120. With regard to markets, the resolution of the Council on October 15 appears to have contemplated not only a special inquiry, but authority to the Council to subsequently introduce a Bill, should the Council after such inquiry think it desirable to do so. On consideration, we thought it better to omit any reference to the introduction of a Bill, and to limit the powers sought to inquiry only, as in the case of water. We recommend:—

\*That the seal of the Council be affixed to a petition for leave to introduce the London Council (General Powers) Bill, and that the Bill be deposited with the petition, pursuant to the Standing Orders of Parliament, with such verbal alterations (if any) as the Parliamentary Committee may consider desirable."

**Mr. Burns's Charges against Messrs. Brass.**—On the motion of Mr. Torrance, it was resolved—

"That the Special Committee, to which the Council on November 26 (No. 23) referred the matter of the accusations affecting the position and standing of Messrs. Brass & Sons, do consist of the following members, viz.:—Mr. Antrobus, Mr. Beal, Mr. Breerton, Mr. Debenham, Mr. Bassett Hopkins, Mr. Lawson, M.P., and Mr. Westcott."

After discussing other business, the Council adjourned until Tuesday next at noon.

## ARCHITECTURAL SOCIETIES.

**Leeds and Yorkshire Architectural Society.**—"The Present State and Prospects of our Modern Architecture" was the title of the first lecture of the present session in connexion with the Leeds and Yorkshire Incorporated Architectural Society, delivered on Monday evening at Croft's-chambers, Infirmary-street, Leeds, by Mr. Edward J. Tarver, F.R.I.B.A. Mr. Henry Perkin, President of the Society, occupied the chair. In the course of his remarks, the lecturer observed that in the present day the use of distinct styles had become common to a great extent, but people were beginning to find out that rigid purity of style,—Gothic inside and out of a house,—sometimes produced rather a severe strain upon one's ideas of true comfort at home. Now-a-days, an architect's client wanted his house built in some particular style or other, and so for the sake of peace and quiet the term

\* We give the text of this part of the Bill on another page.



"Queen Anne" had been murmured into his confiding ears. With regard to church architecture, the lecturer remarked that the most interesting of our old churches were those that were built in different styles. If architects admired the several styles of ancient architecture, they should be consistent and try to carry on the series by unfolding a style of their own. The attempt to improve on the work of the last man was what we now had in our civil and domestic architecture; not so much to preserve old forms as by adapting old forms to new ways and combining them. A large amount of original thought was being devoted to the fulfilment of clients' wishes, and it was admitted that this was being successfully done. As to our churches, well, they were excellent versions of the previous styles; but it would be found that the old architects did not build versions of older styles—not a bit of it! The surest process of checking the formation of a style was the imitation of old ones. Much of our modern work in England, however, was true to its day. The seeming difficulty lay in the number of old examples we knew of; almost any form could be adapted to harmonise with any building. Speaking of improvements possible in the construction of buildings, the lecturer emphasised the value of concrete, and considered that iron and concrete in combination had a great future before them. He thought, in conclusion, that architects were in a fair way to settle down to a style of their own if they only chose to stick to it. The lecture was illustrated in an interesting manner by means of photographs, sketches, &c., of typical examples of architecture; and at the close, on the motion of Mr. Corson, seconded by Mr. Thorp, Mr. Tarver was cordially thanked.

*Sheffield Society of Architects and Surveyors.* The monthly meeting of this Society was held at the School of Art on Tuesday evening. Mr. F. Fowler, the president, occupied the chair, and there was a good attendance of members. Mr. H. Longden, who was received with hearty applause, read an interesting technical paper on "Old English Ironwork." Remarking that it was his intention to confine himself to the history of the rise and progress of work in hammered iron for ornamental, defensive, and domestic purposes, he went on to describe the characteristics of English ironwork from the twelfth century, when a great impetus was given to the art by its use for defensive armour, through the Middle Ages to the close of the fifteenth and sixteenth centuries, when the smith gave way to the locksmith and brass-worker, and the art declined. He quoted from old MS. authorities as to the prices of iron and payment of smiths at Westminster Abbey and other important buildings, pointing out that at Westminster, A.D. 1293, the foreman smith was a highly-paid and skilled craftsman. During the fourteenth century, the first known examples of fire-dogs are to be met with, and there was a much greater refinement and improvement at this period in the design of ironwork, which was often tinned and gilded. During the seventeenth and eighteenth centuries the art was revived by Sir Christopher Wren and other noted architects. At St. Paul's, Wren had a French smith, Tijou. The Hampton Court gates and other fine works of the period were instanced. At the close of last century the art declined, when iron casting came largely into fashion, to be revived again in our own day with the general revival of the decorative arts. There were now skilled smiths in England who, under proper tuition and direction, were able to equal, and actually were equaling, if not excelling, much of the old work, and producing art-work with a distinctive style and character of its own. On the motion of Mr. Flockton, supported by Mr. Innocent and Mr. C. Hadfield, a hearty vote of thanks was accorded to Mr. Longden. In returning thanks, the lecturer suggested as a work to be taken in hand by the Society, especially its younger members, the drawing of every example (and there were many) of old metal-work, wood-work, &c., remaining in Sheffield. In after years such a work, put together in book-form, would be a valuable record of local art, and would be appreciated by the public.

*Industrial Exhibition in the Caucasus.* An industrial exhibition, the first of its kind in the Caucasus, is now being held at Tiflis.

#### ARCHÆOLOGICAL SOCIETIES.

*The British Archaeological Association.*—At the meeting of this Association on the 4th inst., Mr. W. de Gray Birch, F.S.A., in the chair, Dr. A. Fryer reported the discovery of a Mithraeum at Ober, the altars and other antiquities from which have been removed to the Museum, Darmstadt. He submitted a specimen of the mortar sent to him to analyse, and described the results: Sand, carbonate of lime, alumina, oxide of iron, carbonate of magnesia, sulphate of lime, soluble silica, with a trace of chlorine, were met with in varying proportions. The mortar, however, was poor and friable. A long and interesting discussion followed. Mr. J. W. Grover, F.S.A., referred to the wisdom of keeping ancient foundations covered up, or only opened periodically; and Mr. Loftus Brock, F.S.A., spoke of the effects of frost upon the excavated remains at Silchester, and of the use of poor chalk lime mortar in many domestic Roman buildings. The thanks of the Mayor and Corporation of Lincoln for the gratuitous restoration of the maces of that city by Major Lambert, F.S.A., were acknowledged. Mr. C. H. Compton and Mr. Mills Stevenson exhibited rubbings of some fine brasses. Mr. H. Syer Cuming, F.S.A. (Scott.), reported the discovery of portions of an ancient crypt now being excavated on the site of the old Church of St. Chad, Shrewsbury, which building fell down about 1770. The first paper was by Mr. C. H. Compton, on South Creak, Norfolk, in which the descent of the manors and the history of the church were detailed, together with many curious items of local information and tradition. The second paper, was by Mr. J. M. Wood, who, following a paper read at a past session, described two more churches in Essex which have the peculiarity of round towers. These were Lamersh, near Sudbury, and Pentlow. Both are of Norman, if not of earlier date, and appear to have belonged originally to older churches than the present ones.

*Royal Archaeological Institute of Great Britain and Ireland.*—At the meeting of this Institute on Thursday, the 5th inst., the Rev. F. Spurrell in the chair, Mr. F. C. J. Spurrell exhibited a large collection of stone implements, lately brought by Mr. Flinders Petrie from Egypt, and read a paper describing them. Perhaps the most interesting in the collection was a sickle composed of a wooden handle and stone cutting edge. Mr. Spurrell considered that this implement derived its origin from the lower jaw of an animal. An interesting paper on the ancient font in Toftrees Church, Norfolk, was communicated to the Institute by Mr. J. E. Bale. The village of Toftrees, as its name indicates, dates from Saxon times. There are traces of Saxon, or more strictly speaking, Anglian, work in the nave. The chief architectural features of the church, however, comprise work from transitional Early English to the Perpendicular styles. The church consists of a chancel, nave, and western tower minus the belfry story. The font is a fine specimen of Norman work, richly sculptured. The bowl is square in shape, and is supported by five short pillars with caps and bases, one at each angle and the fifth in the centre. On each face of the bowl is a panel containing an elaborate design in low relief. Mr. Bale contended that much of the ornamentation showed traces of Anglo-Celtic workmanship, and pointed out how it blended harmoniously with the recognised Norman details.

#### ELECTRIC LIGHTING NEWS.

*Dundee.*—Last week, Mr. Hopkinson, of London, met the Electric Light Committee in Dundee, and gave a verbal statement as to the cost of lighting the centre of the city, the compulsory area suggested being from Panmure-street on the east to Tay-street on the west, including High-street, Reform-street, Commercial-street, Bank-street, Whitehall-street, Lindsay-street, and Meadow-side, up to Bell-street. The first cost of an installation of 1,000 incandescent lamps in that area was roughly estimated at £5,500; and if it went up as high as 5,000 or 10,000 lamps, Mr. Hopkinson believed the light could be produced almost as cheap as gas. He promised to furnish a detailed report, with the prices at which an installation could be given for installations varying from 1,000 to 10,000 lamps, including arc lamps for lighting the principal streets.

*Torquay.*—At the meeting of the Torquay Local Board, on the 6th inst., Mr. Newton,

deputy engineer to the Municipal Electric Lighting Company (who with the Devon and Cornwall Electric Lighting Company are applying to the Board of Trade for Provisional Orders for supplying electricity in the district), attended as a deputation from his company, to support a communication from Mr. Gordon, chief electrical engineer, which dealt with the system, supply, and price. As to system, Mr. Gordon stated that the business of an electric light company in any town was to supply electricity, which under the Act of Parliament the customers might use in any way they might think fit. The company was not allowed to specify any particular lamp, but might advise in a friendly manner as to the lamp to be used. It was advantageous to use incandescent lamps, which might be of any candle-power required, preferably of about the same power as the gas-jets throughout all private houses, and, in fact, for all indoor lighting, and to use arc lamps for all street and public lighting. Some members of the Board had probably seen a very large example of the two systems working side by side in the electric lighting of the Great Western Railway at Paddington station, carried out by him (Mr. Gordon) three years ago, and which had been working without a hitch ever since. For so extensive a town as Torquay it would, probably, be advisable to adopt what was known as the "alternating-current system," but they would use only such moderate pressures as had stood the test of long experience, and which had been proved to be quite safe. The cables which he was laying down in London were covered with ordinary commercial insulation, and could be handled with perfect impunity when carrying any such current as he proposed to put into them. He should adopt an arrangement of machinery which would allow of regular and continuous extension as the business increased,—that was to say, he should build a somewhat large engine-house, and should put only a few machines into it at first, leaving room for the extension which they confidently anticipated would be required very shortly. With regard to the price proposed to be charged for electricity, they proposed for private consumers to take power to make a maximum charge not exceeding 1s. per unit, but they hoped shortly to be able to lower this. Their power of doing so would depend on the support afforded by the townspeople. This price was about 30 per cent. in excess of the cost of gas, but it was found that even at such a price the annual bills of the consumers seldom exceeded their gas bills, as the facilities for turning the electric light on and off were so much greater than gas. As to the public lamps, they would be prepared to make a very substantial reduction, their principle being to do the public lighting as near as might be at cost price in consideration of obtaining the privilege of supplying the private lights.—The matter was referred to a special committee.

#### AN ILLEGALITY IN LONDON HOUSE DRAINAGE.

At the West London Police Court, on the 5th inst., Mr. Alfred Heaver, a builder, of St. John's-road, Clapham Junction, appeared to answer a summons charging him with constructing a drain to a house in Rosebery-road, Fulham, contrary to the direction of the Vestry.

Mr. Bianco White, on behalf of the Vestry, said (according to the report in the *Daily Chronicle*) a pipe was passed under the party-wall connecting the drain in the adjoining house. Notice was given to the defendant that the work would not be passed; but instead of any alteration being made the drain was covered over, thereby constituting a second offence. The Surveyor had an interview with the defendant, and pressed upon him to put the drain in proper order. The defendant then said if the proceedings were withdrawn he would do the work, otherwise he would not. When he found that he was incurring certain penalties the matter was put right. He (Mr. White) pressed the case for a conviction.

Mr. Norrington, the Surveyor, gave evidence bearing out Mr. White's statement, and in answer to Mr. Laukester, who appeared for defendant, said he did not know whether the alterations were made before the issue of the summons.

Mr. Curtis-Bennett, the magistrate, looked at the plans approved by the Vestry, and said they represented the drainage of two houses into one drain.

Mr. Norrington pointed out that the junction of the drains of the two houses was outside the boundary-wall. Practically there was separate drainage to each house.

Mr. Curtis-Bennett said the regulations required



separate drainage to each house. What was the use of having regulations if they were not complied with? In the event of a stoppage in the drain two houses would become blocked.

Mr. Norrington said the blockage would be under the control of the Vestry.

Mr. Curtis-Bennett: No matter. In the meantime fever would get into the house.

It was deplored that the junction was inside the garden.

Mr. Lancaster submitted that a technical offence only had been committed.

Mr. Curtis-Bennett, in reviewing the evidence, dwelt upon the fact that there had been a wrong departure in the works by the junction being made in the precincts of the premises where the Vestry had no power of access. He said it was most important for the well-being of this large metropolis that every house should have direct communication into the sewer, and so long as he was guided as that Court he was determined to have the law carried out strictly. He did not think that a technical offence only had been committed, and fined the defendant 10*l.*, as the junction was not made according to the plans, but he should not allow costs for the reasons he had indicated.

#### "A MINISTER OF FINE ART."

SIR.—It is no doubt a popular notion at the present day with many who can see only one side of a question that art can be elevated and artists created by Act of Parliament.

Your correspondent, "C. F. M.," suggests, as a remedy for the mischief he deplors at St. Alban's Abbey, that there should be a Minister of Fine Arts. He has apparently overlooked the possibility that Lord Grimthorpe himself might be the first Minister of Fine Arts, and that his successors might be like him.

When will it be understood that the hope of art lies not in the interference of the State nor in restriction of the freedom of the artist, but in the enlightenment of public taste and the awakening of public interest?

Dec. 11. T. G. JACKSON.

#### TESTING STONE FOR MACADAMISED ROADS.

SIR,—I have been expecting that some surveyors would have given us their views on the above subject, after the interesting article in your issue of October 19, *re* the specimens of stone exhibited at the Paris Exhibition.

It is undoubtedly a rather difficult question to decide what is the best test to adopt for road metal; but, nevertheless, a very important one, when we consider the large amount of money expended annually on macadamised roads in England. I think the test by abrasion is not of much value, which was only demonstrated by the following example:—Quartz, for instance, would be 7 in hardness, whereas elvan would be about 6; but there cannot be two opinions which is the best material for road metal, the quartz being hard and brittle, the elvan inferior in degree of hardness, but superior in tenacity; but if we apply the abrasive test, what is the result? Instead of the tougher material proving the best, it would be quite the reverse.

I append herewith some results obtained by a process of testing which originated with Mr. Clark, road surveyor, Truro. The standards erected are hardness, tenacity, and specific gravity.

The system adopted is as follows:—A 3 lb. sample of broken stone,—broken to a 2½ in. gauge,—is pounded by a machine constructed for that purpose, having a 15 lb. hammer with a 10 in. drop, directly on to the material being operated on, which is placed on a solid iron bottom. The pounding continues until the material is reduced sufficiently small to pass a ½ in. sieve. All material that will not stand 200 blows before becoming reduced to the maximum gauge is considered worthless.

The following are specimens of stone tested by this process:—

	Hardness.	Specific Gravity.	Tenacity, or number of blows.
Quartz .....	7	2.560	204
Elvan .....	6.5	2.760	740
Greenstone .....	6.5	2.910	752
Gneiss .....	6.5	3.070	799
Sandstone .....	6	2.693	660
Limestone .....	4.5	2.680	356
Granite (Guernsey). ..	6	2.787	612
Basalt (Clee Hill) ...	6.5	2.655	724

SURVEYOR.

"Safe Deposits."—We are informed that Messrs. Chubb have in hand at their London works what is described as "the strongest and most novel form of safe deposit," for the new Security Company's premises in St. James's-street, S.W. Messrs. Chubb are also, we hear, constructing the large safe deposit for the Birmingham branch of the same company.

#### The Student's Column.

##### WATER-SUPPLY.—XXIV.

###### RURAL SUPPLY.

THE sources usually drawn upon for the supply of villages and country mansion-houses, are springs and small streams, or wells. Where these fail, the rain collected from roofs when properly treated is utilised, and even where water derived from the first-mentioned sources is laid on, it is often customary to store rain from roofs of large mansions, in addition, for use in the garden or for washing purposes, especially when the other water alluded to is rather hard. Another method, not very frequently resorted to, is the collection of rain by the ordinary drainage system on a small scale, and conducting the water to tanks underground.

In all cases of rural supply, it is essentially necessary to attend to the quality of the water proposed to be used, and we would suggest that consumers themselves should look more carefully to this than they now do. The average country gentleman is not over-particular in this respect. A local well-sinker and water-fitter produces and lays on an abundant supply to his house; the water is clear and tastes sweet, and everybody seems satisfied. Samples of the water are not submitted to a competent man for examination, and, in short, no professional assistance has been rendered in respect of the whole work, a circumstance of much gratification to the householder alluded to, as he has saved himself all the attendant fees. After a few years, the appearance and taste of the water being apparently quite the same as at first, somebody in the house contracts zymotic disease. The doctor, knowing how frequently this is brought on through drinking bad water, naturally (*inter alia*) suspects the well, and advises that the water should be examined by an expert, who pronounces it to be contaminated with sewage. On investigation, it is found that the well-sinker, not having been under proper supervision, had constructed a form of well quite unsuited to the surrounding conditions of the site, or had sunk it to a wrong horizon. Assuming the first is the cause at fault, it may be found that he has made a brick well, after his own fashion, in highly porous strata slightly water-bearing throughout, but especially so at the bottom. The cesspool belonging to the house, the drainage from piggeries, stables, &c., are made in the same porous formation, usually gravel or sand, and this water-bearing horizon is, therefore, contaminated along certain levels, according to the precise lithological character of the strata. Upon the first construction of the well, the cement (or whatever has been put in) being new, may succeed in keeping out this bad water, but eventually it finds its way through some weak places in the brickwork, and the well forms a convenient receptacle for the contaminated water to drain into.

We may quote another case as an example of the prevalent opinion in non-professional circles, even in these days of sanitary reform, as to the influence of cesspools over well water. The student will find that this is one of the most important subjects with which he will have to grapple, as it crops up in many schemes of rural supply; and although it is only an elementary point, it cannot be too strongly commented upon. A gentleman finding the water obtained from the roof of his house not altogether to his liking, consulted a proper authority as to another method of supply, and was informed that by having a well sunk, and lined in a certain manner, he could obtain what he wanted at a defined depth. On submitting the scheme to contractors, he received estimates for the work, and found that to have it lined in the manner suggested would be more expensive than in the style recommended by a local man, who "knew more about wells than the London gentleman consulted." On inquiring as to the reason for the special kind of lining, the London expert answered that "the upper layers of the proposed well would be water-bearing and contaminated from the cesspool belonging to the house, and the lining would be required to keep this deleterious water from gaining access to the well." Now the cesspool was about twenty yards from the site of the proposed well, and his client did not see how the latter could possibly be contami-

nated from this source, as the distance between was so great, so he followed the advice of the local contractor and had the well sunk accordingly. The result was that the water has since been condemned.

How many farmyards do we find with wells sunk in close proximity to permanent manure-heaps? The consumer in such cases fondly hopes that by bringing the brickwork of his well above the surface drainage level, he excludes all obnoxious matter; but nevertheless it soaks into the shallow well underground. And we may here point out that water may be contaminated so slightly that, ordinarily, it has not much deleterious effect upon healthy persons. Water from a well may be used for many years without producing defined disease; but, sooner or later, one of the consumers may be struck down. True, we have properly authorised persons, whose duty it is to find out and close wells giving forth water of inferior quality; but for very many obvious reasons it is not possible to detect all such bad sources. Wells in country villages are frequently only condemned after the cause of an epidemic has been inquired into.

Where water is supplied to large communities, there is almost sure to be some one who will take sufficient interest in the matter to have the quality of the water examined, but this is not always the case with villages and mansion-houses. In these latter, the occupier himself ought always to cause this to be looked after, and have an independent report made on it for his own information. Yet,—and this is an extraordinary fact,—the occupier, or proprietor, is in many instances the last person to have this done; indeed, the reluctance often arises from a suspicion that his well may be closed if the quality of the water in it is too carefully inquired into. When it is condemned, instead of being heartily glad that a fruitful source of disease has been detected in his midst, he regards it as a hardship that he is compelled to seek another supply. The condemned well, he argues, has served his family for years and, "therefore," he does not see why it should not do so for years to come.

From the foregoing, it might be imagined that well water is not suitable for rural supplies, but this is not so. On the contrary, we think that it is often the best source that can possibly be drawn upon, only that much care should be exercised in devising methods of obtaining it. Due consideration must be given to the disposition of the water-bearing horizon from which the supply is to be had, and the character of the surface deposits. For example, suppose we have a clay, covered by about 20 ft. of aquiferous gravel and sand, the clay holds up the water, but the superficial porous beds are impregnated with sewage matter, and it is clear that good water cannot be obtained from them. Underneath the thick bed of clay, sand may be found, giving out water of the first quality. Now, in order to sink a well to this last-mentioned horizon, that portion of the boring which passes through the superficial gravels alluded to, must be lined with iron cylinders to keep out the bad water. Wells are frequently lined in this manner almost throughout their entire depth. Very often the source of contamination only exists in the uppermost few feet of the well. Instead, therefore, of looking for altogether different sources of supply where wells are condemned, it should first be ascertained whether, by lining the well properly, the same source cannot still be utilised. It may be found more economical to construct another well on an improved system in close proximity.

In cases where a village or mansion-house is supplied from a stream, the quality of the latter may be judged from our earlier articles on that subject. As to rain collected on the roofs of houses, we recognise the fact that under certain circumstances no other water is available; but where this is not the case, it should never be used as a sole source of supply. It is all very well to say that it can be filtered and made pure—and we do not deny that by a refined process of filtration the consumer can always be assured that such water is wholesome—but we think that more palatable water and of even quality and quantity can be obtained from the other sources alluded to. Some believe that, beyond being dirty, the water from the roofs of country houses is otherwise good—that it cannot be organically polluted, having only fallen from the clouds just prior to its collection. This, however, is a fallacy; any one who inquires into the matter will find that the elements of disease are not unfrequently introduced into roof-water



by decaying animal and vegetable matter, and especially through the agency of birds. It has been directly proved that the excrement of diseased pigeons has resulted in serious contamination. Decaying animal matter, such as dead sparrows, &c., has also been found guilty in polluting roof-water. No kinds of filtration can altogether remove these noxious organic matters from water. Still, in cases where this class of water must of necessity be used, it can be very much improved, and the danger reduced to a minimum, by having special arrangements for separating the first parts of a shower (always the dirtiest) and for catching and collecting the rainfall and filtering it by an iron process in the best possible manner. The collecting tank should be kept covered up.

Mr. J. Lucas refers\* to a novel system of rural supply, which consists in collecting rain-water by means of an artificial catchment-area formed of sheet zinc, which is at present in use at a little hamlet about two miles east of Goring, in Oxfordshire. The catchment-basin is enclosed by a railing, and the water runs into a tank, out of which the cottagers draw as from an ordinary well.

One of the most important items in connexion with rural supply is the provision of water, under pressure, for distribution purposes, but especially as a means of protection against fire; in this latter respect, we think that where the supply entirely consists of collected roof-water it is often totally inadequate to cope with a large conflagration, and this, perhaps, constitutes the chief objection to its use. No matter from what source the water is derived, it should be raised to a reservoir of sufficient height and storage capacity to produce a good head and ample supply in case of fire, and hydrants should be fixed in all suitable positions. Various machines for raising water will be considered in our next article.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

15,920, Water Cisterns. J. H. Lightbody. The cisterns, which are the subject of this patent, are made of a substance resembling papier-mâché, light and strong, glazed, enamelled, or painted, and, if necessary, strengthened by iron stays. All kinds of rain-water goods, pipes, heads, gutters, &c., can be made in the same material.

17,839, Ventilating Sash-fastener. J. Cole. The fastener, which is the subject of this invention, is made with a small trigger or stop to prevent its being opened from outside, and when the window is opened it can be allowed to remain partly open for ventilation without the possibility of any one entering the room through the window. The arm of the fastener, which has a double motion, is curved and passes over a segmental-shaped catch, in the centre of which is a slot or notch to receive a small trigger or stop attached to the knob. This stop is so hinged or pivoted to the arm that it readily falls into the notch, and thus prevents the arm from being moved by a blade passing through the catch. The arm extends over and grips the catch so as to tighten and firmly hold the sash in position.

1,139, Water-closet Apparatus. T. Stevens. According to this invention, the water is retained in the basin by means of a plug or plunger, and the plug being lifted by means of a handle placed at the side of the basin, or by other means, the space required for the plug to work in is entirely covered and filled up with water when not in use, thereby avoiding the accumulation of foul air in the apparatus at such times as it is not in use.

12,397, Casement Opener. H. S. Owens. This invention relates to the construction and arrangement of parts, constituting a mechanism whereby casements, skylights, &c., may be opened, closed, or held securely. The upper end of the operating-rod is formed into, or attached to, a slide, which travels in a guide of special construction, and the lower end is controlled by a screw-threaded nut or suitable gearing.

15,523, Ventilators. G. Connell. This invention is principally applicable to wall-ventilators. It consists of a chamber, having a large inlet externally, and gradually tapering away in an upward direction, so that the outlet internally is only about a fourth of the area of the external inlet.

15,669, Manufacture of Artificial Asphalte. J. Ersley.

According to this patent, sand, tar, and resin are mixed in suitable proportions, and then formed into blocks. It is claimed that this artificial product is found to be proof against all temperatures, as well as against blows. It will not yield under a heavy pressure of load, and will not crack under powerful blow. It is not affected by hot water, and

can be exposed to steam without affecting any change in its condition.

##### NEW APPLICATIONS FOR PATENTS.

Nov. 25.—18,862, H. Sutcliffe, Water-closets.—18,866, M. Goodwin and W. Doward, Flooring.—18,883, G. Arnold, Fire-places.—18,911, P. de Kristoffovitch, Artificial Granite.

Nov. 26.—18,951, W. Hague, Kilns.—19,015, N. Sorensen, Handles for Door and other Latches.

Nov. 27.—19,091, F. Rendell, Facilitating the Application of Sash-cords to Windows.—19,092, W. A. Kernian, Boilers for Utilising the Waste Heat of Kinds or Ovens for burning Cement, Lime, Bricks, &c.

Nov. 28.—19,113, F. Laurence, Boss for Connecting Taps with Pipes.

Nov. 30.—19,246, J. Wilson, Fireproof Hearths and Carriers.—19,258, W. Wheatley, Roof-covering.—19,259, W. Wheatley, Hap Lock.—19,260, C. Carmont, Non-slipping Tread.—19,292, A. Jones, Nails.

##### PROVISIONAL SPECIFICATIONS ACCEPTED.

14,687, H. Sanderson and O. Ehlers, Reversible Sliding Windows.—16,120, H. Le Mesurier and W. Dart, Fastenings for Emergency Exit-doors, &c.—16,340, W. Ayres, Sash Weights.—16,726, T. Rutherford, Knobs or Handles for Doors, &c.—16,784, W. Muirhead, Flushing Apparatus.—17,447, E. Christie, Combined Door-chain and Latch.—17,665, J. Keighley, Chimney Pot or Ventilator.—17,666, J. Eapson and others, Valves for Cisterns.—17,712, T. Bradley, Bench-stops or Hooks for Joiners' Benches.—17,758, H. Bassett, Building Material, &c.—17,985, J. Stone, Tip-wagons and Carts.—18,041, A. Hughes, Protector.—18,042, J. Martin, Pigments or Paints.—18,069, B. Stocks and W. Illingworth, Automatic Bolt for Doors, &c.—18,126, H. King, Flush and Knob-bolts for Doors, &c.—18,132, E. and E. Evans, Sash-fasteners.—18,143, H. Nettelford and J. Sheldon, Screws.—18,174, G. Duggins, Fastener for Windows, &c.—18,368, A. Taurman, Door Springs and Checks.

##### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to Opposition for Two Months.

17,817, R. Batey, Chimney-tops.—685, T. Turner, Apparatus for Turning Stone, &c.—1,268, J. Lorence, Circular-saw Disc Cutters.—1,642, W. Crichton, Raising, Lowering, and Lifting Window-frames.—1,863, C. Hall, Sliding Flush-bolt.—1,694, H. Blake, Block-paving.—17,002, J. Stevens & Co., Major Spring-hinges for Doors.—17,121, L. Kennedy, Brick and Tile Machines.

#### RECENT SALES OF PROPERTY:

##### ESTATE EXCHANGE REPORT.

Nov. 28.—By WORSFOLD & HAYWARD (at Dover).  
Dover—1, New-st., f. r. £16 p.a. .... £170  
7, 8, and 9, Albany-place, f. .... 695  
31, Albany-place, u.t. 81 yrs, g.r. £1 ..... 170  
59, Limekiln-st., u.t. 9 yrs, g.r. £3 3s, u.t. 60 yrs, g.r. £20 ..... 300

Dec. 2.—By T. Woods.  
Feltham, near—Cgr. of £9, with reversion in 78 yrs ..... 180

Dec. 3.—By DAVES & Co.  
Haymarket—Improved rent of £38 4s, a.u. .... 2,800  
City of London—6, Tower Dock, f. r. £20 ..... 1,170  
Brentford—109, High-st., f. r. £30 ..... 620

By P. J. BAKER.  
Rotherhithe—308, Lower-rd., u.t. 33 yrs, g.r. £4 10s, r. £36 ..... 260  
6, Portland-pl., u.t. 77 yrs, g.r. £5 12s, r. £28 12s ..... 285  
Bermondsey—137 and 139, Port-rd., u.t. 60 yrs, g.r. £10 ..... 630

Dec. 4.—By J. C. Cox.  
Walthamstow—43 to 59 (odd), Hervey-pk.-rd., f. r. £165 ..... 1,490

By NORMAN, SON, & BOWEN.  
Forest Gate—75, Eastham-grove, f. .... 615  
Holloway—131 and 133, George-rd., f. r. £20 8s, p.a. .... 510

113, 115, and 117, George-rd., f. r. £79 6s, p.a. .... 565  
Limehouse—28 and 27, Halsey-st., and 7 and 8, Ebenezer-pl., f. r. £74 16s, p.a. .... 460

By D. J. CHATFIELD.  
Peckham—64, Antey-st., u.t. 87 yrs, g.r. £5, r. £28 12s ..... 205  
Bowes Pk.—95 to 100, Whittington-rd., f. r. £130 ..... 1,400

Dec. 5.—By J. G. & A. PERVOZ.  
Forest-gate, Capel-rd.—"Taniwah House," f. r. £28 p.a. .... 420  
Bethnal-green—45, 49, and 71, Coventry-st., u.t. 20 yrs, g.r. £8 ..... 420

By NEWBORN & HARDING.  
Essex-rd.—47, Oxford-rd., u.t. 56 yrs, g.r. £6 ..... 440  
Stoke Newington—3, Brodia-rd., u.t. 75 yrs, g.r. £4, r. £21 6s ..... 210

Clerkenwell 9, Wilmore-st., u.t. 25 yrs, g.r. £12, r. £60 ..... 325  
10, Wilmore-st., u.t. 28 yrs, g.r. £12, r. £85 ..... 465  
Highbury New Pk.—No. 119, u.t. 60 yrs, g.r. £3 10s ..... 805

Islington—168, New North-rd., u.t. 38 yrs, g.r. £8 6s, r. £40 ..... 310

By WALKER & RUNZ.  
Crouch End—F.g.r. of £40, with reversion in 78 yrs ..... 340  
F.g.r. of £29, with reversion in 78 yrs ..... 350  
F.g.r. of £105, with reversion in 78 yrs ..... 2,380

Hatton-garden—3, Charles-st., and 2, Robin Hood-rd., f. r. £10 12s, p.a. .... £1,380  
1, Robin Hood-rd., f. r. £20 p.a. .... 620  
Holborn—11, Leather-lane, f. r. £80 p.a. .... 860  
Finsbury-pk.—60 to 68 (even) Fonthill-rd., f. r. £20 p.a. .... 1,900  
70, 72, 74, 80, and 82, Fonthill-rd., f. r. £110 p.a. .... 1,765  
Upper Holloway—42 to 40 (even), Wedmore-st., u.t. 21 yrs, g.r. £26 4s, r. £200 p.a. .... 600  
East Greenwich—3 and 8, Chester-st., and 5 and 12, Braddell-st., u.t. 31 yrs, g.r. £10 12s. .... 610  
New Cross-rd.—No. 289, u.t. 10 yrs, g.r. £1 10s, r. £39 ..... 90

By B. BROWN.  
Cubitt Town—The Poplar Dry Dock, with Plant and Machinery, u.t. 53 yrs, r. £240 ..... 12,000

By BROAD & WILKINSON.  
Regent's-pk.—1, 2, and 4, Harrow-hill-place, and 2, Wells-road, u.t. 12 yrs, g.r. £37 ..... 830

Dec. 6.—By BAKER & SONS.  
Edgware-rd.—44 and 50, Church-st., u.t. 32 yrs, g.r. £21, r. £120 ..... 780

By O. D. FIELD & SONS.  
Hackney—5 and 7, Sylvester-rd., and 1 to 4, Grove-buildings, f. r. £27 12s, p.a. .... 2,400

[Contrautions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; l. for leasehold; 1. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

#### MEETINGS.

##### SATURDAY, DECEMBER 14.

University College, London (Archæology).—Demonstration at the British Museum, 11.30 a.m.  
Royal Institute of Architects of Ireland.—Annual General Meeting and Annual Dinner, 8 p.m.

##### MONDAY, DECEMBER 16.

Royal Institute of British Architects.—Mr. David MacGibbon on "The Architecture of Provence," 8 p.m.

##### TUESDAY, DECEMBER 17.

Institution of Civil Engineers.—Discussion upon Professor Osborne Reynolds's paper on "The Triple-Expansion Engines and Engine Trials at the Whitworth Engineering Laboratory, Owen's College, Manchester, 8 p.m."  
Glasgow Architectural Association.—Mr. Hippolyte J. Blanc on "Scottish Collegiate Churches of the Fifteenth and Sixteenth Centuries."  
Architectural Association.—"Common Room" Meeting. Discussion on "The Position of Architects' Assistants."

##### WEDNESDAY, DECEMBER 18.

Society of Arts.—Sir Robert Hawkinson on "London Sewage," Professor Sir H. E. Roscoe, F.R.S., M.P., in the chair. 8 p.m.  
Civil and Mechanical Engineers' Society.—Mr. R. Bolton on "Percussive Rock-Drilling Machinery," 7 p.m.  
Builders' Foremen and Clerks of Works' Institution.—Annual Meeting of the Directors, 8 p.m.  
Meteorological Society.—Four papers will be read, 7 p.m.

#### Miscellaneous.

**East of Scotland Engineering Association.**—The second meeting of the session was held on the 3rd inst., in Edinburgh, Mr. J. B. Bennett, C.E., President, in the chair. Mr. James Thomson, Assoc. M.Inst.C.E., read a paper on "A Successful Purification Process for Sewage and Water," in which, after referring to the various methods which have been at different times adopted for these purposes, he described fully the works at Acton, in which the process of the International Purification Company is in use. The paper gave rise to an animated discussion.

**The British Home for Incurables.**—The Board of Management of the British Home for Incurables, Clapham, having purchased a freehold site at Norwood, ask for the sum of 15,000*l.* to erect the new Home (rendered necessary by the expiration of the lease of the present premises), which will, we are promised, have every modern improvement for the care of the patients, combined with strict economy as to building.

**Indiarubber Paving.**—The experiments which have been made with indiarubber paving in Hanover, Berlin, and Hamburg are reported to have proved so successful that the use of this material for street paving is to be extended. The indiarubber is not slippery, and has not shown much sign of wear, and the traffic upon it is of course noiseless.

**The New House of Parliament in Stockholm.**—The jury appointed to decide upon the designs for the new Houses of Parliament in Stockholm, has awarded the first premium, 335*l.*, to Herr Valfrid Karlson, a young rising Swedish architect, for the best design. Four other premiums were also awarded, and four more designs purchased.

\* "Trans. Surveyors' Inst.," vol. xx, (1889), p. 202.





*Officers & Warehouse: 76, CHEAPSIDE, London; Manufactories, Wharfedale Works, Arlington-st., London, N.*



# The Builder.

Vol. LVII. No. 2446.

SATURDAY, DECEMBER 21, 1899.

## ILLUSTRATIONS.

St. Paul's Church, Kensington: Interior.—Mr. Arthur Baker, Architect	Double-Page Photo-Litho.
Tower, Senlis Cathedral.—Drawn by Mr. A. B. Mitchell	Single-Page Ink-Photo.
Victoria Assize Courts, Birmingham: Pediment with Figures.—Messrs. Aston Webb & E. Ingress Bell, Architects; Mr. W. Aumonier, Sculptor	Single-Page Ink-Photo.
Sketches in Chelmsford.—By Mr. J. W. Cobb	Single-Page Photo-Litho.
Head Quarters of the Artists' Rifle Volunteers: Detail of Front.—Col. Edis, F.R.I.B.A., Architect	Single-Page Photo-Litho.
Bungalow on the Bellaggio Estate, East Grinstead.—Mr. R. A. Briggs, Architect	Two Single-Page Ink-Photo's.

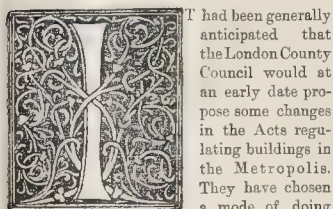
## Blocks in Text.

Plans of the Head-Quarters of the Artists' Rifle Volunteer Brigade	Page 442
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### The Proposed Amendments of the Metropolitan Building Acts.



It had been generally anticipated that the London County Council would at an early date propose some changes in the Acts regulating buildings in the Metropolis. They have chosen a mode of doing this which appears, as we have already noted, to be open to some objection, as the proposed amendments appear in the form of a group of clauses in a "General Powers Bill,"\* and thus may escape the attentive scrutiny they ought to receive. The amendments sought to be introduced are fragmentary and disconnected, and in several cases are directed to remedy defects or deficiencies which have been found in the more recent Acts rather than in the Act of 1855.

This piecemeal legislation is not thorough, and can hardly lead to much durable benefit, and though it undoubtedly may apply a remedy to certain immediate evils, there are other points towards which attention might with equal advantage have been directed, and which may, we hope, be dealt with hereafter.

Two clauses, singularly enough not connected in position, refer to the function of the Superintending Architect as the authority for fixing lines of frontage. By one of these (67) he is directed to deal with corner-plots,—that is to say, in fixing the line of frontage in a street where, hereafter, a corner-house will have to be built, he is to determine the line of frontage to the second street on which such house will also abut, and the line so determined is to be binding upon the persons who hereafter build in such street. This will, it is true, dispose of some vexed questions as to corner-plots, but it will seriously increase the responsibility of the Superintending Architect, as in some, at any rate, of such cases he will be compelled to fix a line of frontage without being able to have the advantage and assistance of having the persons who hereafter may become interested in the property before him, and hearing what they have to say.

The other clause (No. 61), which will in some cases be of essential service, will not relieve the Architect in such a case as the

above. This is a clause requiring the Architect's decision to be notified to the Vestry or District Board and the adjoining owners, and giving a right of appeal within fourteen days. Probably the most important of all the proposed changes is the establishment of a new tribunal which is to hear these appeals, and which is to consist of three persons, one to be appointed by the County Council, one by the Royal Institute of British Architects, and one by the Institution of Surveyors. Not only is such a tribunal likely to dispose satisfactorily of any appeals that may be raised, but we hail its appointment as possibly a first step in a direction towards which an improvement is urgently needed to be directed. If the establishment of this tribunal for frontage appeals should prove the first step towards the constitution of some Court or Court of Appeal where all important technical questions, arising under the Building Acts, could be heard and reviewed, it will be, indeed, an amendment in the best sense of the word. The greatest difficulties in the administration of the Acts governing building in the Metropolis, rise out of the uncertainties and the conflicting decisions in the existing tribunals of the Police Magistrates' Courts.

A useful power is proposed to be conferred on the County Council by Clause 62, under which it can consent to the erection of business premises of greater cubic contents than the present limit. This alteration, or something like it, has been proposed before, and met with determined opposition from the Insurance Companies, but it would be of great advantage to manufacturers and others if the proposed powers were given, supposing always that they were liberally and prudently administered.

Two clauses, again disconnected in position, refer to the width of roads and setting back of frontages. In order, apparently, to correct an oversight in the Act of 1878, the Council seeks to obtain under Clause 63 a power arbitrarily to fix "the centre of the road," and under Clause 68, to inflict penalties for infringing a frontage line of 20 ft. in case of a carriage-way, or 10 ft. in case of a footway from such centre as was prescribed in the 1878 Act. Apparently the object in re-enacting the penalties may be to get rid of a process of giving notice to offenders which, under the enactment just quoted, has to be gone through. There is room for doubt whether this provision, as it stands in the Bill, would be found quite workable; and there certainly is room for more than doubt as to the propriety of arming

the County Council with an arbitrary power of fixing what shall be the centre of the roadway. Surely the defects in Clauses 4 and 6 of the Act of 1878, which do not, it is admitted, fully carry out the intentions of the framers of that Act, might have been carefully amended without so drastic a remedy as this.

Another clause, No. 69, gives control to the Council over carriage-ways which will not directly communicate at both ends with a public carriage-way. This appears substantially to extend to carriage-roads the provisions of Section 7 of the Act of 1882, which apply to laying out a road for building. It may be expected that land-owners will resist this enactment. Many of them are already much hampered by the operation of the Act of 1882 just referred to, and this will add materially to their grievances. It is true that in the clause which enacts this regulation it is proposed that there shall be an appeal to an arbitrator chosen by one of the Secretaries of State. Could this right of appeal be with advantage extended to decisions as to roads laid out for building it would probably be of more service than when confined to roads for communication only. A man who wants to drive a road through his estate that is not intended to create building frontages, does not, as a rule, care for an expensive and tedious tribunal.

The other provisions include one (No. 60) as to the form in which the approval of plans is to be given; one (No. 65) prohibiting the turning of buildings erected for private purposes into public buildings without the previous consent of the Council; and one (No. 66) enforcing notice to the authorities before pulling down, as well as before erecting, any building within 30 ft. of any public thoroughfare, and the erection of a proper hoarding, platform, and handrail. About these there is not much to be said; but there remains a provision in Clause 70 of more serious importance, one which will strike a blow at the erection of houses in flats and other developments of building, and which probably will be fiercely opposed. It is proposed to enact that no building, after the passing of this Act, shall be carried to a greater height than 70 ft. from the pavement without the consent of the County Council, under a penalty of £100. The 70 ft. are to be computed up to the top of the parapet if there is one, or the top of the wall if there be no parapet. Surely, it would not have been impossible to devise some reason-

\* For the text, see the *Builder* for Dec. 14, 1899, p. 421.



able rules as to lofty buildings without making each one of them a special case for the consideration of the Council.

So far the various clauses state definitely what it is intended to do, but there remains one (No. 64) in which the precedent of the Act of 1878 is followed, and the Board is authorised to proceed by way of by-laws in regulating certain questions, though we fail to find the clause which that Act contained requiring the by-laws, or any variation of them, to be sanctioned by a Secretary of State before they acquire the force of law, and to be notified by advertisement before they obtained the force of law; but, instead thereof, the sections of the Metropolis Management Act of 1855 which relate to the making of by-laws are incorporated. These sections do not so fully safeguard the public against surprise or hasty enactments. The subjects upon which this legislation by means of by-laws is proposed are the materials used in plastering, and on the sites of buildings for 3 ft. round the building, and what they may be filled up with, and the duties of District Surveyors in respect of these matters. Legislation by means of by-laws is not a desirable course to pursue, and surely in so very simple a matter as this it would not have been difficult, would not now be difficult—to draught a clause setting forth exactly the nature of the proposed amendments as the Council desires them to stand.

We have now touched upon all the clauses, and we are tempted to express our regret that they should be, one and all, of the nature of stop-gaps; they are eminently specimens of piecemeal legislation, but in one thing—and apparently one only—they are consistent. Each difficulty is to be referred to the County Council. This we also regret. There is no proper machinery in a large, overworked and overweighted public body for giving the due consideration to individual appeals, and the true wisdom would have been to make the various amendments as perfect as skill and experience could suggest, and there to leave them.

The appellate jurisdiction of the Metropolitan Board gave rise to much that was undesirable, and it is most unfortunate that its owners should be seeking to extend instead of, if possible, to contract it.

One other question forces itself on our notice. Why were these points specially selected for amendment? We had hoped that some attempt might be made to render the Building Act a little more favourable to architectural design as developed at the present day; that some more scientific definition of the materials to be employed in fire-proof staircases and passages might be introduced, so as to favour fire-resisting construction; and that, perhaps, some provisions for the protection of iron employed as columns, &c., from the action of fire and water, might have been made.

We fear the present Bill can hardly be looked upon as an instalment of a well-considered scheme of reform; and were it not for its provision of an appeal court in certain cases, which we heartily welcome, it could hardly be considered anything better than a hasty attempt to do something in order to redeem platform pledges.

**Edwardian Architecture**—Mr. B. Priestley Shires, past hon. sec. of the York Architectural Association, delivered a lecture on "The Domestic Architecture of the Edwardian Period" on Wednesday evening last, in the large lecture-hall connected with Batter-street Church, Plymouth. The lecturer spoke at length on the historical and literary references to the subject, and alluded to the arrangement and plan of Edwardian houses and castles, to the furniture, tapestry, manners, and customs of the time, windmills, water-mills, and public roads of the period. The lecture was illustrated by drawings and sketches.

**Architectural Exhibition in Stockholm**.—During next summer an exhibition of architectural drawings is to be held in Stockholm, with the view of collecting all designs of buildings offered for competition in Sweden during recent years.

#### ABOUT SUNDIALS.

**A**T the present day whatever interest is felt in the sundial is one of a purely sentimental kind. For many centuries, no doubt, it was a recognised practical way of recording time, and was regarded as a purely practical scientific instrument for that purpose. The modern perfecting of mechanical means of registering the passage of time has long since removed the dial from its place of honour as a clock, although certain special applications of sun-shadows can still be found useful, as noticed and illustrated in Sir E. Beckett's (Lord Grimthorpe's) work on "Clocks and Watches," for obtaining true time from the sun at noon, for the benefit of those "who cannot or will not undertake sidereal observations." The two systems mentioned in the work referred to are the "meridian dial" by which a thin slit of light is thrown on an ascertained and marked spot on a slab, at noon; and the much more scientific instrument patented by the late Mr. Bloxam, a barrister, called the Dipleidoscope. This consists of an arrangement of three pieces of glass, two of them mirrors, in the form of a triangular box, the two mirrors being so arranged that a double reflection of the sun is seen at all times except at meridian noon, when the two images coincide. The adjustment has to be made with a chronometer in the first instance. This may be said to be a kind of stationary sextant, reading true always for the permanent position in which it is first adjusted.

Both these however differ in principle from the sundial proper; the latter obviously so, the former in the fact that the angle at which the upright bearing the slit is fixed is a matter of little importance, provided the slit face south; it is supposed to be fixed upright, but might vary its angle in the plane of north and south without affecting its use, provided no movement takes place after the adjustment is once made. A simple and scientific method of making the adjustment is described in Lord Grimthorpe's book just referred to. The essential difference in the sundial consists in the fact that it measures time by a shadow passing over equal angles in equal times, and that to effect this the gnomon which casts the shadow must be fixed at a special angle which, in regard to the earth's surface, varies with the latitude. The shadow of an upright gnomon, unless it were fixed on the earth's pole, would travel over different angles in equal times, at different parts of the day. To produce an approximation to correctness (for various reasons and in various ways it is not more than an approximation) the gnomon must always be fixed parallel to the earth's polar axis. Theoretically, indeed, it could not be perfectly true in its registering except when in the position of being a continuation of the polar axis itself; but the difference caused by the distance from the earth's axis is too infinitesimal to be taken into account, in relation to the distance of the earth from the sun; and the gnomon, when fixed parallel to the earth's axis, may be regarded, in relation to its function, as on the axis.

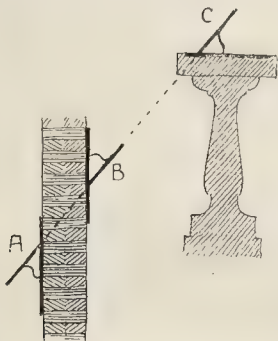
The interest which the sundial has had for many minds, in many generations, is perhaps in great measure owing to the fact that, though confessedly imperfect, it is a measure of time carried on not by any machinery of wheels and springs or weights made by human hands, but by the great mechanism of the solar system itself, a mechanism with which no human force can intermeddle. It is the sense of the relentless movement of this silent shadow marking away the hours that has probably tended to render mankind so disposed to moralise over the sundial, and to decorate it with a multiplicity of mottoes, many of which are collected for us in Mrs. Alfred Gatty's beautiful volume, "The Book of Sundials,"\* and the bulk of which, in their weighty and even solemn tone of thought and suggestion, give

ample and very interesting evidence of the impression which the sundial has made upon men's imagination. Apart from this moral interest of the subject, which is in its nature perennial, there is no doubt still an interest attaching to the construction of sundials in another sense, as a means of putting oneself practically *en rapport* with the movements of the sun and the earth; and Mr. W. Richardson, who has written the appendix on the construction of dials to Mrs. Gatty's book, observes that "if any youthful reader will take the trouble to construct a sundial it will teach him more astronomy than a course of popular lectures can afford him." But we rather question whether the writer has taken the best and clearest method of illustrating the practical part of the subject. One or two minor points are in fact inaccurate, and tend to make the student mistake ascendentals for essentials. In relation to his diagram fig. 3, for instance, which gives the plan for the setting-out of a dial-plate on a horizontal square table, he says "draw a square or rectangle, and down the centre draw a perpendicular line PS. On the left of this draw a parallel line and make its distance from PS equal to the thickness of the gnomon. This double line is called the substile," that is to say, since the gnomon has a certain thickness, a central blank must be left under it on the dial-plate, corresponding to its thickness, and the setting-out of the hour-lines must be made on each side of this space. But to direct the student to commence by drawing a centre line on the plate, and then marking off a parallel one to the left of it, is to start him with an error which will get the "substile" space out of centre on the plate. The diagram itself, we observe, is correctly drawn, but the description of how to set about it is wrong at the outset. He should have said, draw a central line, and on each side draw a parallel line, the space between the two representing the thickness of the gnomon; or, which would have been still better, the setting-out should have been made from a central line, assuming the gnomon to have no thickness (as indeed the writer suggests in the demonstration of another figure); when the setting-out of the hour-lines is complete, it is easy to reproduce it, substituting a double line with a space between for the central line—in other words, pushing the two sides of the dial-plate asunder and inserting in the centre a blank slip representing the thickness of the gnomon. Again, at the conclusion of the demonstration how "to construct a horizontal sun-dial for the latitude of 54 deg.," we are told "the gnomon will be a right-angled triangle, having one angle of 54 deg. at O, and placed on the substile O XII." This may be only *façon de parler*, but it leads the student to think that the triangular shape of the gnomon is essential, whereas the only essential part is the side subtending the imaginary right-angle. Gnomons constantly have been made of a triangular shape, because it is an easy and simple way of making them strong and seating them firmly in their position; but this shape is a mere constructive matter, the only part essential to the function of the dial is the upper edge at an angle of 54 deg. (or whatever other angle the latitude may require). And in adopting the rather complicated methods of demonstration and setting-out apparently taken from Leybourn, the author has given a good deal of mystery and apparent difficulty to what is really a simpler problem than the student would gather from the pages of this "appendix." As Mr. Richardson refers to the definition of the subject in Mr. Norman Lockyer's "Elementary Lessons in Astronomy," it is to be regretted that he did not adopt the beautifully simple and logical definition there given of the principle of the sundial, by far the best and clearest we have ever seen. It cannot perhaps be fully realised without Mr. Lockyer's diagram, which is to be found on page 192 of the "Elementary Lessons,"\* but he explains the matter thus: Suppose we had a transparent

\* The Book of Sundials: collected by Mrs. Alfred Gatty; new and enlarged edition, edited by H. K. F. Gatty and Eleanor Lloyd. With an appendix on the construction of dials, by W. Richardson. London: G. Bell & Sons; 1889.



cylinder with an opaque axis, both axis and cylinder parallel to the axis of the earth. Let us draw down the surface of the cylinder parallel lines at equal distances of 15 deg. of the circumference of the cylinder, and place a dial-plate in the cylinder in contact with its sides, and let the opaque rod pass through the centre of the dial-plate; the sun would cast the shadow of the rod on the dial, and whenever the end of the shadow coincided with one of the hour-lines on the surface of the cylinder an hour would be marked. The dial-plate might be put in any position in the cylinder; if at right-angles with the axis it would be a circle, if otherwise, an ellipse, but the hours would be marked just the same. Now that is what all the sundials in the world are,\* in whatever position and in whatever latitude; they are dial-plates strung on to an imaginary rod which is parallel to the earth's axis, and of which the gnomon of each is the portion of the rod there visible. If the editors of the present edition of the work had realised this they would hardly have made the observation they have made (page 317) in regard to the dial on the north side of Market Deeping Church, that the gnomon "instead of being parallel to the axis of the earth is placed in an exactly opposite direction on account of the unusual aspect of the dial." We have not seen the dial in question, but we presume what is meant is that the gnomon inclines upward instead of downward; but it is still parallel to the axis of the earth. As Leybourn says, when you have set out the dial for a vertical face looking due south, you have set out two dials, "for the north dial is but the back side of the south." Suppose, in the accompanying sketch, A represents the angle of the gnomon for a vertical dial-plate facing south, for a given north latitude. If we erect another dial back to back with it on



the north side of the wall (B), the angle for that gnomon will be the line of the south dial gnomon carried through the wall, as shown by the dotted line. And if we produce this line further we can show it at C as the gnomon for a horizontal dial-plate for the same latitude, a pedestal dial. All the three gnomons are only visible parts of an imaginary continuous line parallel to the earth's axis. If we imagine it changed to a similar degree of south latitude, the position of all the gnomons will be reversed; that is to say, they will appear to be so in relation to the earth's surface. At the equator the gnomons would all be horizontal, or parallel to the tangent of the earth's surface. Thus the theory of the sundial is really the very simple one of getting a rod parallel to the axis of the earth, in the centre of a circular disk, the surface of which is divided off into hours (i.e., spaces of 15 deg.) by lines radiating from the centre, and then projecting those divisions on to whatever other plane is required by the circumstances.

If there is some scientific interest in the construction of the sundial, there is certainly

much about it also to interest the artist and the architect. The many old sundials still remaining are always welcome objects both from their often picturesque forms and from the memories and associations that cluster around them of days when time was not money, as it is now said to be, and when these less accurate methods of measuring it were sufficient for the needs of life. But there is a great deal to be said in favour of not letting the sundial die out. It affords an opportunity for giving an added interest to some point in a building which might otherwise be left blank, or for making a pleasing decorative centre in a garden. The various methods of treating it architecturally have been by no means exhausted; on the contrary, there is a good deal of room for new invention and fancy in the designing of sundials, and the subject and its associations are certainly suggestive enough.

We have left ourselves little space to speak of the mottoes which form the main subject of the book which chiefly suggested these remarks. These are 738 in number, with twenty-one more added as "addenda," the place from which the motto is taken being in all cases given. To go at all in detail into these would lead us perhaps a little too far afield. But we cannot help remarking upon the wonderful amount of moral and poetic suggestion to be found in the mottoes thus collected. Some of them, no doubt, are among the commonplace moralities about the lapse of time and the uncertainty of life; but many are really striking and powerful, and none the less so when expressed in Latin, that terse yet refined language which seems made for inscriptions and proverbs of grave import. The beautiful one "*Horas non numero: nisi serenas*" occurs in several varying forms; it is one of the expressions of a feeling which the sundial seems to have awakened in many minds, as to the significance and value of light, moral and material. "*Sol me, vos umbra*" ("the sun guides me, the shadow you") is a reflection of a different cast but with a similar origin. "*Now or never*" and "*Now is yesterday's tomorrow*" are among the examples of sturdy moralising in the mother tongue; of which a still more forcible instance perhaps is that from Leventhorpe Hall,—"Time can do much." These, however, are only a few examples out of a great number of inscriptions equally characteristic and suggestive. It should be added that the volume containing them is produced in admirable form, and that both for its matter and its manner it is a book that should be welcome to all those (to vary Milton a little) "who in trim volumes find their pleasure."

#### NOTES.

THE London sewage problem has been prominently brought forward this week,—firstly at the meeting of the County Council on Tuesday, and secondly by Sir Robert Rawlinson in his paper at the Society of Arts on Wednesday evening. As will be seen by our report of the meeting of the County Council, a proposal to build two more sludge ships was rejected, evidently owing to the lack of faith which prevails in the Council as to the efficacy of the costly and complicated precipitation works which have just been completed at the Barking outfall and are still in progress at Croydon. We have from time to time described the progress of these precipitation works, which will cost about a million sterling before they are completed, and we have not hesitated to express the opinion that they are destined to fail in effecting the object aimed at,—an opinion shared by many eminent engineers and chemists. Sir Robert Rawlinson, in his paper read before the Society of Arts, likens the works "to an entire herd of white elephants" bequeathed by the late Metropolitan Board of Works to the London County Council, and he declares boldly that "these abortive works" "must and will be abolished." For

his own proposals we must refer our readers to the portion of the paper which we print. His views coincide with those of some of the speakers at the meeting of the County Council. That body has decided to make further inquiry into the question before incurring additional outlay for sludge ships, and to make temporary arrangements for the removal of the sludge. The Main Drainage Committee have been instructed to secure the services of "an eminent civil engineer" to be associated with the Engineer of the Council in the inquiry.

THE London and North-Western Company completed their case before the Board of Trade last week, after fifteen days sitting, the next step being the opening of the case of the Associated Companies by Sir Henry James. The increasing prospect of a prolonged inquiry brought forth a proposition from Lord Balfour of Burleigh, whereby the Court would take the cases of traders wishing to effect changes in the classification, and the railway companies who defend the present position, in a manner that would prevent any great waste of time and money. His lordship suggested that it should be done by taking so many sets of articles a day, and only summoning those to attend who are interested in such particular articles. All those affected would thus have an opportunity of being present, while others would be relieved from unnecessary attendance. The chief Goods Manager of the North-Western, in the course of his remarks opposing exceptional rates for 10-ton trucks, made a rather noticeable statement. He said that the cost of working a full train was very much the same, whatever the load in each truck was. This appears to contradict what we have been accustomed to hear from our railway officials as to the way in which they are handicapped in comparison with other countries in this very matter of full-truck loads. Mr. Harrison should have been asked for a definition of a "full train." Mr. Henry Lambert, who succeeded the late Mr. Grierson as General Manager of the Great Western Railway, was the first witness examined this week on behalf of the Associated Companies.

WE understand that an attempt is at last to be made to deal with the sewage of Glasgow, which still finds its way by a score or more of different conduits into the Clyde, modified not in the slightest from its maximum filthiness any more than it ever has been, although the subject has been talked of more or less earnestly for the past quarter of a century. The building of the Glasgow Central Railway and the Bridgeton extension of the North British city system (both underground in character), are about to necessitate a wholesale diversion of the main sewerage lines of the eastern quarter, to be carried out at the cost of the invading railway companies, and instead of several outfalls into the river, with only one place of discharge, at a point rather above the city boundaries. This will affect only about one-fifth of the area of Glasgow, and, as the waste ground surrounding the proposed outfall is already public property, it is the design (avowedly in the character of a mere experiment which in any case cannot run to a very important outlay) to employ this now unutilised riverside patch for the systematic cleansing of the effluent sewage liquid in tanks and otherwise before permitting it to escape into the river. Systems and methods of purification, as yet, are only in the stage of discussion by the members of the committee of Town Council in whose hands the operations rest; but it is understood that chemicals will have an opportunity of showing what they can do; as also filtration and sedimentary action, to an extent sufficient for deductions as to practical usefulness. The population of East Glasgow whose drainage is thus to be experimented on will amount probably to rather over 200,000, but the precise boundaries have still to be marked out.

\* All that is to say, which are constructed with a plane superficies for the dial-plate. There are exceptional forms, such as the concave hemisphere on which the shadow of the rim is thrown, which do not come into the same category.



THE strike of the gas-stokers at Manchester and Salford scarcely received the attention in London which it deserved. In many ways it was an event of much more than mere local importance. It differed essentially from ordinary trade disputes, since it was a struggle not between capital and labour, but between labour and representative local government. It was not an attempt on the part of labour to get a larger share of the profit of capital, but to make the public and the local community pay more than the current and necessary rate of wages to a particular class of workers. There are few who do not sympathise more or less with the efforts of working men to obtain a larger share of the profits of the capitalist, but no one can sympathise with an attempt such as was made at Manchester. In many respects it was an attempt to set up the principle which underlies Protection—namely, that one particular class should be benefited at the expense of the whole community. Light is a prime necessity. It is for the benefit of the whole community that it should be supplied as cheaply and as efficiently as possible, and it is the duty of the representatives of a locality which manages its own lighting to put as small a burden on the ratepayers as possible. The Gas Committee were therefore bound to resist the gas stokers; they would have been guilty of a breach of duty if they had done otherwise. But it showed a lamentable want of sagacity on the part of the leaders of the men that they failed to recognise the vast difference between a struggle with a number of capitalists and with a representative local body. They fell into the error of trying to benefit one class of workers at the expense of the whole community, a principle which when the Corn Laws were abolished received its death-blow in this country. Not only was it an attempt to resuscitate this principle, it was also flavoured strongly with Socialism, because it was advanced that the public should share their money with the gas-stokers, not because the latter did more work or because the general rate of wages had risen, but because the gas-stokers had not as high wages as they wished. That the attempt failed is fortunate. If it had succeeded it would certainly have been followed by others, and thus the general community would have suffered from a general increase of the rates.

THE new volume (vol. v., new series) of the Transactions of the Institute of Architects fully keeps up the high standard of interest, both in regard to matter and illustrations, which has distinguished the "New Series" of these volumes. Mr. Belcher's paper on "Musical Requirements in Church Planning" gains new value by some admirable illustrations of existing church organs and plans and sketches of his own proposed arrangements. Professor Aitchison's paper on the "Roman Thermæ," with the plans accompanying it, is a contribution of permanent value to a subject of the greatest archaeological and architectural interest. The paper is further illustrated by a phototype of the late Professor Cockerell's view of a restoration of the Tepidarium of Caracallas Thermæ; the same drawing which we had the pleasure of publishing, to a rather larger scale, in the *Builder* for March 23 last. Mr. Percy S. Worthington's prize essay on "Five Famous Domes," with a number of illustrations, is also a very interesting and useful *resumé* of a great subject. Some of Mr. Roland W. Paul's sketches during his Pugin Studentship tour in Hampshire and Somersetshire make a very pleasing addition to the volume. But a feature of special importance is the republication of some of Street's early contributions to the Institute meetings, which have been long out of print, and are now reprinted with facsimile reproductions of various sketches by the same hand. The subjects of these reprinted papers are "Some Churches in Le-Puy-en-Velay and Auvergne"; "The Church of St. Michael Penkevel, Cornwall"; "English Woodwork in the Thir-

teenth and Fourteenth Centuries"; and "Some of the Differences of Style in Old Buildings."

IN *L'Architecture* for Dec. 14 is a long illustrated article by M. L. C. Boileau fils on "le Rationalisme Gothique et la Raison Classique," which is mainly concerned with the logical form of treatment of the capital or impost in relation to the arch or vault lines springing from it. The conclusion M. Boileau comes to is a sufficiently surprising one, and in direct contradiction to the criticism of Fergusson and other modern English writers on the Roman treatment of the impost. That the springing of the vault should oversail the width of the column he admits as an architectural necessity; the Mediaeval architects however, he thinks, made the double mistake of overdoing this and of placing between the shaft of the column and the springing of the vault only a weak-looking carved capital or, as he calls it, corbel. If the capital were treated in such a manner as to have the requisite appearance of strength and weight for the springing of the vault, it must become in itself heavy and clumsy. Now, says the French critic, Classic architecture solves the problem exactly, inasmuch as, in the first place, it reduces the over-sailing of the arch-springing to the square described about the exterior circle of the plan of the column, so as to have no over-sailing effect except in an angle view, and by inserting beneath the arch a square mass of entablature, it forms "the most logical transition that can be imagined between the column and the arch-springing." By this means, we are told, we can unite "la fermeté de l'abaque à l'élégance de la corbeille fleurie"; and he adds, "il est impossible d'imaginer une solution plus correcte" (!) All which seems to prove that in architecture, as in other spheres of human action, there are no favourite sins for which a hardened conscience will not invent a justification.

THE case of Myers v. Catterson, of which a report will be found in another column, adds to the mass of light and air law. It is quite unnecessary to go into all the facts which were brought out before the Court of Appeal; it is sufficient to say that the litigation was raised on the question to what extent a railway company could obstruct the light of an adjoining house, which had been built on surplus land sold by the company. Shortly stated, the rights of the grantees are the same against a railway company as against any other grantor, with this limitation: that the company may interfere with the light so far as such interference is necessary for the construction and working of their railway. In the case before the Court, openings in railway arches, through which the light passed, were blocked up with hoardings. These the Court held were not necessary for the construction and working of the railway, and the plaintiff therefore had a right to have them removed. A railway company would, however, clearly be wise to contract expressly, when surplus land is sold, against any implied grant of light. Railway arches, for example, are of pecuniary value, and a railway may lose a source of profit if they cannot be closed and used as buildings.

IN the *Times* of Thursday Mr. Vian, the Secretary to the French Asphalte Company, makes a rejoinder to the protest entered by the Horse Accident Prevention Society, through a deputation to the Commissioners of Sewers, against the dangers of asphalt pavements. Mr. Vian contends that the slipperiness complained of in asphalt pavement is due to its not being properly cleansed, and that the fault lies with the dirt and not with the asphalt. There is unquestionably a certain amount of truth in this plea, but at the best we fear it cannot be contended that asphalt, even when wet with fresh rain only, and before mud has formed, is not a slippery and risky pavement for horses. We quite agree with Mr. Vian that it has important

sanitary advantages over wood pavement, and on the whole we are inclined to believe it is the best town pavement yet used in England, taking them all round; but the distress it often occasions to horses is a real evil, and one not to be entirely got over, we fear, by any amount of cleansing. In connexion with the suggestion, we may call attention to the fact noted in a paragraph in this journal last week, that india-rubber paving is said to have been successfully used as an experiment in Berlin and one or two cities; that it is noiseless and not slippery. We have as yet no technical details in regard to it, but it may be worth further inquiry.

WE have received a printed copy of a paper upon "Earth and Masonry Dams," recently read before the Liverpool Engineering Society by Mr. George Farren, Assoc. Mem. Inst. C.E., in which the author deals principally with the Vyrnwy masonry dam, and expresses the opinion that the Vyrnwy section is safer than either Rankine's section or the more modern Quaker Bridge dam. He calls attention to the precautions taken to secure cement strong enough to resist crushing, all the cement used in this wall or dam having been exposed to the humid atmosphere of a room for ten to fourteen days in thin layers prior to use. An apron also is constructed at the toe of the dam to protect the foundation by receiving the surplus waters of the Vyrnwy lake as they fall over the central portion of the dam, which acts as a weir for the bywash of the reservoir. Lake Vyrnwy is deep enough to keep the water cool, and is so situated that the water is kept constantly susceptible to the oxygen of the air by the action of prevailing winds maintaining the surface in motion. The Vyrnwy dam, the author states, has enormous strength, the factor of safety being 5.7, instead of 2½ to 3½. Modern American practice favours straight dams, while modern French dams are built on a curve vertically, so as to increase the pressure upon the inner and outer footings. The author instances the Furens, the Roanne, and the St. Chamond dams as examples of high dams, and gives a table of the comparative weight per foot-run of nineteen masonry dams of different depths when constructed of the same depth as the Vyrnwy dam. He gives an account of the Johnstown disaster, which he considers to have been partly due to neglect in maintenance since the abandonment by the State of this reservoir in 1853. But history repeats itself. The old story of a culvert through an artificial embankment is a warning to all designers of high banks. At the Upper Barden Reservoir, belonging to the Bradford Corporation, an outside tunnel is carried round the bank, so as to allow the bank to settle independently of the outlet. Opinions differ respecting the stability of dams, and we regret that an account of the discussion upon this paper does not accompany the pamphlet. The author includes some valuable remarks upon clay as used for puddle, its chemical nature, and the action of water upon it. He also mentions a reservoir at Blaenau Ffestiniog, North Wales, containing a dam which is reported to be perfectly watertight, formed of two stone walls 4 ft. apart, in which hydraulic mortar to the joints extends only 15 in. upon both sides, the interval between the two walls being filled up with layers of peat of a purely fibrous origin throughout the entire length of 200 ft. and depth of 33 ft., the whole of the rest of the walls being dry, squared, irregular stones, with a layer of peat, puddle, and gravel upon the inner face of the dam.

IN the December number of the *Portfolio* the papers on Westminster Abbey by Mr. Loftie, with Mr. Railton's beautiful illustrations, are brought to a close, or so we gather from the wording of the last paragraph of the article in this number. The illustrations to the final number are a view in the nave of the Abbey, a view in the choir, a sketch of a door in the cloisters, an exterior sketch of the apse, and



a view of the corner containing the Dryden monument (the latter a process-block from a photograph). We hope these articles and the illustrations will be published as a separate work, which would make a beautiful illustrated monograph of the Abbey—for popular reading, be it understood; architectural students would hardly find it of special value, except that Mr. Railton's drawings are admirable models of picturesque and effective architectural sketching.

THE collection of the works of "London Impressionists" which has been on view for the last week or two at the Goupil Gallery shows the usual characteristics of collections of this kind, producing an "impression" of a keen perception of effects of air and light and tone combined with an absolute indifference as to accuracy or definition of detail. The very first drawing in the order of hanging, "The Marble Arch," by Mr. Sidney Starr, includes a supposed representation of the Marble Arch which does not contain the slightest suggestion of its real architectural form, and no one could tell what it was meant for but for the title. Mr. Francis E. James's sketches, especially that entitled "Uddimore" show great truth of perception as to colour and light, and as sketches of effect they are very good; but there is neither detail nor texture indicated, and to produce an aerial effect when all detail is omitted is, we are disposed to think, not so difficult a task as impressionists would have us believe. Mr. G. Thomson however has missed it, in "Kew Gardens" (22), which is full of very strong colour with no light or atmosphere at all. In "A Spring Evening in the Row" (25) he has got an effect of light no doubt, but look at the horses! If that is the "impression" horses produce on Mr. Thomson's retina, we can only be glad that they never produce that impression on ours. Other drawings in the collection, such as Mr. F. Brown's "On the Pier, Morning Sunlight" (42) and "Walberswick Church" (46), and Mr. Maitland's "The Three Public-houses, Morning Sunlight" (49), show effects of light, with no trouble about drawing anything properly or definitely. In fact, this is a collection of promising but unfinished pictures, that is all.

WE some time since received some specimens of indelible ink manufactured by Mr. O. Percival, of Manchester. One sample styled "Engineering Fluid," is intended for general office work, and is said to be photographically opaque to white light. Another example is an "Indelible Brown Ink," said to become indelible the moment it is dry. We have tested these inks in use for some little time, and find that they appear to possess all the merits claimed for them, with the exception that the brown fluid is not absolutely indelible until several hours after use. Both samples tested are slightly too fluid to be used quite comfortably with a ruling pen, and are apt to run into blots at the ends of lines. The black ink is not absolutely black in very fine lines, but owing to the ease with which it runs from the pen a line of moderate thickness is so. The colour of the brown fluid is not as good as that of several indelible brown inks. Neither ink has faded in the course of about four months.

IN an article entitled "A Farewell to Grey Friars," we adverted, on Oct. 10, 1889, to a scheme made by the Charity Commissioners for dealing with Christ's, or rather Christ, Hospital, more popularly known as the Bluecoat School. Slightly modified, that scheme was re-issued by the Commissioners about eighteen months ago, and approved by the Education Office. Having been opposed at various stages by the Governors and others, it was finally referred, upon appeal, in June last, to the Judicial Committee of the Privy Council. On Saturday, 14th inst., the Lord Chancellor delivered a judgment which, in effect, ratifies all the proposals of the Commissioners except as touching the conscience clause introduced under the Endowed Schools

Act, 1869, and the scheme will be remitted for correction in this particular forthwith. A new governing body, to be set up by the scheme, are charged to provide fresh sites and buildings, and to fit out a boarding-school for 700 (hereafter 850) boys; another for 350 girls; and a preparatory school for 120 boys—all within a convenient distance from the City. Also, a day, or science, school in the City for 600 boys; and a day school for 400 girls: this latter to be in Middlesex, but not more than three miles from the Royal Exchange. A subsidy of about 7,000*l.* is assigned to the day schools; and the Council are empowered to raise all requisite funds from out of the endowments by sale or other transfer of property. It may be mentioned that amongst recent lists of old "Blues" occur the names of the late Sir Henry S. Maine, jurist; the late Sir Henry Cole, C.B.; the late Dr. Edmund Parkes, hygienist; and Mr. Ewan Christian, architect. To these should be added the name of one of the earliest pupils—George Peele, the dramatist—whose father was Clerk to the Hospital 1562-1585. It is rumoured that the existing site in Newgate-street, or part thereof, may perhaps be acquired by the authorities of the contiguous St. Bartholomew's Hospital. This site (with the buildings) has been unofficially valued as worth about 600,000*l.*

ACCORDING to a Norwegian paper, the *Teknisk Ugeblad*, it appears that great satisfaction is felt among Norwegian architects at the election of Herr Paul Due, a well-known architect of Christiania as an Honorary Member of a "Society of Architects" of this country, the more so as there are, it is said, only two other foreigners upon whom this honour has been conferred. This we can well believe, but we fear that Herr Due and his Norwegian contemporaries are under a delusion as to the value and significance of the honour supposed to have been conferred upon them by English architects. The honour certainly has not proceeded from the representative Society of this country, the "Royal Institute of British Architects," which numbers about fifty distinguished foreigners as "Honorary Corresponding Members."

#### "DRAWING."

It may seem, perhaps, strange that an architect dealing with drawing should not have chosen for his title the term "architectural drawing." I have purposely avoided that title for two reasons; first, because I shall extend my remarks beyond the limits of architecture, and, secondly, because the term has a certain sinister significance. Strictly speaking, "architectural drawing" means no more than drawing of architecture; but you talk of it to a painter and he begins to think of an architect's drawing of architecture, and there rises before him a wiry mechanical piece of black and white in which values and selection and abstraction and everything that he has been taught to aim at are systematically ignored.

Now, there is no denying the fact that in nine cases out of ten the reproach is well deserved; but whether this exhausts the subject is another question, for it is quite possible that the draughtsman never intended his drawing to have any artistic value at all. The suggestion of contempt with which a drawing is dismissed as an "architectural drawing," may be founded not only on the incapacity of the draughtsman, but in some degree on a misapprehension on the part of his critic. Whether then you wish to make such a drawing yourself, or to criticise it fairly when made by somebody else, the first thing to do is to form a clear conception of the specific purpose of the drawing in question.

Broadly speaking, drawings are made to answer one of three purposes. Either the drawing is a shorthand note, the place of which might be taken as well by writing; or, secondly, it has for its object to make an accurate record of natural objects, including therein the works of man; or, thirdly, the drawing is a technical method, that is, it is the technical language in

which the designer expresses his own ideas and makes them intelligible to the minds of others. Stated thus, the simplest form of the third division would be a set of working drawings. I do not refer, however, to these, but to decorative design in black and white. I propose to deal with these three classes of drawings in the order in which I have given them, and I shall do so from the standpoint of the architect, leaving the difficult subject of the study-drawings of the painter to hands more competent than mine.

With "shorthand" drawings we are all of us familiar. Most of us have stood on the rungs of precarious ladders with our note-book and 2-ft. rule, and broken our shins in dingy lofts, in our all-consuming zeal to get at the very thing itself, to get on our paper, by hook or by crook, such details and sections, and measurements as will show us how the thing was actually made; how some obscure moulding really did intersect or die out in an unsuspected corner. Notes take the place of drawings, and *vice versa*; any scribble is good enough, provided it tells its story. Architects, indeed, have almost a monopoly of this sort of work. When a painter makes an anatomical study, even of the roughness to him how he makes a matter of indifference to him how he makes his drawing. He must consider his method, for unless he pays some attention to his shading, as well as to the correctness of his outline, he will get wrong with his planes, and his notes will have no subsequent value. But an architect, let us say, wishes to make a note of some detail. His drawing may be rough, dirty, and dilapidated, but provided it is correct and complete, the method is immaterial. The deftest touch in the world is as nothing to his purpose as compared with mere scale accuracy. To put it shortly, the object of his drawing is rather psychological than artistic, and the process, I take it, is this. He sees a piece of work which he admires; with no conscious intention of copying, he notes so much of its structure as would enable him, if necessary, to reproduce it exactly (not that this, by the way, is his object). This he does partly by drawing, partly by written notes, whichever comes readiest to hand, some instinct seeming to hit upon the one or the other at need. At least, this is how some of us make our notes. Now, the value of this work is not in the result, that is, in the various scrawls and other hieroglyphics which cover the page; neither is it in the crib of somebody else's idea, as our friends will have it when they good-naturedly suggest that such and such details are to appear in our next bit of work. The value of such work is in the mental process itself. During all this time the mind of the sketcher is, or should be, busily at work assimilating the new idea, and laying up a fresh store of material for his mind to work on, adding, in a word, to that vast reserve of facts and observations which lies behind the consciousness of every genuine artist. This being so, the method of drawing employed becomes in theory, as it certainly is in practice, a matter of complete indifference. It is of no importance whether the lines are thick or thin, adroitly sketched or ploughed in from the elbow. The essential point is the amount of thought which they imply. To make a good detail of a piece of architecture on the spot, and against time, requires considerable power of analysis, besides much previous knowledge. The Institute examination does not, I believe, include a set of working drawings made under the examiner's eye, from the top of a forty-foot ladder. Yet it would, I think, be a more effectual test of ability than learned answers, previously crammed on the history of architecture. A truly architectural mind possesses in a high degree the quality of versatility—quickness to grasp existing conditions, and readiness to turn them to account. An architect should be, like Ulysses, ἀντιπροσδοκῶν πολυμήτρις "quick to turn, of many wiles," and, I believe, such a quality of mind can to some extent be acquired by this habit of trying to master the intention of any given piece of work, and transferring the results of one's thought to the paper by the simplest available means. If, then, this view of the object of an architect's sketch notes is correct, any criticism on the drawing itself becomes irrelevant. The drawing is a sort of "go as you please" process. Smudges on the paper are immaterial. These may be only the honourable scars of the rain and wind; and the point of importance is the mental condition of the sketcher himself. Any advice on this point is outside the range of my subject.

\* A paper by Mr. Reginald T. Blomfield, M.A. Read before the Architectural Association on the 13th inst., as elsewhere mentioned.



Drawing, then, as far as we have considered it, is out of relation to art. It is not till we come to the second class of drawings, those intended for purposes of record, that the aesthetic question enters into the case. Everyone would admit this at once in the case of drawings of landscape,—for nobody cares about a woolly tree, or a lumpy rock, and mere labour here is as nought. The standard is higher than what is commonly accepted as sufficient for the record of architecture or work in any of the other arts, and I shall therefore limit my remarks to the latter class of subjects in dealing with record drawings. Now, bearing in mind the principle of our classification, the first point to be determined is, What is the purpose of this sort of drawing? Take, for instance, an old building. Is it our object to make an exact scientific transcript of this, or to record the impression it actually makes on us personally? If the first, the scientific methods must be followed. We must proceed by plan, elevation, and section. In other words, make a set of working drawings of the building in its existing state. This, though, of course, invaluable for its own purpose, is an affair for the mechanical draughtsman and the archaeologist, not for the artist. Moreover, it always seems to me that the scientific method, like many other scientific methods, is singularly unscientific. It proceeds by eliminating half the elements of the problem, and then is undoubtedly able to furnish you with a very clear statement of the remainder. Thus, the scientific draughtsman makes his drawing to scale. He even shows every stone in its existing position, but he gives no suggestion of the weather stains on the stones, and no indication of the effect in perspective. That is to say, he leaves out of account texture and grouping, the two most important points in the whole matter.

The record drawing which I have in view is of a different order. With the impression which a building makes on the mind, exact knowledge of its dimensions has very little to do. The grouping of its different parts, the texture of the wall surfaces, the shadows which actually fall on the building, the lights and the reflected lights, these and many another detail which escapes the scientific draughtsman, are the elements which go to build up our idea of the building as it actually is, and if the record fails to give these, it fails to my mind in its primary purpose. Now the scientific record gives no reasonable suggestion of all this detail. Moreover, it deliberately ignores the element of individuality. What charms one in Hollar is not so much, or not only, the actual buildings which he drew, but Hollar's own delightful way of looking at things, and the reflex of this in his method of presentation, but it is just this very personal element that the scientific method purposely obliterated. If, therefore, we wish to hand down to posterity some record of a building as it affected you and me, and any one now living, we must seek some other method, some method which will take account of storm and sunshine and the slow influence of time. This method must be drawing of a very high artistic excellence. Whoever takes it in hand must, as a matter of course, have the power of drawing accurately whatever he sees, and correct perspective will have become to him almost a matter of instinct; but to this must be added the rarer gifts of selection and self-restraint. There are different ways of understanding accuracy. One notion of it is to draw in every detail with undeviating monotony, because they are all on the building itself. Yet the result may be simply inaccurate. A laborious drawing which draws in every moulding, and attacks each scrap of carving with obstinate conscientiousness, will give an impression of the building which, if not absolutely false, will be far less true than a sketch by a sympathetic hand, which hides half the detail in shadow, or leaves it out as bathed in a flood of sunshine. You may recollect Heine's description of the view from the Brocken. "It's," he says, "like a map, dryly drawn, and purely coloured, but without a single beauty for the eye to rest on," and this, he continues, "is just what happens to us German compilers, owing to the conscientious exactitude with which we try to tell every scrap of the story, without the power of bringing out details with a special and peculiar charm." It is just this power "à faire ressortir le détail avec un charme particulier" which is so fatally absent from most of our architectural drawings. Even in detail sketches, such as simple studies

of carving, it is wise to use this subordination, to put your labour and delicate finish into one particular part of the drawing, and to leave the rest in suggestion. The eye and the mind can only take in a certain amount at once, and it is no good trying to choke people. Any one familiar with the drawings of the great masters, Rembrandt in particular, will know that to do this well is no trick, but consummate art. It implies that you are master of your material, instead of being overpowered by it. In the case of drawings of buildings or groups of buildings this accuracy as a whole, in the spirit, not in the letter, becomes of the first importance. You must first get to the idea of the building,—that is, try to make out what the designer was actually driving at; and then you must form some conception of the effect you are to aim at yourself, and determine, for instance, whether you will dwell on the detail, or on the outline against the sky. And then, to interpret all this into black and white, you must keep a firm hold on your values,—that is, you must never lose your grasp of the subject as a whole, and you must resolutely sacrifice all that is unimportant, in order to bring out the essential features. I have known good men smoke a pipe before a building for half an hour or more, before drawing a line, and I recommend this practice to those who think they can rush at a building, and hurl it on to their paper. Nothing is gained by trying to take your subject by storm; you probably end by falsifying the proportions of the building, or suffer the ignominious defeat of not getting all you intended on to the paper.

As to the style of drawing, so much good work is done in utterly different ways, that it is almost impossible to point to any one method as the only right one. The instances I have got together by some of the ablest living draughtsmen of architecture will bear this out. For details such as carving, it would be hard to surpass the delicate pencil work of Mr. Ruskin and some of his followers. The sort of tentative touch which feels about, as it were, for the form, and in good hands seems to build it up as it goes, gives a nearly perfect suggestion of texture and modelling. But, when applied to groups of buildings, this method is apt to fail; perhaps it is betrayed by its own fondness for detail. The artist must go to his work in a larger spirit, he must have a feeling for great spaces of light and shade, and still more for those highest qualities of architecture, mass and outline; and this will mean that he must deliberately sacrifice much of the detail. Mr. Fulleylove has made some beautiful drawings in this larger manner, which illustrate my meaning better than any words. One quality in common is shared by all good architectural drawings, and that is the complete absence of trick and affectation. If the lines are few, they are true and to the point; if there is shading, it is there for some well-ordered purpose, and not scattered about at random, without thought of the effect as a whole.

Perhaps one of the commonest temptations to an immature draughtsman is to "criep up," as the odious phrase is, a dull, heavy sketch by spots of dark shading judiciously peppered over the drawing. The artifice is too transparent to be of the smallest value; it simply directs attention to the faults of the drawing, like a fine jewel on an ugly neck. A good way to avoid this trick is to begin by using only one pencil, say an H.B. There are dangerous seductions in a B., or a 6 B. Another useful rule is to avoid cross-hatching. It is best to begin, at any rate, with open line drawing,—that is, by shading with lines deliberately drawn side by side. The very finest drawings in the world have been made with open lines, and, apart from this, the practice has this advantage, that you can never deceive yourself about your own drawing. After a certain amount of practice, you may acquire that lightness and freedom of touch and that sure rapidity of execution which are, I think, the finest qualities of pencil drawing. The essential thing is to avoid trick; or, if you must have tricks, at least to form them for yourself, and not borrow other people's.

Pencil drawing, in regard to the modern methods of illustration, is of less importance than pen-and-ink work, owing to the facility with which the latter is reproduced. It might be expected that architects would excel in pen-and-ink work; they have considerable practice in it,—yet to judge by the works of the architectural draughtsman, there is no form of artistic drawing in which they more conspicuously fail. Of course, there are some eminent

exceptions to this, but I take the average. We are all familiar with the architectural draughtsman and his ways. He takes a house by John Doe, and a church by Richard Roe, and with his unfailing recipes he turns them out as spick and span as if they grew from the self-same brain. Indeed, I believe there is a machine for the manufacture of perspectives, and if there is not, it would only be the natural development of this ungodly drawing. A line drawn one way represents stones; turned another, it does for bricks; ruled straight, it represents slates; ruled with a creak, it is taken for tiles; a sprinkling of scraggles does for trees; and marvellous convolutions of lines, neatly broken off at a fixed point, are understood to be clouds. The figures come from old fashion sheets, and the dogs and horses from the Noah's ark of the draughtsman's childhood. The whole thing is a trick from end to end. It reminds one of the instructions given by the British workman to his apprentice on the methods of graining. "Meogany," I says, "and you combs it so, and puts twiddles with a rag. Then I changes my mind, and I says oak, and you up and combs it lighter, and puts the twiddles t'other way. Then I says worrut, I says, and you makes it werry dark, and turns the twiddles upsey down. Then I up an' I says 'marble,' I says; then you paints it black, and shies a hegg at it; and there's your marble."

No wonder that if this is understood to be architectural drawing, the very name of it is a byword of contempt. Not only are the trees not like trees, and the figures wooden, and the animals ridiculous, but the architecture is not like architecture. This uniform monotony of straight-ruled lines, varied by certain tricks of the trade, quite fails to give any notion of the building, not only to the layman, but to us, the learned in the 45° and T-square. The standard of drawing among architects has certainly risen in the last few years, but the architectural draughtsman still flourishes in our midst, as any one can tell from the abundance of his works, and the numerous publications of measured drawings and sketches by men who seem to be unfamiliar with the rudiments of black and white. In regard to the latter, I believe it is a mistake, as a mere matter of advertisement, to publish drawings unless they have some artistic excellence. The public does not look at these things, and architects take them at their proper value. If, as architects, we are to be worthy of our claim to be artists, it is high time that this sort of work should be discredited, even if it is necessary to throw overboard the cherished delusion that it is in the power of any one, with the help of a few trade tricks, to turn out a satisfactory architectural drawing. In point of fact, it is not given to everyone to be a fine draughtsman; it is not given to one architect in fifty; and the sooner we recognise our limits in this direction the better for our reputation. After all, a man can be a great architect without being a great draughtsman, and, though, as I believe myself, noble ideas sometimes get marred by the designer's inability to get them out on to paper, the amount of drawing power which is necessary for this purpose is quite a different thing from what constitutes fine draughtsmanship, and that this is so is proved by the beautiful works of architects who are not pre-eminently distinguished for their skill in drawing. It is not necessary to pitch one's T-square into the fire, because one feels unequal to good pen-and-ink work. Perhaps it would be wiser to leave it alone, or if it is absolutely necessary to assert your existence at the annual Academy show, to go to someone who understands the business.

The remarks I have offered above in reference to pencil work, apply in the main to pen-and-ink drawing; but there are one or two limitations in the latter which require attention. It is best to get over the ordinary difficulties of drawing correctly, before taking to the pen; for the latter is by no means so kindly as the pencil; and it is a very different thing to rub out a pencil line and to scratch out a detail in Indian ink. So far as regards abstraction and selection, much the same principles must be followed as in etching. Pen work is the directest form of black and white, and as much depends on the white as on the black; in other words, a skilful artist tells you as much by what he leaves out as by what he puts in. Mr. Pennell is extraordinarily dexterous in his power of omission; he is only surpassed, perhaps, by Virgile the Spaniard and some of the Frenchmen. As compared, however, with etching, the pen moves much less freely over the surface than the needle, and a



person with a clumsy touch constantly finds his pen digging holes in the paper. To avoid this, you should cultivate a light, free handling of the pen,—what the French would call, "légèreté"; and, as a general rule, it is wise to avoid cross-hatching, partly because you scratch up the paper, partly because you sacrifice too much of the white. Mr. Raitton, however, sometimes cross-hatches with admirable effect.

Another limitation of the pen as against the needle, is that the pen-stroke must be made once for all; to repeat it is to destroy its value, and you cannot bite it deeper. It follows, therefore, that you must think rapidly, and realise your effect with unhesitating decision, if you are to attain to the highest qualities of pen-and-ink drawing. Turnbull's Bristol boards, and any flexible pointed pen, not crows-quills, are all the tools necessary,—that is to say, if you work for reproduction,—for in this case the drawing should be in the blackest of ink on the whitest of paper.\* If your drawing is not made with this intention, a smooth, tinted paper is much pleasanter to work upon. There is an excellent paper, not unlike parchment, sold for this purpose in Paris.

It is impossible within the limits of my paper to deal with modern work, but I should like to call the attention of the younger members of this Association to Cotman's architectural etchings. Taken as etchings, I think they fail in the freedom and suggestiveness of first-rate etching; Cotman always tended to make his etching an engraving on copper. But as studies in black and white, for solid draughtsmanship, for composition in light and shade, and for suggestion of texture, these etchings are unsurpassed; and for draughtsmen who feel that the marvellous tact and subtlety of a Vierge is entirely beyond them, Cotman forms a valuable model. The only danger is that his rather artificial method is apt to degenerate into trick in inferior hands; and, indeed, I believe that the architectural draughtsman, *pur sang*, might father some of his methods on Cotman. If, however, instead of copying his faults, you make for the great qualities at which Cotman aimed, you will, at any rate, steer clear of the flimsy and ineffectual draughtsmanship which appears to satisfy most of us.

For insight into the spiritual qualities of architecture, Piranesi and Meryon stand absolutely alone. Not only were they both consummate masters of the line, but to this they added a far-reaching imagination which gave to their drawings of architecture much more than a merely technical interest. These two men have placed the poetry of pure architecture beyond the reach of challenge, and the one is the correlative of the other.

Piranesi found in Classical buildings material for a sombre fancy that had its pleasure in great masses of masonry, and endless vistas of colossal architecture; and for once in a way an artist of first-rate power selected as the vehicle of his ideas architecture. In its most abstract form—architecture unclouded by sculpture, and dependent only on its own great strength, I refer to the large Prison series. It might well make us despair to turn from the midst of our little work, with all its prettiness and fussiness, to the terrific immensity of Piranesi's vaults, and the vast mysterious horror of these Titianic halls. Grandeur was the quality on which his genius was set. He showed the walls of the Roman buildings like the cliffs of the seashore. Piranesi must have revelled in the mightiness of the Roman work, his ear caught across the ages the echo of the workshops of the great imperial builders; and so long as modern civilisation lasts, there will be minds in sympathy with his and eager to honour him for his revelation of the spirit of a mighty past. And Meryon for his part had thought himself into the spirit of Medievalism. His was a strange wild nature, out of touch with his time, but in singular harmony with the supernaturalism of the Middle Ages. To Meryon's grim fancy the air was no mere oxygen and hydrogen, but the home of myriad spirits, and for him the powers of darkness would haunt again the lonely pinnacles of the great Cathedrals. The "Stryge" expresses to my mind the very quintessence of one side of Gothic art; and you may find Meryon's innate Gothicism again in his intense perception of detail.

Meryon and Piranesi have given us the

highest level yet reached in the interpretation of architecture, and between them they cover the whole range of its expression in black and white. It is a curious coincidence that in both cases their rare genius ended in madness.

We have hitherto been considering record drawing in relation to objects already in existence; but the question arises, How are we to deal with drawings of objects, buildings, let us say, which exist only upon paper or in the designer's mind? The problem is certainly difficult, and we are not helped towards its solution by the practice of the day. The architectural draughtsman solves it by the recipes of his office, and his method I believe to be utterly unsatisfactory. On the other hand, some of the most successful draughtsmen of the day anticipate the effect of some 200 or 300 years on their buildings. They reproduce in their drawings effects which they have already annexed and made much of in sketches of actual buildings. This, though an attractive method, seems to me to fail in honesty of purpose. We must, as usual, look to the practice of the great men of the past for the answer. I do not recollect myself in any of the architectural sketches of the great Renaissance architects any such merely pretty sketches, on the one hand, or such elaborate masterpieces of monotony on the other. Inigo Jones, our great master in architecture, used to make free-hand sketches of his work, roughly hatched, or in more detailed drawings he would rule in a few of the more important lines, and sketch in the rest, and tint in monotone. He made little or no attempt to give the effect of an old building to a new one. With characteristic contempt for futurity, he appears to have thought it a waste of power to devote any more trouble to a drawing than was necessary to bring out the purely architectural qualities of a building; and his simple, slashing method was exactly suited to the purpose. The system of painfully working up each detail came in with the Epigoni, with the inferior men of the eighteenth century, who hoped to hide the poverty of their endowment under a mass of laborious finish. This is very much what has happened among ourselves. As I said before, it is not given to everyone to make good drawings or to design good architecture; yet the whole practice of modern architecture is conducted as if it was. Bad draughtsmanship is concealed under the labour of these many lines, and bad design lurks behind the crispness of many an effective sketch. We ought to be more honest in our drawings of our buildings,—we ought to be content with a strong, straightforward draughtsmanship, sufficient to show the grouping and meaning of our building. Anything beyond this, I think, a trick or a worthless *tour de force*.

The third division of my suggested classification is drawing as a technical method; that is, drawing of which the primary purpose is to express, in line, an idea in the designer's mind. At first sight this seems to approach the first division, in which the drawing is entirely subordinate to the mental process; but it differs from it, in that in this third division it is impossible to separate the idea from its expression,—the two work themselves out together in the mind of the designer, and thus it is separated from mere shorthand work by the importance which it is to claim for its method. And again, it is separated from record work by the fact that it deals, not with the transcript of an idea either already realised or having a value independent of the drawing, but with an idea in the designer's mind, the object of which is attained by its expression in the black and white design. That is to say, it does not depend for its *raison d'être* on its realisation in some ulterior material, whether past or future; but when the idea is once expressed in the design, let us say on paper, the idea and its expression together form a complete and independent work of art. Realism, therefore, is not so much the object as the most forcible expression of this idea; and everything which interferes with that expression,—such as excessive imitation of texture,—is superfluous and wrong. This, to put it shortly, seems the intention and justification of the very conventional use of black and white, which is most perfectly exhibited in the works of Albert Dürer or Lucas van Leyden, and the little masters. You take a woodcut by Dürer. There is no suggestion of merely imitative realism, and yet every line tells its story; each line suggests the field of thought in which the mind of the artist has been at work. The lines seem to be dashed into their

place without effort, yet each is burdened with thought,—it is there as a factor in one organic whole. The twenty-ninth plate of the *Little Passion* represents Christ rising from the tomb. In the left-hand corner is the sun just showing above the fields. The rays are given by single lines radiating from the sun. Nothing could be more simple, almost rudimentary, than the means employed; and yet it is impossible to conceive of any method which could suggest more vividly the strange supernatural light, neither night nor day, in which Dürer has represented this intensely mystical act. It would be clearly absurd to criticise such a drawing on the score of its disregard of realism, for no such thing was ever attempted, and I do not see myself the slightest necessity for attempting it in work of this sort. There is the primary objection that to do so distracts the mind from the main idea. Moreover, any representation of an object in nature, short of actual facsimile copy modelled in the solid and coloured, only resembles that object by convention, and through the force of association and knowledge. There is, therefore, nothing illogical in making a further demand on this convention, and confining your imitation to what is strictly necessary to suggest the idea of the object in question, with this limitation, however, that the greater the artist's ability, the profounder will be his insight into the character of any object, and he will therefore suggest its essential qualities instead of mere accidents.

All kinds of decorative work in black and white, and the line, book decoration, the designing of advertisements, broadsheets, circulars, and the like, form the proper field for this sort of drawing. I don't know who is responsible for the advertisements and postbills which make our boardings hideous, but there always seems to me here a grand field for a good designer in black and white. Mr. Herkomer, following in the footsteps of Fred. Walker, set an example a few years ago with a well-known advertisement, but his example has not been followed, except in some rare cases where men of first-rate ability have been employed. Then, again, book-plates, title-pages, headings, and tail-pieces, all give fine opportunity for the skilful use of the line. The beautiful work of Mr. Crane, Mr. Heywood Sumner, Mr. Whall, and others, is familiar; and I will only add one other instance of an admirable design in black and white, a book-plate for this Association, drawn and designed by Mr. Lethaby. In regard to the method to be used, I have anticipated elsewhere the few remarks I have to offer, and shall only summarise what I believe to be the most important points.

1. The lines should be firmly drawn, and kept distinct, they should be of uniform thickness, and each line should be thought out.
2. If the drawing is to be accompanied by printed type, the scale set by the latter should be followed in the drawing, and the type used as in itself a means of decoration. Where it is possible, the type should be designed with the drawing.
3. Mere realism should be avoided; and the decorative standpoint sedulously adhered to.

I must ask your indulgence, if I take up your time in answering a criticism on the remarks referred to above. In a leader in the *Builder* of Oct. 12, 1889, it is said: "Turner was far too great a poet in landscape painting to be harassed by any such shackles," to wit, the shackles of decorative art. No one ever denied that Turner was a poet in landscape painting of the very first order; but landscape paintings are not executed on printed pages, and when these latter have to be illustrated certain limitations of method and material are introduced, which no artist with any idea of design could afford to overlook; and it was just these limitations that Turner, being essentially a painter, disdained to consider. Anyhow, against Turner's practice there is to be set the entire consensus of all the great masters of design in black and white of the fifteenth and sixteenth centuries. Again, when pointing to Dürer as a model for imitation, the work I had in view was only this decorative design. To apply it to drawings of buildings, or to any form of what I call record work, is as the *Builder* says, a mere archaeological affectation,—in short, a trick.

To come, then, to any conclusion in the matter. The point which I have endeavoured to lay before you is, that before making, and certainly before criticising, a drawing, a clear conception must be formed of the purpose of the drawing. A drawing may be made as part of an educational exercise, or as a simple short-

\* Not necessarily black ink; a warm brown ink reproduces just as well; many draughtsmen are not aware of this. Of course, unless it is to be printed in the same colour, the draughtsman does not realise so well what will be the effect of the reproduction.—Ed.



hand note. Here the drawing is out of relation to art, and should be criticised from a totally different standpoint.

Again, the drawing may be made to record some building or work of man, in its actual state and surroundings; and here I contend that the methods of the typical architectural draughtsman are inadequate and absurd, and should be permanently discredited. Drawings of this class require consummate draughtsmanship and knowledge, and are not a matter of hard sketching to be knocked off by any one. The standard of architectural drawing in this respect should be higher than it is. I am sorry if my remarks are disagreeable, but, to borrow a sentiment from your President's address, I take architectural drawings as I find them, and I find some of them exceedingly bad.

Thirdly, drawing may be used to present, in black and white, some conception of the mind; and with this a simple method should be adopted, which sacrifices all that distracts from the main idea, and treats each line as a matter of decorative design. To apply to one class the standard and principles of another inevitably means confusion and false criticism.

It may very well occur to many of you that, after all, an architect is not primarily a draughtsman or a designer in black and white. No more he is; but this field of design is just one of those on the border-land between the province of the architect and the painter, which are rapidly slipping out of our control into the hands of specialists, so that day by day the work of the architect is being narrowed down to the strict limits of the planning and construction of buildings. Many a client to this day considers that in matter of taste he is the superior of his architect, and at this rate the architect will be relegated to the position usually assigned him by public bodies, of a superior clerk of the works.

In the great days of architecture an architect was primarily an artist. He was supposed to do work not only for the sake of immediate profit, or even honour, but for its own sake. He might have taken as his motto "*Ne te quæris extra*." Nowadays, through indolence and timidity in yielding to the aggressive assertion of the business man, we have almost lost our claim to be considered as artists at all. You know what Lord Grimthorpe, that Goliath of the Philistines, calls us. He says that an architect is no more an artist than his cook; and Lord Grimthorpe is a fair index of uncultivated public opinion. Many of us must have winced under the phrase "architects and artists." It is time we combined against such an insult to our calling, and to combine means a determined individual effort along common lines. It means systematic resistance to what is vulgar and commonplace; and for each of us persistent self-cultivation, and an unswerving search for the most beautiful modes of expression in drawing and design. We are not very likely to develop the genius of a Méryon or Piranesi, but something at least may be done by the labour of love, and a sincere enthusiasm for beauty in art, which is not to be fobbed off with any tricks of the trade or traditional platitudes.

[For a report of the discussion, see page 443.]

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS:

##### THE ARCHITECTURE OF PROvence.

The fourth ordinary general meeting of this Institute for the present session was held on Monday evening, at No. 9, Conduit-street, Regent-street, S.W. Mr. J. Macvicar Anderson, Vice-President, in the chair.

On the motion for the confirmation of the minutes,

Mr. Robins asked in what order the names of gentlemen who had passed in the recent preliminary examination were placed, whether in order of merit or in alphabetical order?

The Secretary (Mr. Wm. H. White) replied that in the preliminary examinations the names were returned in the order of the date of the candidates' applications; that was to say, the forty-four first names were the names of those who were exempted, and they went in the order of the date of their application. The remainder were those who were examined in London and in the various centres, and they were placed in the order of their application.

Mr. David MacGibbon then read a paper on

"The Architecture of Provence," of which the following is an abstract:—

In a few introductory remarks, the author stated that architecture might be said to have been introduced into Provence by the Phœnicians, who colonised the country about 1000 B.C., and traces of whose work were still discernible in the harbours they had established, and the forms of worship they had observed. He then briefly referred to the Roman remains in Provence, pointing out that these were of foreign origin, and that his remarks would be limited to the native style of the country. Provençal architecture, he considered, had sprung up with the revival of the arts and letters about the time of Charlemagne, before which period the architecture of Rome everywhere prevailed. The mode in which Roman construction was continued in the West as late as the ninth century was well illustrated by the church or mausoleum erected by Charlemagne at Aachen; and where Roman examples existed it was natural that the works of the Teutonic invaders should have been adaptations of them. In the native architecture of Provence would be seen all the Roman elements preserved and still in daily use until the eleventh century; and their gradual change in the twelfth century into a special form of Romanesque, in which the stages of the transition were clearly discernible, could be noted. Mr. MacGibbon then proceeded to describe twenty-four examples, of which illustrations were exhibited by the lime-light.

(1) The Church of Saint-Paul-trois-Châteaux, the elevation of which might well be taken for a structure of the late Empire, but was supposed to be of the tenth or eleventh century. (2) The porch of Notre-Dame-des-Doms was so strikingly ancient in character as to have long been regarded as a Classic structure, but was probably a work of the tenth or eleventh centuries. (3) The Sainte-Trinité (one of the early chapels on the island of Saint-Honorat-de-Lérins) was clearly an imitation on a small scale of Roman domical and vaulted construction. (4) The Baptistery at Fréjus, on the Riviera, was a sample of other similar structures long regarded as Roman works. (5) The celebrated monastery of Montmajour contained several buildings of great interest in connexion with the development of Provençal architecture, of which the Chapel of Sainte-Croix was remarkable, and was the late example of an imitation of a Roman form of construction. (6) The Chapel of Saint-Pierre, at the foot of the rock on which the Monastery stood, was an example of early deviation from the traditional type of classic columns and capitals. (7) and (8) Saint-Trophime, Arles, exhibited two very fine examples of the fully-developed Provençal Romanesque in the western portal and the cloisters. (9) The cloisters at Elne. (10) The portal of the church of Saint-Gilles, which was the most complete and most finished illustration of that Provençal style in which the Visigothic spirit prevailed almost completely over the Classic, was described by Mr. MacGibbon in considerable detail. He then dealt with the vaulting in Provence, directing attention to the different forms adopted, and to the peculiarity that they were pointed and not round arched. The domes were next alluded to, and the effects of their employment on the structures subsequently erected in the whole of the South of France described and commented upon, especially in cases of church plans. (11) The Cathedral of Fréjus had originally been an instance of the single nave or hall plan, aisles being added afterwards. The examples he had described gave an idea of the various steps by which the Romanesque style advanced in the country up to the middle of the twelfth century, and showed that a style was produced which at first borrowed its forms from Roman models, that they had been gradually modified by the Northern spirit, and continued to the last to rejoice in exuberance of decoration. Mention was then made of the rise of the Cistercians and the style introduced by them. (12) The Monastery of Thoronet was described as an example of the plain and severe style of the Cistercians. (13) The cloisters of Thoronet; and (14) The nave of Saint-Trophime at Arles were also cited as examples of the same style. The introduction of Northern Gothic took place in the thirteenth and fourteenth centuries, spreading over the whole country, and producing a mixture of Provençal elements of construction and Gothic ornamental details which was far from satisfactory, and of which (15) Saint-Nazaire

at Béziers, and (16) Saint-Jean at Perpignan, were examples. Churches in that mixed style continued to prevail in the south of France until the fifteenth century, but the importation of Northern Gothic became more and more marked. Mr. MacGibbon then referred to a very important phase of the architecture of Provence—the military structures. The walls of the cities of (17) Carcassonne and (18) Aigues-mortes were deservedly celebrated as the most perfect representatives of the art of defence of towns as practised in the thirteenth century; and were both described by the author, as well as the walls of Avignon and (19) the Abbey of Cruas. (20) Villeneuve-les-Avignon, the great castle of Saint-André, on the west side of the Rhone, presented many interesting features, and was also described. Attention was then directed to the Watch- or Keep-towers of Southern towns, the construction of them being explained by the speaker, and the Keep of (21) the town of Saint-Paul-du-Var, especially referred to as of peculiar construction. Having briefly reviewed the course of Provençal architecture he had described, Mr. MacGibbon referred to (22) the castellated monastery of Saint-Honorat as a very interesting structure, in which were combined examples of all the styles of Provence, and, having given a general idea of the building, described (23) the lower cloister, and (24) the upper, of Saint-Honorat, in considerable detail; the latter and other examples showed the Italian influence which prevailed over a large portion of the Riviera. The speaker concluded by stating that on the island of Saint-Honorat there was ample evidence of its varied fortunes and of the different people by whom it had been possessed. On that island there was thus preserved an epitome of the varied architecture of Provence.

The Chairman said that no doubt many of them came there attracted by the subject, and expecting to be interested. He felt sure he did no more than express the opinions of all present that not only had they been interested, but instructed by Mr. MacGibbon's exhaustive treatment of the "Architecture of Provence," so capably illustrated by his admirable sketches, thrown on the screen by the lantern. It had certainly been extremely interesting to trace with him the Roman characteristics of the earlier buildings to which he had referred growing into the Romanesque period, to be themselves superseded in turn by the Gothic features from the North. One thing that struck him forcibly was the massive and grand simplicity of many of the buildings. In these days of luxury and ostentation, he thought most architects might not be above taking a lesson from this feature. It was comparatively easy to cover a façade with ornamental detail, but too seldom was it that an architect had the courage to leave a mass of simple wall space.

Mr. Phené Spiers, in proposing a vote of thanks to Mr. MacGibbon, said he was extremely interested to find that he had attempted to trace the origin of many features of the earlier forms of Romanesque work found in the vicinity. He quite agreed with the statement that the style, as they found it, must be looked upon as one which took its form almost entirely from the old Roman work, and that it was very little influenced by the Byzantine work. In these earlier periods the great pride of the mason was to try and imitate something which had gone before. He remembered reading a letter from some monk to Charlemagne, in which he boasted of the monastery he had been able to erect "after the antique fashion." It was curious to notice how the mason of that period fancied he was clearly copying the old work when he was producing the work in question. In many of these buildings in Provence they found the same thing. The architect of the Church of St. Gilles certainly thought he was doing his best to copy the style he had seen built by the Romans. It seemed to him that the mason of that period attempted to copy the peristyle of the Maison Carrée at Nîmes, in which they found three distinct features—the architrave, the frieze, and the cornice. The architrave was looked upon as a decorative feature; the frieze was greatly increased because they wanted to introduce figures of greater importance, and the cornice was still there. But they seemed to conceive direct imitation, and the masons evidently thought when they were making that building that they were erecting something which was equal in its character and style to the peristyle of the Roman temple. He had



been thinking whether, instead of Venetian influence having come over to France, it was not possible that Provençal influence had extended to St. Mark's at Venice; whether the assemblage of columns there piled one upon another in a manner totally unknown in Byzantine styles might not have been taken from many important buildings in the South of France. He certainly thought that St. Front, at Périgueux, was a copy of St. Mark's at Venice. They did their best to copy that church, but when they came to construction they did not know how to form the pendentives. The pendentives at Venice were portions of spheres, but at St. Front, at Périgueux, in consequence of the arches being pointed, they were simply what we should call webs. Probably the pointed arch at St. Front, at Périgueux, was one of the earliest examples; and they might look upon the system of construction as being the precursor of the introduction of the Gothic vault. He was sorry to say that a great deal of St. Front, at Périgueux, had been pulled down to be built up again; and, so far as he could see, the shape of the arch was so nearly circular as to be an entire change from the original form. He confessed to a feeling of disappointment in the fact that the views they had seen that evening had not been photographs from nature. He had been informed that Mr. MacGibbon took some photographs, and he was in hopes that they would have seen them. They were startled a fortnight ago by the photographs exhibited by Mr. Elsey Smith, and though he was disappointed at not seeing some that evening, he was bound to say that Mr. MacGibbon's pen and ink sketches quite stood the ordeal. The accuracy of their perspective was shown to be very exact by the way in which they appeared on the screen. He had much pleasure in proposing a vote of thanks to Mr. MacGibbon.

Mr. Wm. White said he should be most happy to second the vote of thanks to Mr. MacGibbon, which he was sure was well deserved. From a general historical and descriptive view of the architecture of a considerable district, he had shown the manner in which so much of the work had been developed, giving them the channels by which it had come. There was no doubt that not only local architecture was copied by those who had colonised or taken possession of a district, but also they took back a great deal to their own country on their revisiting it. The manner in which that part of the country was colonised, and the architecture distributed, seemed to have been very much the same as that in Cyprus, which they were told of a fortnight ago. First came the Phœnicians, then the Greeks, then the Romans, and then the other succeeding elements which certainly affected the whole of the architecture of the district. The pictures of Avignon were very striking—the Bishop's palace, and also the towers and fortifications. They were almost the only instances that he had seen of the work which had been described by Mr. MacGibbon, and while feeling much interested in them, he felt he ought to apologise for saying so much as he had done.

Mr. Loftus Brock said that he was recently reading that a competent hand might make a good deal of this subject, but that no competent hand had yet touched it. It was a matter of congratulation to them to know that such a hand as Mr. MacGibbon's should have taken it up. Certainly, the drawings that had been exhibited showed different phases of Gothic work to anything that they were accustomed to. When they examined it, there was one feature which had never yet received the attention it deserved, and that was the curious fact that whenever any Gothic work was erected under a permanently sunny sky, instead of it being tall and aspiring, as Strasbourg Cathedral under a northern sky, on the contrary it became flat and heavy, and not aspiring. Whatever might be the case as to details, the general style was as stated, one of the most interesting features of the lecture was the comparison which was drawn between the classic work of Provence, and its adaptation and development in later times. He thought they could glean a good deal of information of what the style had been in Roman times by what had been put before them that evening. With regard to the columns that had been referred to, unless they were examined accurately on the spot, no one could be aware of the extreme delicacy and beauty of their carving. From what he had seen of casts of this work in Paris, he was led to

the belief that the work was the same as was found in the columns of the crypt of Canterbury Cathedral, which were too little known, but which were probably executed by foreign workmen. It was a curious point brought out by the lecturer, but it might be a matter of interest to refer to what had been said of the cessation of the classic style of carving which these buildings gave them. He ventured to think that Mr. MacGibbon would find that the great bulk of the carving such as they saw in those beautiful portals of St. Trophime, at Arles, were almost exactly like the carvings of Roman times, which survived, as two things could be, but if they put the classical carvings at the Museum side by side with those of the twelfth and thirteenth centuries, they would find a very great contrast. But the more they went up the stream of Time the more, he took it, they would find that the old Romanesque work of Provence showed the same style and mode of construction. Compare this little building and the baths of Diana at Nîmes. The two works were identical, and yet there were 800 years between them. There was a marked resemblance between those buildings and the triumphal arch of Susa,—they were almost line for line. Now these were all things which they were not accustomed to, and he took it that their thanks were greatly due to Mr. MacGibbon for having brought this before them, and when his paper was printed they would be able to study the subject more at leisure than they were able to do that night.

Mr. E. J. Tarver said he thought they owed a debt of gratitude to Mr. MacGibbon for bringing forward these early Romanesque buildings,—buildings which had been called by Fergusson "Christianised Roman architecture."

Mr. Campbell Douglas said that Mr. Spiers had expressed regret that the lecture was not illustrated by photographs rather than by sketches. He would join issue with that opinion. Photographs were all very well, and they were enormously indebted to them; but he thought, when they were dealing with matters of detail, he would prefer his own rude sketches to any photograph. The artist who drew the picture had, so to speak, the photographic image and the retina of his mind. The sketch might not be such an accurate representation, but that would be counterbalanced by the knowledge of detail gained by the artist. He felt very proud of his little country,—and he was there as a Glasgow man,—to find an Edinburgh architect enlightening them.

After a few remarks from Mr. Needham Wilson and Mr. Burrows,

The Chairman put the vote of thanks, which was carried by acclamation. Mr. MacGibbon, in acknowledging the vote of thanks, said, in reference to Mr. Spiers' remarks as to St. Front at Périgueux, that what he said was not that St. Front had not had any influence, but that he did not think there was sufficient ground, in the fact of St. Front being copied from St. Mark's, to support all that the French authors wished to found upon it. Admitted that St. Front was a copy of St. Mark's, as nearly as workmen could carry it out, still he wished to draw attention to the fact that the cupola was in general use throughout Europe. Mr. Brock referred to the differences in the Northern and Southern Gothic, and he must agree with him, that it was the interest attaching to this which led him to take up the subject *con amore*, and he could assure any one who could spend two or three months in a winter holiday in Provence that he would find much to interest him. Mr. Campbell Douglass had been kind enough to defend his poor sketches, and he was very sorry they were no better. So far as a man was personally concerned, the sketch was of very great moment to him, but the more lifelike and the more true to nature the illustrations to such a lecture were, the better for those who were listening. No doubt a carefully prepared photograph gave a fuller representation than any one could do with a sketch. One or two other points were brought forward by other speakers, but he was unable to pick up the exact point that was wanted to be explained. A good deal of information on the subject of his paper would be found in Révoil's book, entitled "L'Architecture Romaine de France."

The proceedings terminated with the announcement that the next meeting would be held on Monday, January 13.

#### THE NEW PRUSSIAN POLICE REGULATIONS REFERRING TO THE SAFETY OF THEATRES.

THE new "Prussian Police Regulations Referring to the Safety of Theatres" were published on the 30th ult., and have been in force since the 1st inst., one year's grace being allowed for alterations in buildings already erected or in course of erection. Since 1881 these regulations have been in the hands of a "Commission," which had been called together by the Minister of Interior and Minister of Public Works, and which has consisted of several Government building officials, several architects and engineers, several directors and managers of theatres of various grades, and the chief of the Berlin Fire Brigade.

The new regulations, which are of a very detailed and exact character, are intended to give the public a feeling of security in public places of amusement; and the Government hopes that by a strict enforcement of the rules many of the existing dangers will be prevented.

Looking at the new regulations as a whole, one sees that the chief aim is to prevent the danger to life and limb caused by panics founded either on real or false alarms of fire. Very exact rules have hence been laid down as to the number of exits, and the convenience of getting at them from every seat in the building. The width of the doors, passages, stairs, &c., have to be in a certain ratio to the number of people likely to use them; and a common method of describing the routes to be taken to gain the open has been arranged.

As panics are known to be just as dangerous in absolutely fireproof buildings as in those of somewhat more combustible nature, not half so much stress has been laid on the materials themselves as is usually the case; in fact, that part of the regulations referring to the safety of the building itself has been put quite into second consideration. Wooden columns, flooring, and corridor partitions are distinctly permitted, and even wooden staircases can, as a rule, be erected, only a few exceptions being made in the preference to iron. Wooden staircases are considered to be safer than either those of stone or iron, especially if the underside of the wood have a good coating of plaster.

The Commission has considered it to be of great importance that smoke or suffocating gases should be stopped from entering the passages and staircases. In order to avoid this, ventilating-floes, easily manageable in case of need, have to be made both over the stage as well as in the ceiling of the auditorium, and the disposition and construction of the flues are subject to very stringent rules. It is chiefly to prevent the smoke from filling the auditorium too rapidly that the so-called fireproof curtain is to divide the theatre into two parts. Its substance is simply required to be incombustible, but its working is distinctly not to be automatic; in fact, no self-working contrivance is permitted in any position where it would be of importance if it did not work. Such doors as may be required in the wall between stage and auditorium are to be of hard wood plated on both sides with iron.

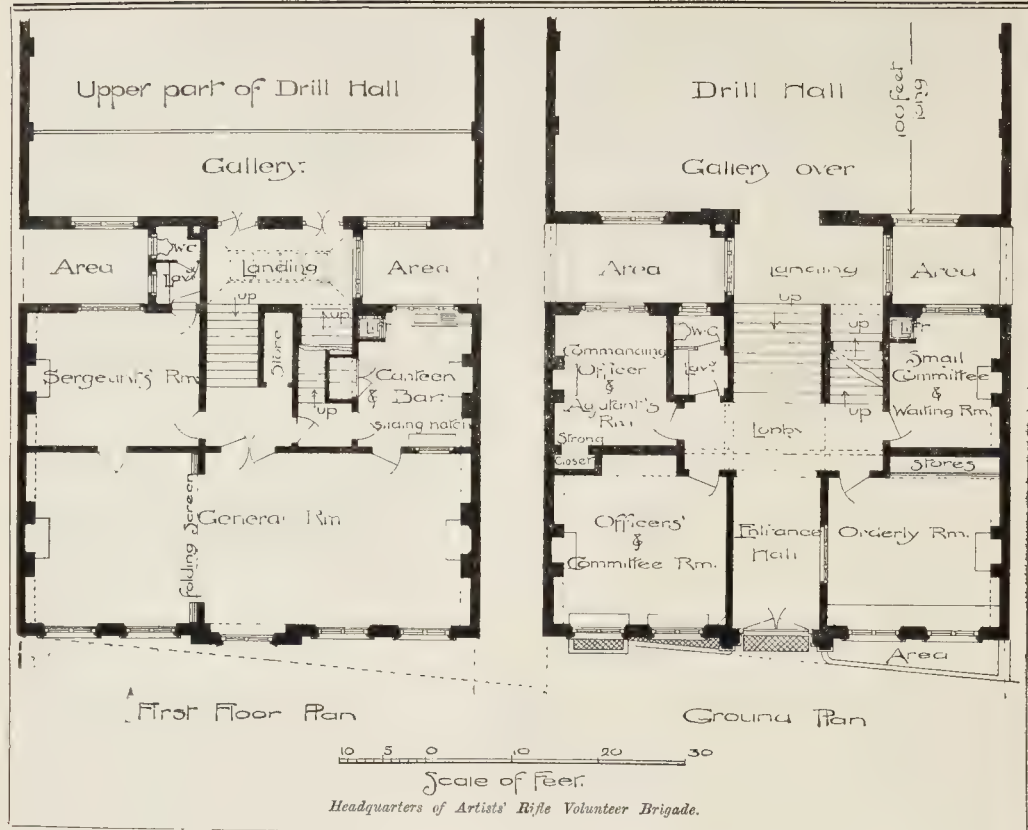
The impregnation of stage paraphernalia, so as to render it unflammable, is not required, but the scenery itself is to be of an unflammable nature as possible. A substitute for canvas is not definitely mentioned in the regulations, but the official "Centralblatt der Bauverwaltung" recommends a certain cloth of wire netting and asbestos, invented by Mr. E. Tepper, of Berlin.

The Commission has set down several paragraphs concerning the lighting, ventilation, &c., but no novelties are to be found in those parts of the rules.

Great care has been taken to let the rules be of as practical a nature as possible, and not only of a theoretical kind. The regulations of the cities of Paris, Vienna, New York, and London seem to have been well studied, and the results of the official inquiries into the Ring Theatre and Opera Comique fires were taken fully into consideration.

**Death of Mr. F. R. Conder, M.Inst.C.E.**—We record with much regret the death of Mr. Francis Roubillac Conder, a well-known civil engineer and writer. He died suddenly at Guildford on Wednesday, while reading in his study. He was for a great many years a contributor to our columns. Major Conder, the eminent Palestine explorer, is a son of the deceased.





### Illustrations.

#### ST. PAUL'S, KENSINGTON.

**XX** We publish this week an interior view of the Church of St. Paul, Kensington (Mr. Arthur Baker, architect), of which we published an exterior view and a description in the *Builder* of November 30 of this year.

#### S.W. TOWER, SENLIS CATHEDRAL.

This tower is, says M. Viollet-le-Duc, one of the very few still existing which were built in the early part of the thirteenth century without any stoppage or hindrance of the work from commencement to finish. It is one of the earliest existing examples of an important steeply in which the upper part of the tower, as well as the spire, is of octagonal form. This arrangement gives great facilities for overcoming the awkwardness with which the octagon sits upon the square, and is a favourite one with modern architects. The open pinnacles that fill up the angles in this case might possibly perform their part more happily if they were a little more solid, but the skill which led their designer to incline the axes of the little spires that crown them is much to be commended. The same skill and taste are apparent in the design of the eight great dormers, which serve to blend the vertical lines of the tower and the inclined ones of the spire; which carry the light, open character of the composition into the spire itself and take the place of pinnacles around its base. The expedient of cutting down the backs of these dormers is a rather clumsy one, but it serves its purpose, and is not very noticeable.

The illustration is reproduced from a drawing by Mr. Arnold B. Mitchell, which was exhibited at the Royal Academy during the present year.

#### SCULPTURE—NEW LAW COURTS, BIRMINGHAM.

This is a reproduction from a drawing exhibited in the last Royal Academy Exhibition,

showing the sculptural decoration of a gable in the new Law Courts at Birmingham, of which Messrs. Aston Webb & Ingress Bell are the architects. The figure in the gable represents Art, those below represent "Modelling" and "Designing" respectively.

The figures were modelled by Mr. W. Aumonier, who writes in regard to it, "The whole of the work was modelled in the open air on a gallery above the clay-pit at Mr. Edwards' Terra-cotta Works at Raabon. This was done expressly that we might go continually 60 or 70 ft. below the work while it was in progress so as to judge what its effect would be when fixed in its proper position on the building. The centre figure is about 5 ft. high in execution."

#### SKETCHES IN CHELMSFORD.

These sketches, taken by Mr. J. W. Cobb of Chelmsford, represent some of the old picturesque corners in a town which has not been much illustrated.

There is no particular history attaching to the houses. Those shown in the larger of the three sketches in Moulsham are situated at the corner of what is known as "The Friars," but which was formerly "Friars Walk." At the other end of this "Friars Walk" once stood a Priory, belonging to the Dominican Friars, though now not a vestige of it remains.

Moulsham is one of the oldest portions of Chelmsford, and formerly was the property of the Mildmays, at one time one of the wealthiest and most powerful of Essex families.

#### THE ARTISTS' VOLUNTEERS' HEADQUARTERS.

These premises were opened by the Prince of Wales on March 25 last, as we mentioned at the time.

The façade of the new building is in the Renaissance style, with red terra-cotta dressings. The large medallion over the entrance was executed by Mr. Brock, A.R.A., who is a lieu-

tenant in the corps. On the ground-floor is a large entrance, 10 ft. wide, with orderly, committee, officers' and commanding officer and adjutant's rooms, and a spacious drill-hall, 100 ft. long by 52 ft. wide, top-lighted, with a gallery at the south end, 52 ft. by 15 ft. In the basement are the armoury, rooms for quartermaster's stores, lavatories, and dressing-rooms for the men. On the first floor a large general room for the men, 52 ft. by 20 ft.; canteen, with lift to kitchen over, and sergeants' room. On the top floor are dressing and bath-rooms, &c., for officers and sergeants, and accommodation for headquarter staff. The total cost of the new building, including furniture, has been 6,500*l.*, of which the officers, non-commissioned officers, and men have subscribed 3,200*l.*

The work was carried out under the honorary architect, Colonel Edis, by Messrs. Charles Kynoch & Co., contractors, Clapham.

#### BUNGALOWS FOR THE BELLAGGIO ESTATE.

The house of which an exterior view is given is now being built on the above estate. The whole of the walls above the plinth, which is of red brick, are of stud work covered with Brosely tiles, with which the roofs are also covered.

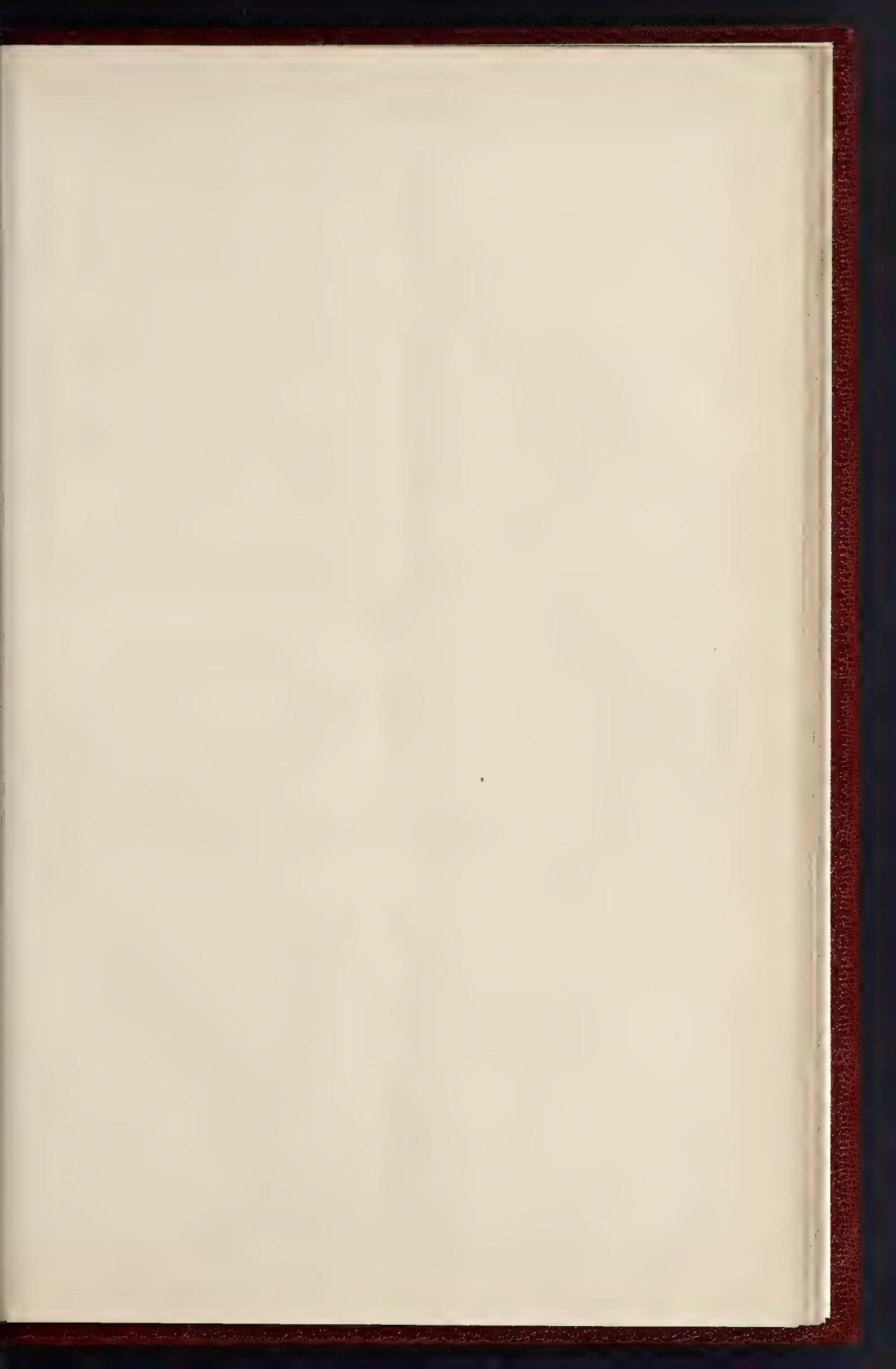
The bungalow, of which an interior view is shown, has been built on the same estate. The whole of the house has been raised 8 ft. from the ground on dwarf stone walls, in order that the magnificent view may be seen from the windows of the sitting and bed rooms.

The sitting-room is panelled in oak, and the stud and plaster work is left exposed to view, and will be hung with tapestries; the whole of the woodwork throughout is stained very dark brown, and coated with boiled linseed-oil.

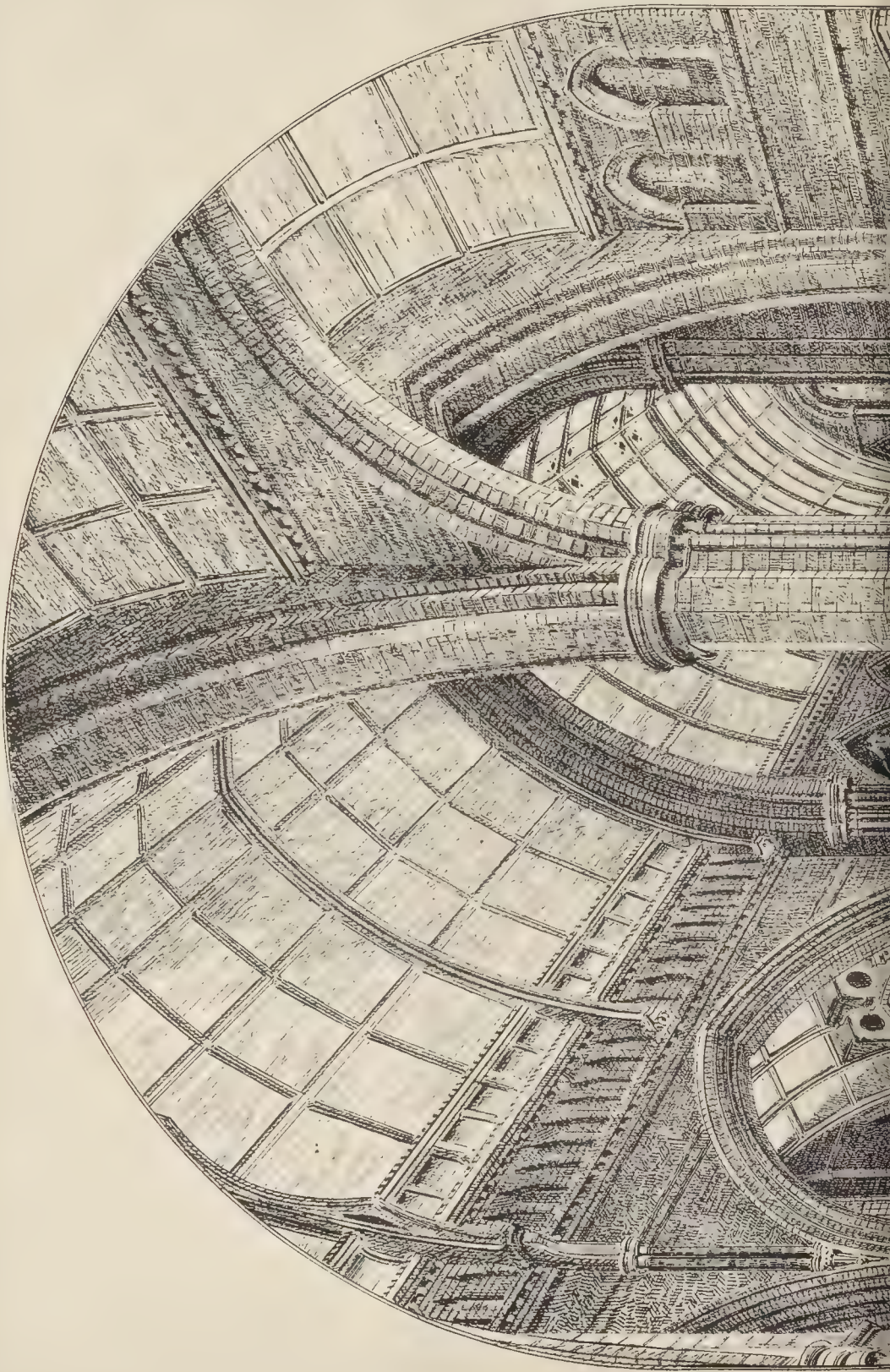
The walls above the balcony level are covered with tiles, and the roof is thatched. In the angle nook a window, filled with bevelled plate-glass, is formed.

Mr. R. A. Briggs is the architect of both buildings.

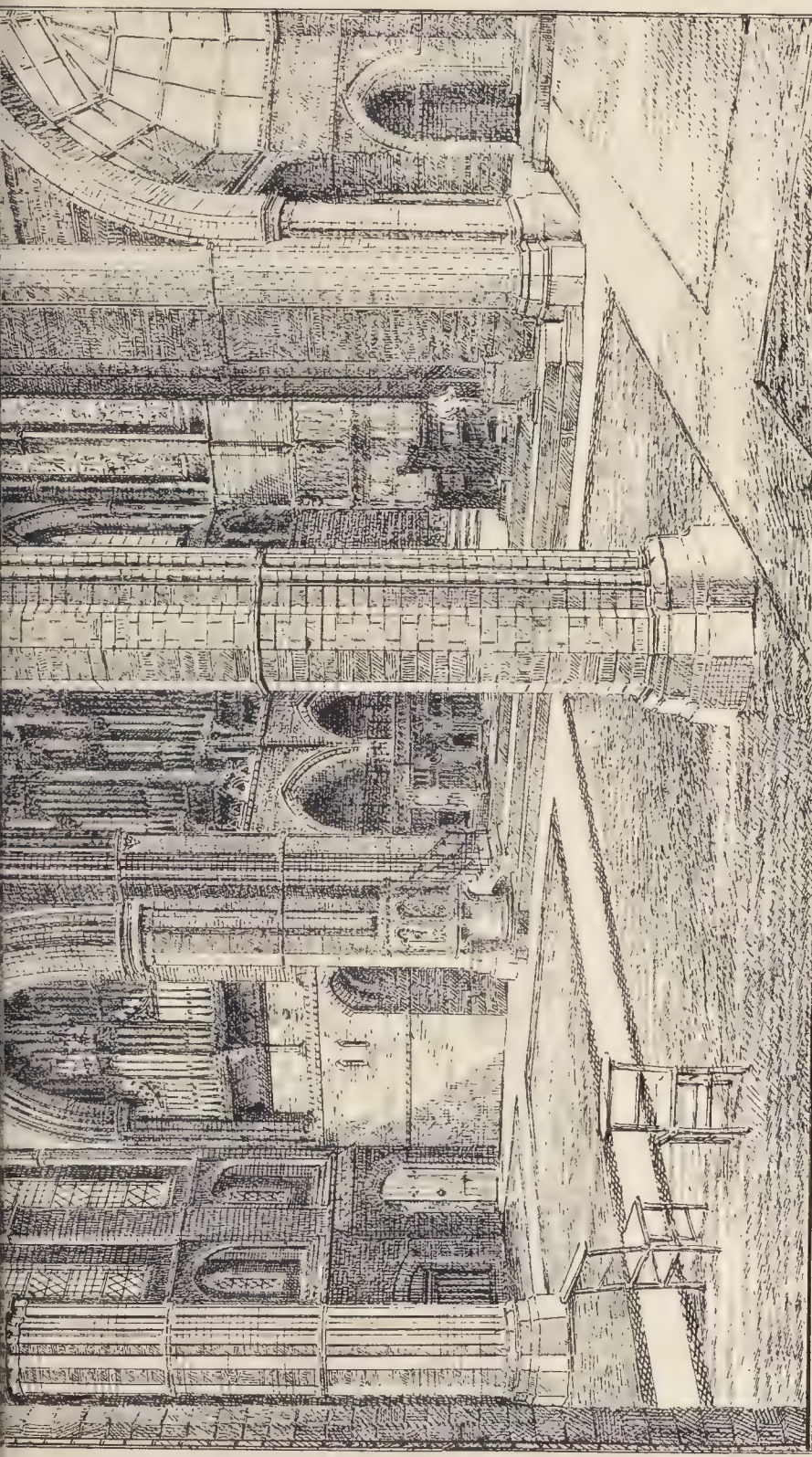




THE BUILDER, DECEMBER 21, 1889



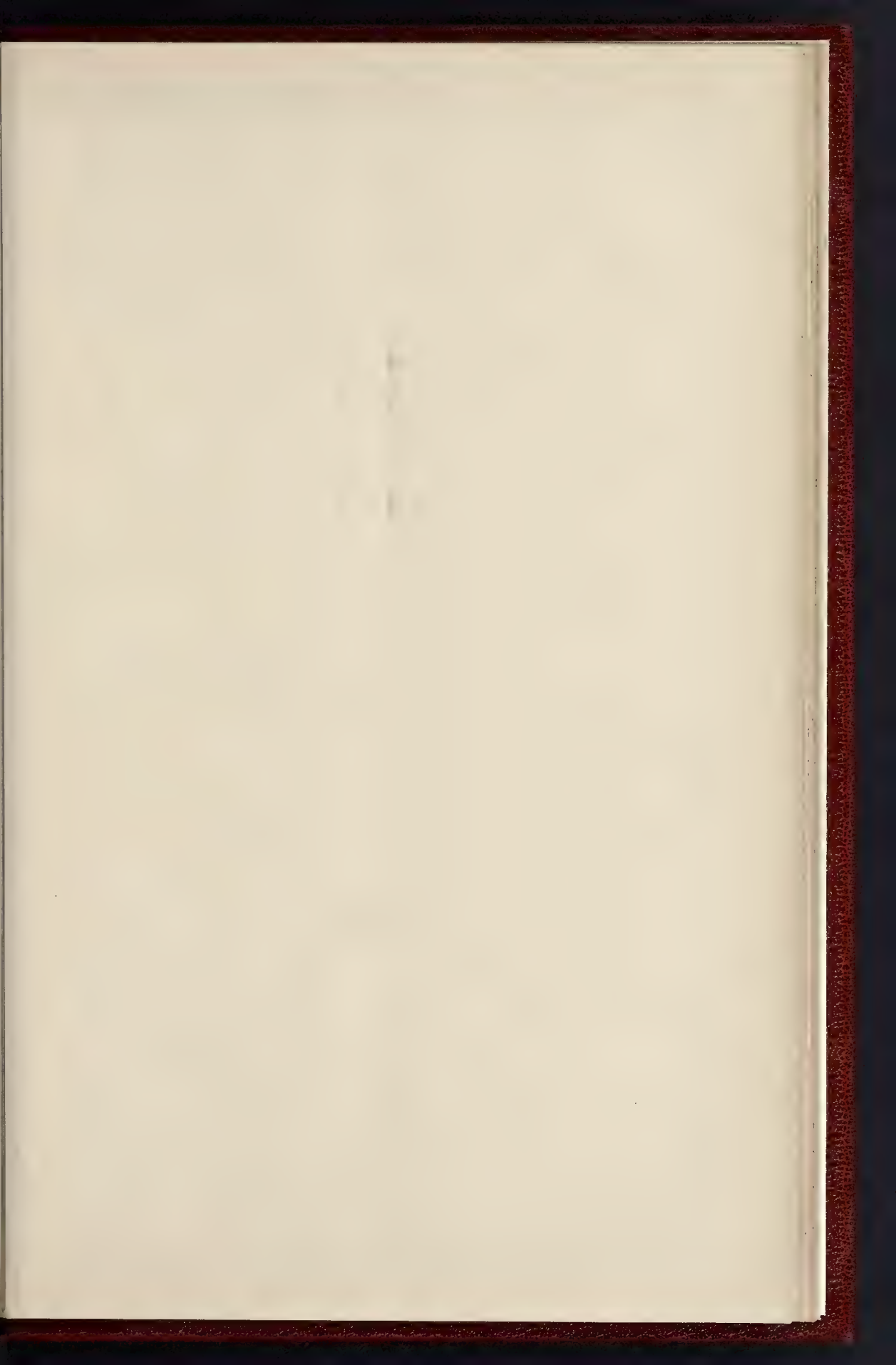




ST. PAUL'S CHURCH, KENSINGTON. MR. ARTHUR BAKER, F.R.I.B.A., ARCHITECT.







THE BUILDER, DECEMBER 21, 1899

The sign for Bunicklow for the Bunicklow Estate, Ipswich, Essex.

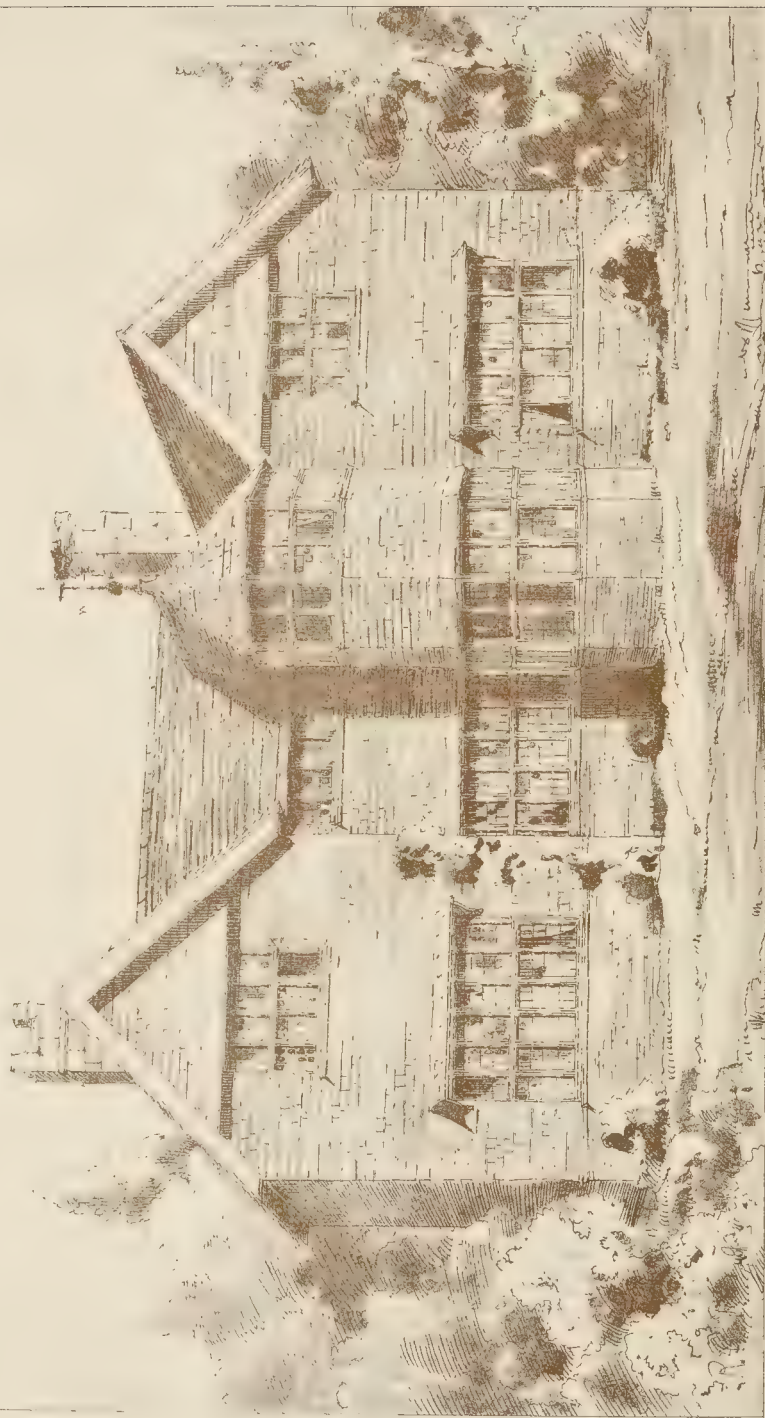
R. A. Briggs and W. A. Archibald  
2, Devonshire Square, E.C.4.



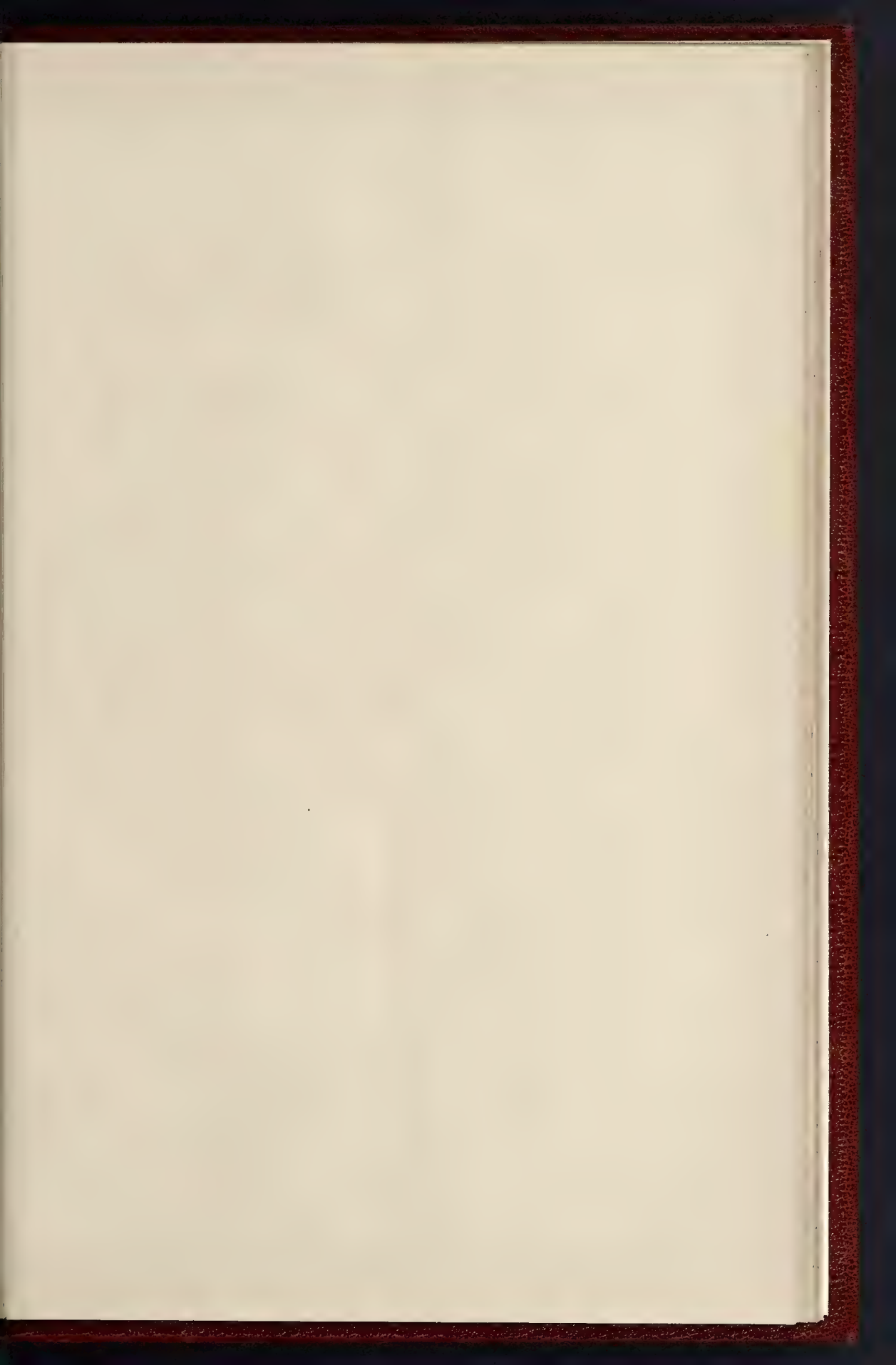
GR. RE. FLOOR PLAN



EAST ELEVATION PLAN

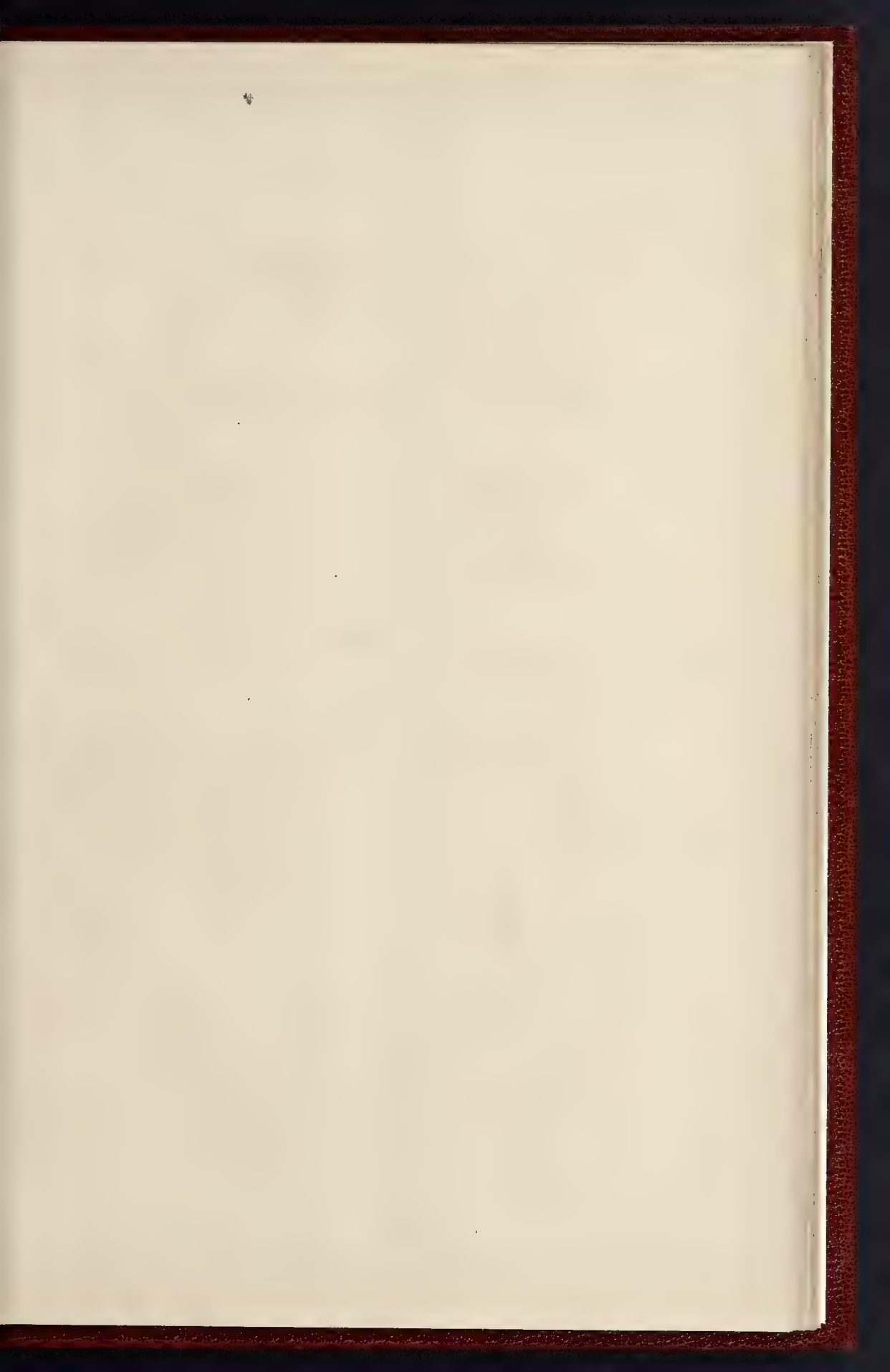














SW TOWER  
CATHEDRAL  
172' 8" x 13' 6"



VICTOR A. COOPER, BIRMINGHAM.

SKETCHES FOR FIGURES IN CABLES CORPORATION.

GABLE FOR ART

ART

MODELLING

DESIGNING



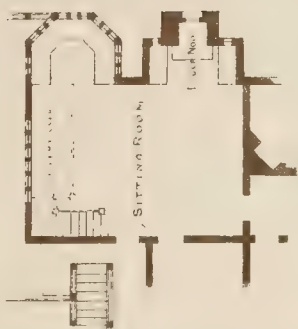
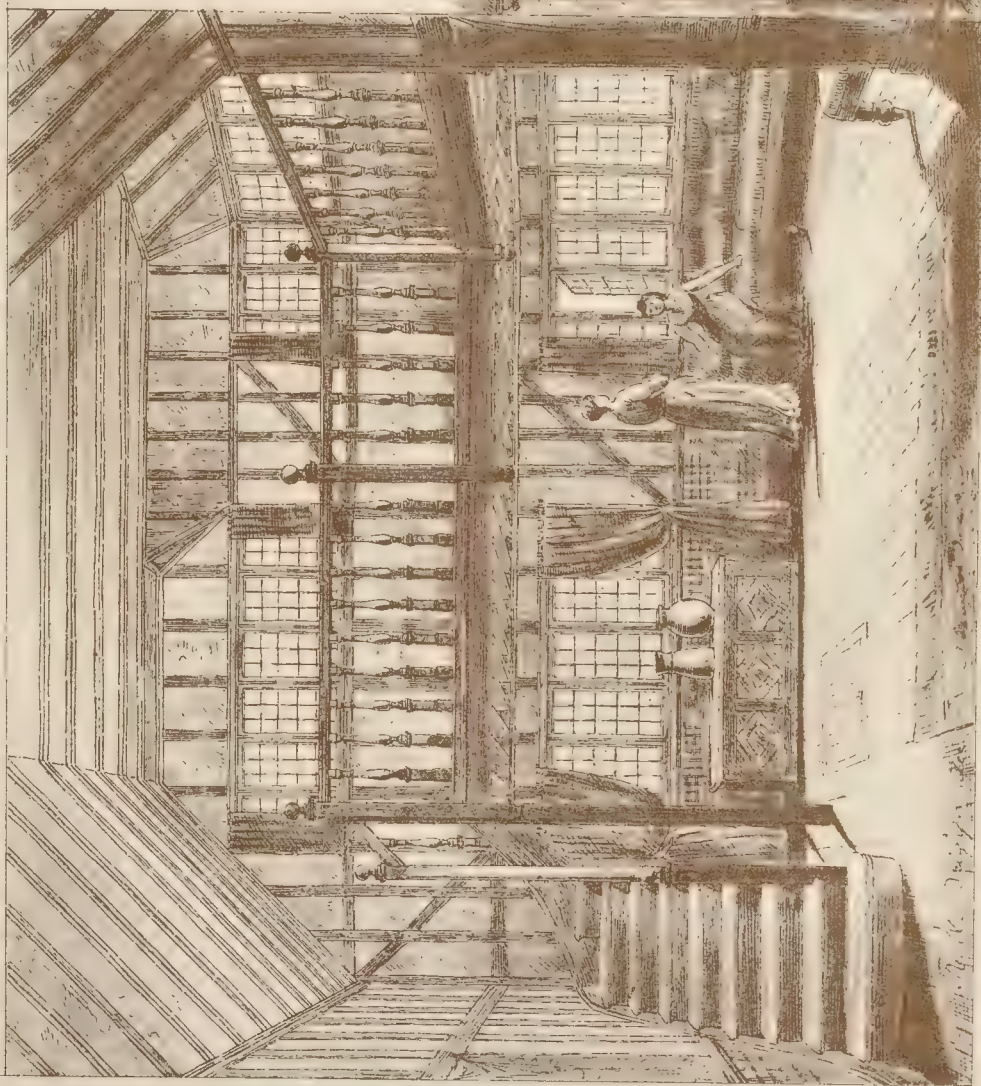




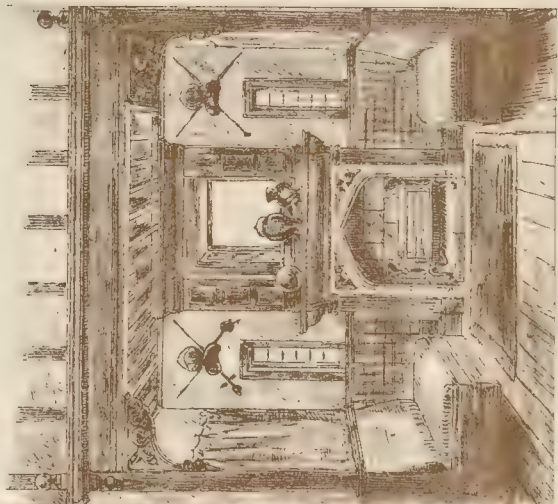








High Nooks







## THE ARCHITECTURAL ASSOCIATION.

THE fifth meeting of this Association for the present session was held on Friday, the 13th inst., in the meeting-room of the Royal Institute of British Architects, Conduit-street, Mr. Leonard Stokes (President) in the chair.

The following gentlemen were elected members, viz.:—Messrs. O. E. Blayney, C. B. Hutchinson, H. Bulman, J. H. Bolton, O. G. Beater, J. Richmond, W. D. Goodwin, W. E. Hazell, A. R. Hennell, G. G. Irvine, and H. Bailey.

Mr. R. T. Blomfield, M.A., read a paper on "Drawing," which we print *in extenso* on another page.

Mr. A. B. Pite, in rising to propose a vote of thanks to Mr. Blomfield, said they ought to express their deep sense of gratitude to him for his paper. The subject was one of vital importance to them all, and although it was true that a comparatively small proportion of the members of that Association were architects, yet he hoped they were all architectural draughtsmen, and therefore such a paper as they had heard that evening was, he thought, of far more use to them as a body and as individuals than a good many other papers could be. He hoped they had listened to it with that amount of care and attention which would enable them to put into practice some of the truths and principles which Mr. Blomfield had so happily laid down. If Mr. Blomfield's own very successful work was based on those principles, the careful study of those principles by others ought to produce the same successful results. But it was, perhaps, to be regretted that Mr. Blomfield had confined his exhibition of illustrative drawings to the works of a few men who were on the fringe of architectural draughtsmanship—men whose genius and vocation lay, more or less, in the production of picturesque architectural landscape. It seemed to him that architectural draughtsmanship, practically speaking, as far as it concerned them, was very much connected with one or two historic facts. One of those historic facts was that they were now in the presence of some half-a-dozen weekly architectural journals, each publishing, on an average, from six to eight pages of lithographic drawings. But he regretted to say that they were indebted to those journals for the abolition, if not the extinction, of the highest form of illustrative architectural drawing, viz., the old steel-plate engraving, which had survived in the French school, but was absolutely a dead letter in English architectural illustration. No one could now afford to publish a book equal to one of Professor Cockerell's; the wind was taken out of their sails by the methods adopted for producing the illustrations,—the very popular and very successful illustrations,—in the architectural journals. They could do nothing but offer advice to these journals, and he thought that advice should be that they would much rather have one steel plate a week in the manner of M. César Daly\* or Professor Cockerell, than the whole show of architectural illustrations with which they were deluged every week,—good, bad, and indifferent architectural drawing of every description. He was sure that instead of paying fourpence a week, some of them would be willing to pay one shilling a month and have one good plate, rather than the two or three dozen which they now got in the same time and for the same cost. There was much work illustrated in the present day which had no business to be illustrated, and by which architectural drawing was reduced to a very low ebb. It was no doubt true that architectural illustrations, drawn with delicacy and refinement, could not, except under exceptional circumstances, be produced by the thousand in a few hours, which was practically what had to be done by the illustrated weekly journals. These journals did their best, and they owed them a deep debt of gratitude; but for those journals the majority of them would probably never have become acquainted with the works of Mr. Norman Shaw; nevertheless they must protest against the photo-lithographic method of reproduction. It was to be regretted that no journal could now afford to give the time to the reproduction of drawings which represented real feeling,—generally pencil work,—such, for instance, as those that Proust's, or Cotman's, or Coney's genera-

tion knew. The art of lithography had, he thought, been killed by photo-lithography; the field which there used to be for architectural draughtsmanship on stone had been spilt by photo-lithography. They were now told that they must do this and that in order that their drawings could be reproduced,—and their drawings were to be made with "the blackest of ink on the whitest of paper."\* There were other processes for reproduction of drawings which were pseudo-technically known, he believed, as "stinking" processes, owing to the odours of the offensive chemicals employed; but he had seen as yet no results which would justify them in hoping very much from such processes. They could not hope to get Goupil photogravures in the weekly journals, but might hope to do so in a good monthly paper. Turning to another aspect of the subject, he had always regarded architectural drawing as being of two sorts, scientific drawing and imaginative drawing. An architectural drawing was, of course, in its origin and in its use a scientific drawing. They could make their drawing an actual representation of form or effect for sketch purposes, but when drawn for the reproduction of that form and effect in some material or other, and necessarily to scale, it was a drawing of a building or part of a building as it would never possibly look. It was in that sense so highly technical a production, being entirely without regard to atmosphere or perspective, or even colour or detail, that their simple scale drawing or full-size drawing was essentially a scientific drawing. It had to represent in the clearest manner the building which had to be erected. To make such a drawing perfectly would show plans, sections, and details mysterious to the uninitiated, carefully figured with detail, and with the materials indicated by the most gaudy colours; and it was thus their imaginative qualities were shocked rather than encouraged by architectural drawing. But they should always remember that with reference to the scientific in artistic drawing, there was the quality of drawing in their buildings. Just as there was the quality of drawing in sculpture and in painting, apart from the outline itself, he thought there ought to be apparent the quality of drawing in all their buildings, as executed, and not on paper only. With regard to form, there should be not only contrast of outline but a due proportion of light and shade. In the majority of buildings erected in the present day pilasters projected in a very haphazard sort of way, and had no relation to the surface which they broke up. The cornices, too, however well proportioned as to their sections, had no relation whatever to the proportions of the buildings they surmounted. Effects of light and shade, as well as contrast and form, in other words relief, were qualities of architectural drawing which could only be expressed in the building itself, for it was difficult to give them in a drawing. The French school tried to get their effect by a complicated method of shading on their drawings, but not altogether with the happiest results. As to imaginative architectural drawing, he did not see why they should be denied the liberty and opportunity of drawing for drawing's sake. Why should they not have just as much enjoyment in making a drawing as the artist who enjoyed sketching an old street? Even supposing an architect, by making a perspective of the building as he would wish it to look rather than as it would look when new, sinned a little against the proprieties, he could not but think that such a sin was one that was very near the borders of righteousness. He could not see, again, why in drawings sent in in competition by students in the Institute or Association the imaginative element should be interdicted for fear of causing a poor assessor to be deceived. He thought that the imaginative element should be recognised and encouraged as much as possible, and that men who could show that they had an imaginative ideal should not be snubbed. With regard to Piranesi's works, there were twelve or fourteen to be found in the South Kensington library, to which they ought to give their early attention, and there was also one in the Institute library. A good many of Albert Dürer's prints had been reproduced, and some of Cotman's drawings had been published in America, and, therefore, without going to museums they could get sufficient supply of imaginative drawings to feed the fire of their souls. In one of Piranesi's drawings which was exhibited that evening—the Temple of Peace,

he thought—they had the idea of vast size. The building was a vast one, but Piranesi had endeavoured to make it look larger. It was his ideal. In the same way in Albert Dürer's drawings, the imaginative element was remarkably manifest by portraying, by mere force and power of line, the intensity of the scene represented. In the example of Samson and the lion nothing could be more forcible and nothing more practical and clear than the drawing of Samson tearing the lion to pieces. The way in which, without the slightest regard for perspective, Dürer managed the heavy lines just at the points where he required them to express force, was very instructive. Speaking of the "suggestive" school of drawing, he said that, clever as it was, it was possible to have too much of it. He warned his hearers against copying the tricks of that or any other school, for they were always in danger of falling into some trap if they copied. When they came to leaving out the outline of a building, representing chimney-stacks by the black mortar-joints, and omitting the arrises of the bricks, they were too clever. It was very dangerous to copy tricks, and gentlemen who started by copying the tricks of Samuel Prout, for instance, would certainly fall into ignominy. They must not think to get the same happy effects with splashes of black as Mr. Pennell or Mr. Railton. He remembered a friend who, full of enthusiasm for his art, was determined one day to sketch the cathedral of Prague, but he soon found that he could not get on very well, for he felt he had not a power of drawing commensurate with his sympathies. He would advise all students in a similar frame of mind not to be discouraged, for he (Mr. Pite) believed that no architectural draughtsman could obtain anything like facility until he had been patiently working for years. It was of importance that from the first they should aim at accuracy in their drawings. He was very much struck when he first observed that Sir John Millais's remarkably powerful method of drawing was entirely due to the exceeding care and diligent study with which he elaborated his draughtsmanship in his early life. Only those men succeeded in getting broad, brilliant effects with a few touches who had been accurate in their early drawing.

Mr. F. T. Baggallay seconded the vote of thanks, and said he should like to say a word or two about the importance of drawing, which it seemed some people were inclined to doubt. Even Mr. Blomfield had told them that a man could perhaps be a great architect without being a great draughtsman, and that was probably true if by a great draughtsman was meant one who was capable (like Mr. Railton) of representing picturesque buildings that existed. But he (the speaker) did not for a moment believe that a man could be a great architect without being a very good draughtsman; for it seemed to him to be quite impossible for a man to conceive or originate in his mind a form which he could not draw with his pencil. He believed that the power to draw a thing meant a great deal more than the power to draw it; it meant that a man knew every outline and detail of it with exceeding accuracy. Before they could draw a thing really well, they must know it well. He knew a man who did not profess to know anything about drawing, but who knew a great deal about horses; and that man could draw horses with great accuracy, simply because he knew all about them. With reference to what Mr. Pite had said about steel engraving, if Mr. Pite would get somebody to start a monthly architectural journal which should produce steel engravings of the finest description, a nice opportunity would be offered for those prepared to buy; but it would also be a splendid opening for any publisher to drop a great deal of money.

The President, in putting the vote of thanks, said that there was no doubt that Mr. Blomfield was a thorough master of his subject, and he had touched upon various points which they would do well to consider. He (the president) thought that the first point they should seriously consider in drawing was, what the drawing was for. It was all very well to talk about a drawing, and to criticise it when they did not know the purpose for which it was made. If the drawing were intended for reproduction, it should be drawn for that purpose; and if it were a record drawing intended to represent a building in the best and most complete way possible, then they should disregard all thoughts of reproduction. He could not but think that the making of drawings with a view to reproduction

\* Mr. Pite is under a mistake as to M. Daly's paper, the *Revue Générale*, which is a monthly and not a weekly publication; a fact which makes all the difference as to the style of illustration it is possible to produce.—Ed.

\* See our previous footnote to Mr. Blomfield's paper.—Ed.



had done a great deal to deteriorate draughtsmanship. With regard to drawings made from ladders and scaffolds, a great deal might be learnt from the very act of making them; although their roughness and dirty state might make them perfectly useless as show drawings, yet the draughtsman would always retain mentally a certain amount of knowledge from having drawn any particular object. Many men, he believed, who sketched frequently and measured with great care hardly ever referred to the sketches and drawings which they made, but the fact of their having drawn objects in that way was sufficient to stamp them upon their minds and rendered it unnecessary for them to refer to their books. It was only men who did not study and draw who had to refer to books and papers for their inspirations. In making a drawing they should not forget the object as a whole, for it was a great mistake to go all over the drawing and to put in every imaginable scratch that they possibly could. They should grasp the thing as a whole, its outlines and proportions, and should not cross-hatch every possible bit of shadow. He was sorry Mr. Blomfield had said quite so much about drawings for reproduction, for he thought that they, as architects, should draw for their own information, and should make the representations of their buildings in an architectural manner. He rather agreed with Mr. Pite in thinking that they should not be prohibited from drawing a building as it would appear a few years after it was erected. He did not see why they should draw their buildings as they left the hands of the mason; for it was only fair to give their buildings a little time, so as to allow a few shrubs to grow up round them, and a few stains to appear on them. Mr. Pite had given them a very excellent address on drawing, and had pleaded for a certain amount of license in drawing, but he (Mr. Stokes) thought that that depended upon what the drawing was for. If they wanted an accurate drawing, they ought not to draw other than accurately. If a drawing was intended for a working drawing, it should be drawn as a working drawing; and if it was intended as a record drawing, it should be perfectly accurate, and, as Mr. Blomfield had said, with all its shadows, lights, &c. Mr. Pite had laid great stress upon accuracy; that was a lesson which young draughtsmen must not be led away by the desire to make pretty drawings. They should always bear in their mind that architecture was their real end and aim. If they could make pretty drawings well and good, but they should always endeavour to make drawings which would be useful to them, and which would catch the whole spirit and object of the building which they were depicting.

The vote of thanks to Mr. Blomfield was then put, and carried unanimously.

Mr. B. T. Blomfield, in reply, said he had not much to add to what he had already said, but there had been one or two points raised in the discussion with which he would deal. Mr. Pite had referred to lithography. He (Mr. Blomfield) had at one time thought that a good deal might be done with lithography, but drawings reproduced by it had generally been unsatisfactory. By means of what Mr. Pite called "stinking" processes, drawings could be reproduced better than by means of lithography, and that was why he had called attention to the necessity of pen-and-ink work. He did not quite understand Mr. Pite's remarks about the quality of drawing in architecture and sculpture.

Mr. Pite explained that he had referred by way of illustration to the quality of drawing in a painting, a thing which would be perfectly easily understood, apart from the colour and the atmosphere, and simply regarded the representation of form; and when they looked at sculpture they might find exactly the same quality. When he looked at the elevation of a building, he wanted to see the quality of drawing in the elevation; he wanted to see that every form told,—apart from the colour of the materials, or in the absence of archaeological or antiquarian interest,—that they were there naturally, and that the architect had studied the drawing of his building in brick and mortar. By such drawing he meant form, apart from outline, governed by shadow and light rather than by the interest of outline and good proportion alone.

Mr. Blomfield said that he thought he understood Mr. Pite, but he dissented from the use

of the term "drawing." If they got in sculpture the quality desired by Mr. Pite, he thought they ought rather to call it "modelling," while it would be "form" in architecture. Sculptors were very chary about using the pencil; they preferred the thumb. The architect's drawing, after all, was only a means to an end, and Mr. Phené Spiers, in a note to a paper read at the Institute a few years ago, referred to the French method of showing the relief or projection in drawing by means of conventional shading, by which it was claimed that they could show all the qualities of relief, and so on. He (Mr. Blomfield) thought this system not so clear or so easily intelligible as the English methods of working by scale on the one hand and perspectives on the other. As to the "suggestive" sketching, about which something had been said, it was being very much overdone, but in skilful hands it was a method of great value. There was one thing to be said for it, however, and that was that when they saw a thing at a distance, they did not see the detail, but the shadows, and the impression of the thing which the eye took in was the dark part. Mr. Bagallay had referred to what he had said about fine draughtsmanship not being an absolutely necessary qualification of a great architect. He (Mr. Blomfield) had rather spoken against his own convictions on the matter, for he thought that a great architect must be a fine draughtsman, in so far as that he should be able to draw the figure, and any flower or animal which took his fancy. He did not see how any one could make a good decorative design unless he could draw an animal or a flower properly. The President had referred to the reproduction of drawings as having had a bad effect upon draughtsmanship. If they had any *arrière-pensée*,—if they thought they were making their drawings for reproduction, and were not thinking of what they liked themselves in their drawings, there was always a tendency towards affectation; there was a tendency to sink that individuality which it should be their primary object to develop. In work for reproduction they saw that certain things "took," and the tendency of the young draughtsman was to imitate such work. As to the point of architectural drawing, his view was that they could do one of two things. They could either draw as Piranesi did, using architecture as the material for their imagination, or they could draw architecture as Inigo Jones used to draw it. It was extraordinary to see the way in which Piranesi had taken architecture pure and simple as his groundwork, and thought out his ideas in architecture. The figures which he had put into his drawings had been abused by many people, but they were not of the essence of his designs. An exceedingly able design by Mr. Pite, made about five or six years ago, and which bore the motto "El Dorado," was another instance of imaginative drawing of architecture, and in this there were practically two designs, the architecture itself, and the drawing of it in black and white. It certainly showed that Mr. Pite had given himself a considerable amount of the licence and imagination in design for which he had pleaded. Inigo Jones's drawings gave one the impression that he simply dashed on to paper what his notion of a building was, and when he had finished that he left the thing then and there; and that was the other way referred to of making an architectural drawing.

#### THE LONDON SEWAGE QUESTION.

SIR ROBERT RAWLINSON, K.C.B., read an important paper on this subject before the Society of Arts on Wednesday evening. The greater portion of the paper was devoted to a historical sketch of the subject. The latter part of the paper, which contains his conclusions, is as follows:—

Sewage irrigation has been carried on in England and Scotland a sufficient length of time to show that it is the cheapest and most effective mode of treating sewage yet tried, and where land is obtainable at agricultural prices, and the sewage can flow to the land, that there is an income can be earned by the process. There are some thirty or more places in England where sewage irrigation has been in use a sufficient number of years to permit inquirers to be satisfied with the results, as at Banbury Lodge-Farm, Barking, Bedford, Birmingham, Blackburn, Cheltenham, Chorley, Croydon, Craigintinny-meadows, Doncaster, Harrogate, Leamington, Merthyr Tydfil, Oxford, Rugby, Tunbridge

Wells, Warwick, West Derby, Wolverhampton, and Wrexham.

At Berlin, the sewage of the city is lifted by steam-power to a height of 130 ft., at a cost of 12,000l. per annum. Upwards of 2,000 acres have been purchased at a cost of 400,000l., and this land is laid out and cultivated under sewage. The distance of the sewage farm from Berlin is about ten miles. The City authorities are said to be satisfied with the results. Paris has appropriated land for sewage irrigation for some years at Gennevilliers and some other places, to the extent of 12,350 acres. Steam-pumping power is used, and the river Seine is crossed. The municipality is so satisfied with this work, that the engineer, the late M. Durand Clay, is to have a statue.

Irrigation has been practised in China, Japan, Ceylon, and Italy, upon an enormous scale, time out of mind; and in England water-meadows are successfully cultivated. At Edinburgh, the sewage-grown grass feeds dairy-cows, the milk being used in Edinburgh. The London sewage may be turned into milk and butter which will be wholesome.

The volume of crude sewage to be dealt with, if taken at 150,000,000 gallons per day, will represent 670,000 tons. Containing, say 150 grains of solids per million gallons, it will amount equal 10 tons of sludge per million. (?) So that 150,000,000 gallons will represent 1,500 tons per day of sludge to be removed in barges. So that there will be 547,500 tons of sewage-sludge to remove or get rid of, per annum. To consolidate it by sludge-presses at 2s. per ton, would cost 54,750l. per annum. To barge it to sea, there must be not fewer than six of the largest class, as the out-and-home voyage will be about seventy miles. Each barge to take 1,500 tons of sludge, containing, at 90 per cent. of water, 1,350 tons of water to 150 tons of solids. But on testing the barge load before discharging it, 95 and even 97 per cent. of water was found. Taking, however, 95 per cent., there will be 1,425 tons of water to 75 tons of solids. Did it ever before enter into the heads of any body of men—engineers and representatives of vestries—to perpetrate such operations? It must be remembered that the crude sewage flows to the outlets with the solids, and if pumped into the proposed sewage canal or conduit, would flow to the North Sea, or on to any land used for irrigation or warping, as at Foulness Island.

It is not my intention to raise the chemical question as to the use and sort of chemicals for sludge disinfectants; this I must leave to the chemists. The sludge-tanks, and the sludge-barges, will in hot weather become putrid, and to arrest this chemicals may be used, the cost being estimated very high. With fresh sewage flowing at once over land or to the sea, very few chemicals need be used; the land will at once disinfect. The sea will at once dilute and disperse, as at Liverpool, where the crude sewage of Liverpool, Birkenhead, and all the towns on the river and estuary pass harmlessly to sea.

Contracts were let on the eve of closing the old Board to the extent of 741,000l. Add to this extra land, fencing, workmen's houses, new mud-barges, at more than double cost by reason of the rise in iron, steel, and labour, and it appears to me that the legacy in this form will exceed 1,000,000l. sterling. Interest on this with maintenance will be fully 5 per cent., which will equal 50,000l. per annum. Wages may be 50,000l. a year. The cost of chemicals will be in proportion to the quantity used, and may range from 50,000l. up to 100,000l. per annum, or 200,000l. per annum on the whole. And all for what? Not to prevent pollution of the Thames, as the clarified sewage will ferment in the river, will kill fish, as at present, and make the water foul-looking and offensive. Chemicals have been tried at many places to see if they would purify sewage, but ever with the one result,—namely, to produce an effluent which becomes putrid, offensive, and dangerous. The new works land the County Council in a debt of about 1,000,000l. sterling, with an annual cost of probably 300,000l. per annum, and a polluting effluent. A vast nuisance establishment of sixty acres in extent!

It is never good policy to use hard names I admit, but I may quote an established proverb, and say, that these Barking and Crossness Works, as a gift to the new County Council, are equivalent to an entire herd of white elephants. Among the suggested new works are pumping-engines and apparatus to lift the



sewage to the new sewage conduit, say at a cost of 100,000*l.*, or 46 miles of new conduit, at the estimate put down by the referees for the cost of their proposed southern and northern outfall sewers, which together measure 47 miles, estimated at 3,144,300*l.* Pumping-engines will make a total cost of 3,244,300*l.*, which at 5 per cent. for maintenance and redemption will amount to 162,215*l.* per annum to be set against 300,000*l.*, the probable cost of the works in progress.

I will not encumber this paper with any definite estimate as to income from sewage farming, as this will involve the question of purchase of right of way for the sewage conduit, and for outlet works. This feature of the scheme must grow with time. Areas for sewage irrigation may be formed to any extent, from 10,000 up to 50,000 acres, and there will be sewage enough and to spare for this large area. The agricultural value of town sewage has been tried and estimated, over and over again, both in England and on the Continent. A Royal Commission, with the honoured name of Sir J. B. Lawes, Bart., at its head, estimated the commercial value of crude sewage at 2*l.* per ton to a farmer, taking it as he wanted it; but only at 1*l.* 3*d.* per ton if he must take it and dispose of it all the year round. The London sewage is the richest known in manurial ingredients, and amounts in daily volume, at its lowest estimate, to 670,000 tons, which at 2*l.* per ton will amount to 5,383*l.*, and at 1*l.* 3*d.* per ton to 1,355*l.* per day, or about two millions sterling in the one case, and at 1*l.* about half a million sterling. I cannot help dealing with these figures, enormous as they are; but when I know that cultivated sewage lands bring in, year by year, rentals of from 15*l.* to 20*l.*, and even 30*l.* per acre, there must be more than a grain of truth in these very large figures. I do not, however, plead for the purification of the Thames on the score of any probable income to be derived from sewage farming, as this would be begging the main question, which is to free the river Thames from pollution by a sewage conduit, and additional steam pumping sending it eastward, once and for all, to the great North Sea, and let reclamation of land and sewage irrigation follow.

The length of the conduit from Abbey Mills, eastward to Poulness Island, Southminster, and Burnham Marshes, will be about forty-six miles through an agricultural district, and sea outlets must be provided along this shore over the Maplin Sands to low water of spring-tides. This I consider is a work necessary to be done, if it could even be proven to be as fruitless of pecuniary results as the sewage precipitation and mud-barge process.

The conduit will be a canal, or new river, for the conveyance of sewage in its fresh state, along which it will flow unceasingly at not less than two miles in the hour, to be as unceasingly disposed of at the eastern terminus. The question must be put—But will it not be a nuisance to the neighbourhood in its course? My reply is, that the works must be designed and be executed so as not to be a nuisance. Portions will be covered, portions will be in tunnel, and some portions may be open, but at no point need there be one-tenth the nuisance there is now at the existing outlet works, nor more than at a well managed sewage farm, nor so much as from a heavily manured field.

The New River at London has a grade, or fall, of 6 in. per mile, and this inclination may be given, by similar means, to produce this grade; but there must be a head of 23 ft., not, however, necessarily at one point, but subdivided at several points; the reaches from fall to fall being level, velocity being obtained by overfalls and sluices. The Bridgewater Canal is thirty miles in length, from Manchester to Runcorn, of course level, the outlet being by locks at Runcorn. The rate of flow is about one mile per hour. The flow along the London sewage conduit is to be two miles per hour, so that the sewage of each day will be carried, from the junction with the metropolitan sewers at or near Abbey Mills, to the outfalls to the sea in twenty-three hours.

Mr. R. Etheridge estimated the value of London sewage for Messrs. Douglas Galton, James Simpson, and Thomas C. Blackwell, as under:—

**Thames Mud.**—Thames sewage is composed of animal matter, vegetable matter, human excreta in a state of decomposition, and living organisms of the class Infusoria, diatoms, zoophyta, and crustacea. The detritus consists

of crushed road and street material, such as granite and other crystalline rocks, crushed flint, gravel, and earthy deposit. This is termed "crude sewage."

**Analysis.**—From the analysis of mean samples of crude London sewage, it was found that 100 tons of liquid possesses a value of 17*s.* 7*d.* The suspended matter, "mud," is worth 2*s.* 2*d.* The clarified liquid is worth 15*s.* 4*d.*, so that the cost of precipitation obtains in money value about one-seventh that of the entire sewage, and this is to be bargained to the sea, whilst by far the largest value is to be sent to the river. If this would not putrify and pollute the river, there would be so much in its favour, but as seven-eighths of the salts of sewage remain in the fluid, plus some of the chemicals used, that which is most valuable as manure is wasted, and the injurious pollution of the river is continued.

The entire volume of the London sewage at 2,145,500 tons per annum, at 17*s.* 7*d.* per 100 tons, is worth upwards of 1,750,000*l.* sterling; but twenty-five years ago the London sewage was valued at 1,000,000*l.* sterling.

Along the entire line of the proposed sewage conduit, sewage may be supplied to farmers, and dairy-farms may produce milk for London. Italian rye-grass may be grown and sold, as also turnips, mangolds, and other crops. In warm and dry summers hay may be made, and in wet seasons silos. Land is not corrupted by sewage irrigation, but is improved, as the solids out of 100 tons spread over one acre of land would not give a surface deposit of 1-100th of an inch in thickness. In warm summer-time 1,000,000 gallons of sewage may be utilised on one acre in one day, and where something like this volume is used, and the land is light and porous, a very small volume drains from the subsoil. In exceptionally hot weather no water flows from the land.

Where chemicals are used for precipitation and the water so clarified is turned out unfiltered through land, and cattle drink it, the milk is not fit to be used. Cows, will, however, drink crude sewage without apparent injury, but they had better have clean water supplied.

**The Sludge and Sludge Barges.**—It will be possible to send sludge, having 90 per cent. of water, to any distance in open troughs or pipes, to be used in warping low land, and this mode of disposing of it will be far cheaper than bargeing it to sea. Enormous quantities of sand are dredged and passed through pipes to the shore. Diluted clay in brick-fields is also sent along open troughs considerable distances, and this form of conveyance for the sewage sludge may enable the County Council to dispense with sludge barges.

I say that this or some similar work must be carried out to free the River Thames from pollution, and that for this purpose the Barking and Crossness outfalls must subsequently be so altered, modified, and dealt with, as not to pass any sewage to the Thames, but by a tunnel from Crossness to Barking, with the engine-power to lift the combined volume to the new canal or conduit. And that the crude sewage may freely and easily flow along the new conduit, to be used in irrigation, and so much as may not be so required in winter or in wet seasons can be passed on to the North Sea, in the way it now flows along the London intercepting-sewers to the present outlets, so that it will not be necessary to remove, by precipitation, one pound weight of sediment, or use any chemicals, as the whole will flow in one continuous stream, at a rate not less than two miles per hour; and properly-constructed apparatus can be adapted to float along the conduit, sweeping onward any deposit there may be.

This paper is a brief statement of the main sewerage of London, which most undoubtedly is a grand work for the Metropolitan Board to have devised and carried out for the metropolis, and if it had been as wise in its day and generation in devising proper works for dealing with the sewage so as to purify the Thames without any outfalls to the river, it would have deserved a permanent memorial to be a record of its great work, which all men might see and read through all succeeding time. But it has blundered over the Thames purification question until, in its last days, it has handed over abortive works which will cost the County Council not less than a million sterling to get rid of. But must this work remain? I say no, and no. It both must and will be abolished.

Look at this mighty city of London, with its millions of inhabitants; look at the beautiful

river, which flows gently down in silver sheen from its upper reaches, and supplies wholesome water for the swarming population inhabiting its banks; look again at its lower reaches, the great highway to all the nations of the earth, whose ships, laden with the produce of all climes, crowd the wharves and docks; and then say if the final result of the main drainage question shall be to leave the grand old river a black, loathsome, stinking ditch! My final conclusion is that the sewage must be disposed of out of the River Thames.

An animated discussion followed, in which the Chairman (Sir Henry Roscoe, F.R.S.), Mr. Rhodes (ex-Chairman of the Main Drainage Committee of the London County Council), Sir Frederick Nicholson (Chairman of the Thames Conservancy), Mr. A. G. Smith, L.C.C., Dr. Alfred Carpenter, Colonel Jones, V.C., and other gentlemen took part, and the further discussion was adjourned.

#### THE LONDON COUNTY COUNCIL.

The last meeting of this Council for the present year was held on Tuesday last at Guildhall, Lord Rosebery presiding.

**City Charities and Technical Education.**—After the transaction of some formal business, the Council proceeded to consider the Report of the Corporate Property, Charities, and Endowments Committee on the City and Parochial Charity Schemes. Lord Hobbouse, the Chairman of the Committee, moved the adoption of the Report, which contained the following among other recommendations:—

"(1.) That the Council do authorise this Committee to send in to the Charity Commissioners objections and suggestions of the nature as follows:—

*As regards time.*—(a) In the case of schemes so novel, so complex, dealing with such large funds, affecting such vast masses of people, and even now so incomplete, a much longer time for enquiry and consideration should be allowed before the Charity Commissioners send them up to the Education Department, even though the delay should necessitate a prolongation of the Act of 1883.

*As regards the separate Parish Schemes.*—(b) The Governing Bodies are of too exclusively parochial a character. (c) The Governing Bodies should not be ordered to exclude their non-parochial members from an important class of business. (d) The Governing Bodies should not be forbidden to use the buildings for political, denominational, or sectarian purposes. (e) Alterations of the scheme should be made by scheme.

*As regards the Central Scheme—General Property.*—(f) The scheme should not attempt an immediate extensive application of the funds in perpetuity or for many years. (g) It should not give the bulk of the funds to a class of institutions (Polytechnic) not yet sufficiently tested in point of time or in number of experiments, so as to show that they will supply the needs of the poorer inhabitants of the metropolis, and are capable of being managed satisfactorily under permanent schemes. (h) It should admit greater freedom in the choice of objects by the Trustees. (i) In the case of libraries, it should not concentrate them in or close to the City; and it would better consult the welfare of the poorer inhabitants of the metropolis by establishing branches or separate libraries at distant points. (j) These ends will be best secured by beginning on a more modest scale with such objects as are selected in the first instance; and by leaving to the trustees a large amount of funds to work upon, a large discretion within the limits of section 14 of the Act, and time to select localities, to consider modes of expenditure, to watch occasions, and to make bargains and arrangements with other persons and corporations.

*As regards the Central Scheme—Ecclesiastical Property.*—(k) The large funds devoted to repairs and restorations, and to maintain the fabric, staff, and services of the City churches, will be mostly wasted. (l) If the scheme gives more to useless objects than the Act requires, the Commissioners should be asked to modify it in that respect. (m) Such waste as the Act may be found to compel should be brought under the notice of Parliament.

*As regards the Central Scheme generally.*—(n) The twelve trustees not provided for by the Act should be appointed, as far as possible, by elected bodies representing the inhabitants of London. (o) Subject to the present obligation of admitting appointees of the Ecclesiastical Commissioners, four trustees should be appointed by the School Board and eight by this Council. (p) The trustees should not be compelled to transact any portion of their business by committees constituted beforehand for them by the scheme.

(2) That the Council do authorise this Committee to enter into such communications with the Charity Commissioners as occasion may require.

(3) That copies of the principal report be sent to the Charity Commissioners, and, at a fitting time, to the Houses of Parliament, and to such persons or bodies as this Committee may from time to time think fit.

(4) That this Committee be instructed to cause the principal report to be printed in a form more suited for general reading."

These recommendations gave rise to a protracted discussion, in the course of which there was a great deal of wild talk about pulling down the majority of the City churches instead of maintaining them in repair out of the charity



funds. But by a large number of the Councillors the Committee's report, especially section g, was regarded as "throwing cold water" upon the Polytechnic schemes, whose interests were championed by Alderman Evan Spicer, Alderman Quintin Hogg, and Councillor Earl Compton. Councillor Spicer moved, as an amendment:—

"That whereas the report of the Corporate Property Committee on the schemes of the Charity Commissioners calls in question the public benefit to be derived from the establishment of Polytechnic Institutions throughout London, and whereas during the last two years the schemes of the Commissioners have been thoroughly discussed, and have received the approval of the public, as shown by the large amounts of money (almost equal to those proposed to be provided by the Commissioners) which have been voluntarily given for the promotion of the same objects, the Council is unable to agree with the recommendations of the Corporate Property Committee as they now stand."

This was rejected by 53 votes against, to 49 for, and the various recommendations were then agreed to with certain slight amendments.

**The Main Drainage Question.**—The Council then proceeded to discuss the following report of the Main Drainage Committee:—

"Your Committee have considered the report of Mr. Gordon, urging the provision of two more sludge vessels, and have also considered his question as to whether this is the proper way of dealing with the sludge. He had no doubt that it is the least expensive way of disposing of this residuum. Your Committee, agreeing entirely with the Royal Commissioners' report of 1884, that it is neither necessary nor justifiable to discharge the sewage of the Metropolis into any part of the Thames from the Nore upwards, are of opinion that any process of precipitation and of separation of effluent and sludge must necessarily be carried on where the late Metropolitan Board have engaged their successors in connexion with an outlay upon works of nearly 800,000*l.* for that purpose. Your Committee are convinced that the probable alternative will be found to be the conveyance of the sewage to the sea upon the Essex shore, by some such plan as that sanctioned by Parliament in the Act of 1865. But your Committee observe that their immediate and unavoidable duty is to promote the best and most complete use and employment of the works committed to their charge, which are already in a condition to produce as much sludge as four vessels can remove. They, therefore, recommend:—

"That tenders be obtained for the construction of two sludge vessels, upon the model of the older and less costly ship, with certain modifications to be described by the engineer."

This gave rise to a prolonged discussion, in the course of which, Councillor Aeneas Smith moved the following amendment:—

"That, before deciding to acquire additional sludge vessels, this Council desires further information upon the question of sewage disposal, more especially with a view to the prevention of disease and freeing the river from pollution; it therefore instructs the Main Drainage Committee to secure the services of an eminent civil engineer to join the Engineer of the Council in a thorough examination of the whole sewage system. And that the engineers be instructed to include in their report an approximate estimate of the cost of taking the whole sewage to the sea in accordance with the recommendation of the Royal Commission, 1884. That, pending the presentation of the above-mentioned report, estimates be obtained from shipowners and contractors to carry the sludge to sea for one year from April 1, 1890."

This was debated for some time, and on a division being taken the amendment was carried by 50 votes for, to 44 against.

**Waterloo Park.**—Councillor Phillips, on behalf of the Parks and Open Spaces Committee, announced that on the previous day Sir Sydney Waterlow had executed a deed of gift of the estate at Highgate, now called Waterloo Park, and had handed in a cheque for 6,000*l.* in addition. It was also stated that in a few weeks the Parks Committee would report as to what steps would be taken in regard to the ground.

**The Site of the National Portrait Gallery.**—In regard to this question, it will be remembered that at a previous meeting of the Council the Corporate Property and Improvement Committees presented divergent reports respecting the line to be recommended to the Council in the negotiations with the Government as to the vacant land in Charing Cross-road, opposite the site of the National Portrait Gallery. The consideration of the question was then adjourned, and the two Committees now presented a joint report, which was as follows:—

"Since the last reports of these Committees, made on the 26th of November last, an inter-

view has taken place between the Chairman of the Council, the Chairmen of your two Committees, and Mr. Primrose on behalf of Her Majesty's Office of Works. We are pleased to be able to report that in consequence of this interview Her Majesty's Office of Works has made new proposals more favourable to the public of London. It is now proposed, on behalf of the Crown, first, that as regards the plot of land belonging to the Council, the strip marked on the Council's plan, containing about 900 square feet, shall be thrown into Charing Cross-road; and secondly, that the Crown shall give up a strip of the Crown land at the north-east of the National Gallery, measuring about 575 square feet, also to be thrown into Charing Cross-road. This strip is defined by a line drawn on a plan transmitted by the Office of Works. Both Committees are of opinion that the arrangement now proposed should be carried into effect, and the respective Chairmen have been instructed to sign a joint report to the Council for that purpose. The two Committees recommend:—

"(a) That arrangements be made between the Crown and the Council by which:—First, a strip of land belonging to the Council, defined on the plan submitted to the Council, and measuring about 900 square feet, shall be thrown into Charing Cross-road; secondly, a strip of land belonging to the Crown, defined on the plan furnished by the Office of Works, and measuring about 575 square feet, shall be thrown into Charing Cross-road; and thirdly, the Council shall convey to the Crown, for the price of 7,000*l.*, the remainder of their plot of land which abuts on Hemming's-row."

"(b) That it be referred to the Corporate Property Committee to take all proper steps to effect the transfer of the land, and to the Improvements Committee to carry out the widening of the road."

This was unanimously agreed to without discussion, Lord Rosebery remarking that he thought this was a very satisfactory settlement of the question.

**By-Laws as to Drainage.**—On the motion of Councillor Beachcroft, it was unanimously resolved,—

"That, while considering the question of by-laws as to drains, referred to the Sanitary Committee on October 29, that Committee be requested to consider as to the steps, if any, which should be taken for so regulating the construction and maintenance of the vent pipes, shafts, now commonly carried up to the tops of houses as to prevent danger from sewer gas, and that the inquiry be extended to the case of street ventilators."

The Council then adjourned until Tuesday, January 14, 1890.

#### ARCHITECTURAL SOCIETIES.

**Birmingham Architectural Association.**—On Tuesday last, at a well-attended meeting of the Birmingham Architectural Association, a paper entitled "Towers and Steeples," was read by Mr. A. B. Mitchell, A.R.I.B.A. The subject was dealt with in a very comprehensive and complete manner, and was illustrated by a number of excellent drawings of English and Continental examples. Mr. Mitchell, in closing his paper, deduced from the examples he had quoted the principles which seem essential to successful designing of towers, drawing special attention to the means by which an effect of equal richness was attained throughout the height, and to the manner in which the difficulties of the connexion of tower to spire were overcome by the Medieval builders. The meeting closed with a hearty vote of thanks to Mr. Mitchell, moved by Mr. T. Naden, president, and supported by Messrs. Doubleday, Henman, Newton, and Bidlake.

**Edinburgh Architectural Association.**—At the fortnightly meeting of the Edinburgh Architectural Association, in the hall, 42, George-street, on the 12th inst., Mr. G. S. Aitken gave a lecture on "By-paths in Architecture." Professor Baldwin Brown, President of the Association, occupied the chair. Mr. Aitken, according to the report in the  *Scotsman*, regarded as by-paths such subjects as landscape-gardening, geology, painting, archaeology, heraldry, and music; and he dwelt on the necessity for the architect having some by-path or hobby to follow independent of, and yet to a certain degree in line with, ordinary professional work. Of landscape gardening it was remarked that its practice required a knowledge, among other matters, of plants and their habits, shrubs and their effects, and of trees and their forms and leafage, and, if deciduous, their appearance at the varying seasons of the year. As regarded geological study, it was observed that the architect would be specially interested to learn what immunity his buildings might enjoy from the wearing natural action of rain, frost, and sun-heat, or of

the destructive effect which the artificial agencies of city and industrial life might have on his carefully designed works. Under the head of painting, the introduction of coloured materials into modern external architecture was alluded to, and the good effect of the red-tiled and stone-slatted roofs of some of the old Surrey and Lancashire mansions was illustrated by sketches. The untruthness to fact of black-and-white exhibition drawings was pointed out, and that was adduced as a probable reason why the public took so little interest in the architectural rooms of art exhibitions. The employment of water-colour was advocated as the proper medium for representing architectural work. The study of archaeology was illustrated by an analysis of the north transept of Furness Abbey compared with the co-eval and corresponding one of Kirkstall. Alluding to the need of some monographs of the more important Scottish ecclesiastical buildings, Mr. Aitken suggested that it might be a wise thing for the Edinburgh Architectural Association to foster such a scheme by offering out of its superfluous funds prizes for the best sets of measured drawings of some of our Scottish abbeys, as Melrose and Holyrood. References to the desirability of a knowledge of heraldry and music brought the lecture to a close, the lecturer speaking of organ construction and church-bell ringing under the latter head.

**Manchester Architectural Association.**—The fourth ordinary meeting of this Association was held on Tuesday evening at the Diocesan Buildings, Mr. E. Hevitt in the chair, when a paper was read by Mr. F. Bennett Smith, entitled, "A Visit to the Doulton Pottery Works, Lambeth." After giving a general description of the history of these works and referring to the art industry carried on there, he mentioned the improvements in sanitation. In speaking of the ornamentation of buildings, Mr. Smith asked, why cannot we introduce colour into the exterior designs of our buildings? Surely the time is not far distant when we may see blocks of coloured stoneware, relieved with glazed decorations, taking the place of stone and brick as building materials. Stoneware was not so likely to be discoloured by atmospheric changes, and such coloured materials would be permanent decorations. It was union amongst all lovers of art which would make such a great reform in our street architecture, which was so needed in this city. Messrs. Barker, Davies, Hodgson and the Chairman took part in the discussion following.

**Royal Institute of the Architects of Ireland.**—On Saturday last the annual general meeting of the Royal Institute of the Architects of Ireland was held at 37, Dawson-street, Mr. Thomas Drew in the chair. Mr. Albert E. Murray, hon. secretary and treasurer, read the report of the Council. The Council recorded with regret the death of Sir Charles Lanyon, of Belfast, one of the oldest members. The number of members had increased during the past year. Mr. W. H. Lynn's term of office as President being about to expire, it had become necessary to hold a ballot for the purpose of appointing a successor. Three gentlemen, one each from Dublin, Cork, and Belfast, were recommended to the rank of Fellows of the Institute. The Council had not seen their way to take an active part with regard to the Plumbers' Registration Association established early in the year, but they sympathised fully with its objects. The Council felt justified by the course they had adopted with respect to the Architects' and Engineers' Registration Bill by what had occurred. The subject had now been dropped, and was not likely to be revived until it was taken in hand by the British Institute, together with its allied societies. They thought it a matter for congratulation that they did not identify themselves with a project which had so completely failed. They looked forward to a not distant day when the question should be ripe for settlement, and when united action should be taken by the representatives of all the chief architectural societies in the kingdom, and the matter set at rest. At the examination held under their auspices last month, six candidates passed, which was regarded as encouraging. The Institute during the past year had formed an alliance with the Royal Institute of British Architects and the various provincial societies throughout England, Scotland, and Ireland, without sacrificing their independence of action. The result would be that their profession would be able to control legisla-



tion" and give effect to the views of the profession at large. — The statement of accounts, which was considered satisfactory, was also read. The report was adopted. A discussion took place on the question of the Loop Line Railway, and, by a majority of 12 to 5, it was decided to present an address to the new Lord Lieutenant protesting against the objectionable character of the proposed viaduct across Beresford-place. The following is the result of the elections for officers:—President, Thomas Drew; hon. secretary and treasurer, Albert E. Murray; Council, Sandham Symes, J. J. O'Callaghan, J. R. Carroll, Geo. C. Ashlin, Chas. Geoghegan, Wm. Mitchell, Thomas N. Deane, J. L. Robinson, J. H. Pentland, and R. C. Millar; auditors, W. H. Byrne and T. M. Deane.

## LIGHT AND AIR CASE.

MYERS v. CATTERSON.

THIS case was before the Court of Appeal on Saturday and Monday last, Lords Justices Cotton, Bowen, and Fry, being on the Bench. It raised a new and important question as to the extent of the doctrine of implied grant. It appears from the report in the *Times*, that in 1863 the London, Chatham, and Dover Railway Company sold to Solomon Myers, the deceased plaintiff, a piece of land in Newington-causeway, on the south-west side of the railway (being part of the surplus lands of the company), and upon this he built a house, where he resided until his death. The windows of the house faced the railway, which here ran over a series of brick arches from which the plaintiff's house was distant about 8 ft. The sale was carried into effect by a conveyance dated Dec. 31, 1863, which contained recital to the effect that the company required all the land other than that sold to the plaintiff for the purpose of constructing their railway. It contained no express grant of a right to light. The plaintiff alleged that from 1863 he had enjoyed access of light to the windows of this house through the openings of two of the arches. In 1870 the defendant acquired from the railway company the fee of the land on each side of the two arches, and a lease for thirty years of the arches themselves. In November, 1887, the defendant erected buildings on the north-east side of the railway, a short distance from the openings of the arches, and in December, 1887, he blocked up with wooden boardings the openings of the two arches on the side nearest the plaintiff's house. From 1872 the arches had been used for the storage of heavy machinery, which blocked out the greater portion of the light coming through the openings. The plaintiff brought an action to restrain the defendant from obstructing the light through the arches, and upon his death, in 1888, the action was continued by his widow. Mr. Justice Kekewich granted an injunction as to the boarding, and directed an inquiry as to the damages occasioned by the erection of the buildings. (5 *Times* L. Rep., 658.) The defendant appealed.

Mr. Neville, Q.C., and Mr. Russell Roberts, for the appellant, contended that the recital in the conveyance of 1863 that the land retained was required for the purposes of the railway was inconsistent with the notion of an implied grant to the plaintiff of a right to light, and that the plaintiff was not entitled under the Prescription Act, by reason of the interruption of his enjoyment of the light in 1872.

Mr. Warington, Q.C., and Mr. Swinfen Eady, for the respondent, upon waiving their right to the inquiry as to damages, were not called upon.

The Court dismissed the appeal. Lord Justice Cotton, in delivering judgment, said that the question was whether there was any implied obligation on the part of the railway company not to obstruct the plaintiff's light. If the owner of two plots of land, on one of which a house was built, sold the plot with the house upon it, then there was an implied obligation, contract, or covenant on the part of the vendor not to interfere with the access of light over the portion which he sold. That was the law in the case of an ordinary landowner, but this was the case of a railway company, and it was said that it could not be presumed that a railway company would contract to do anything which might interfere with the construction of their railway, and that the whole of the land was stated to be required for that purpose. It was clear that the implied contract entered into by the railway company must be subject to this limitation—that they were not to be prevented from doing whatever was necessary for the purposes of constructing their railway. It was argued that this really made the obligation dependent upon the will of the railway company, and that that was inconsistent with the idea of an implied covenant. But that was not so. What was necessary for the construction of the railway was not a matter which depended entirely upon the will of the railway com-

pany. His Lordship therefore held that the railway company, as owners of the land which they sold to the plaintiff, entered into an implied obligation not to do anything on the land retained by them so as to interfere with the plaintiff's reasonable enjoyment of the land sold, except what was necessary for the construction of the railway. Then was the boarding required for this purpose? Certainly not. The arches were leased, and the tenant had put up a boarding for his own benefit. Even assuming that the boarding was indirectly for the benefit of the railway company, it was not put up for the purpose of constructing the railway. His Lordship then discussed the evidence as to the extent to which the light was diminished, and agreed with the conclusions of the learned Judge below. Referring to the evidence of scientific witnesses, His Lordship observed that he desired to say nothing against scientific witnesses, but in his Lordship's judgment the evidence of witnesses who deposed to the facts was much more reliable. One knew how frequently scientific witnesses of great skill and ability were found by the light of subsequent events to be wrong in their conclusions. In his Lordship's opinion the appeal failed.

Lord Justice Bowen was of the same opinion. Lord Justice Fry concurred.

## MASONS' SEALS.

SIR.—In the work by Messrs. Waller, "On Monumental Brasses," fol. 1842, &c., referring to a tomb to Sir John de Creke and Alyne his wife, at Westley Waterless, Cambridgeshire (dated about 1325), it is stated that "at the right foot of the lady's figure is a monogram," about 1 in. diameter, "consisting of the letter N, above which is a mallet, on one side a half moon, and on the other side a star or sun." "The same device is to be found on a seal attached to a deed 5 Edward I. (1276-77), wherein one Walter Dixi, cementarius de Bernewelle, is conveying certain lands to his son Lawrence; the seal has for its legend 'S' Walter le Masun," with a hammer or mallet, a half moon, and star," as described by Godwin, in *Archæologia*, 1844, p. 119, derived from Coles's MSS., vol. viii.

Dingley's "History from Marble," 4to, 1868, vol. ii., on p. 155 gives a copy of an indenture for executing the monument in Bath Abbey Church to Bishop Montague, dated Nov. 25, 1618, "Between Sir Charles Montague, of London, Knight, and William Cœr, citizen and freemason of London, and Nicholas Johnson, of S. Saviour, Southwark, carver." Attached to it are two seals (given in woodcuts); that of Cœr's is lozenge-shaped, the other is two chevrons with a mallet. The names of the two witnesses are William Blagrove and Francis Legge. Neither of these coats-of-arms are attributable to any of the names. I do not find Cœr's in the "Armorial," but two chevrons occur in the coat of "Johnson of Leicestershire."

These are two instances, very far distant, of seals used by masons. Are any others known during the 350 years (1276 to 1618)? Under what circumstances had a "mason" a right or privilege (query during the earlier years, perhaps, to use a seal? A "mark" we know was used, and we also know how many master masons' marks are still to be seen abroad on the buildings than in England. I am not now referring to the marks seen on the beds or faces of stones, attributed to the ordinary workman. I do not remember an example of a seal used by a master carpenter or any other tradesman, but the subject has not attracted my attention before the present instances.

WYATT PAPWORTH.

## AN ILLEGALITY IN LONDON HOUSE DRAINAGE.

SIR.—The report of this case on pp. 428-29 of the last number of the *Builder* is interesting to all who have anything to do with drainage work. The statement by Mr. Justice Bowen is that—"It was most important for the well-being of this large metropolis that every house should have direct communication into the sewer" is quite right. By "house" is here meant, I suppose, a building or part of a block of buildings. It will also be understood, I expect, that each "house" will be trapped off from the sewer. In the case of a block of buildings, leading into a back-lane where there is no public sewer, it would hardly do, however, to ask each house to carry its drain separately down the lane to the street. In this case, for each house to have its drain, — 6 in., say,—branched into a larger drain-pipe, but trapped off from said larger drain, would be sufficient. In fact, in a case like this, if desired, the main drain-pipe might itself be trapped off from the street sewer and ventilated *per se*. I did this in the case of an epidemic in 1879.

In the case of tenement houses, where, from one common entry, there are large houses to right and left on each flat, as is common in Glasgow, it may yet be found advisable to have the drains of the houses on the right hand kept quite distinct from the drains and soil-pipes of the house on the left hand, especially so far as preventing gases, &c., from the drains on one side of the tenement getting access to the drains or soil-pipes on the other side, isolation, as far as possible, being the watchword for safety.

Glasgow.

W. P. BUCHAN.

## THE DISPOSAL OF OUR DEAD.

SIR.—The paragraph on page 417, referring to the Duke of Westminster's condemnation of overcrowded cemeteries, is of interest to all sanitarians. His Grace's recommendation of "earth-to-earth" burial is not, however, the real or final solution of the problem, but only a sort of half-way house. Science and modern sanitary requirements distinctly point to cremation as the most proper and safest mode of dealing with the dead, and especially for guarding against any chance of after-infection from the bodies of those who have died from infectious diseases—as so many do. On page 418 it is stated, "that cremation were generally adopted, then, where there were numerous bodies to be disposed of daily, the air might probably be laden with particles of matter given off during the conflagration, and the question rises: 'Which is the least injurious, to have such particles distributed in the air around us, or in the earth beneath us?'"

Now as to this, owing to the way in which the body is consumed and the intense heat which anything from it has to pass through before it can reach the open air, there is no chance of any diseased particles ever passing through the furnace without being destroyed or having their capacity for producing disease stopped.

Were people to allow themselves to fully realise the exceeding loathsomeness of the human body some weeks after death—a mass of putrid flesh with millions of low animals preying upon it—they would cry out for cremation to save their dead from such pollution. As it is, both science and sanitation are educating the public mind on the subject, and crematories have been lately erected in many places. The movement has spread to Scotland, and at Glasgow the Scottish Burial Reform and Cremation Society is now being constituted for the purpose, *inter alia*, of erecting a crematory where not merely the bodies of the rich may be sanitariously disposed of quickly, but even those of the poor.

"Cleanliness is next to godliness" might well serve as a motto for the cremationists. There is no reasonable cause why any educated Christian should object to cremation. The body must pay its debt to Nature, and it is better to do so in two hours, so as to prevent after-evil, than to preserve it for years to perchance produce an epidemic and so give cause for our descendants to curse the stupidity of their ancestors.

A CREMATIONIST.

## FRENCH BUILDING TERMS IN MASONRY.

SIR.—In your notice in last week's *Builder* of a recently-published Technological Dictionary, English-German-French, you allude to the words *mœllon* and *pierre de taille* being indifferently translated in the French Dictionaries. I have worked for many years in France, and the architects I consulted on the point all translated *pierre de taille* "ashlar."

"*Mœllon*" is the stone used in wallers' work. Such stones, for example, as "Touris or Cassia Pierre de taille dure," are often specified "Mœllons piqués à la pointe et entouré d'une échelle" (drifted edges), but I never knew freestones as "Arles, Echailon," so termed, otherwise than "Pierre de taille," a distinction being made between the "Pierre de taille dure," and the "Pierre de taille tendre," by the addition of the word *le* I have put in italics.

Quoting from a copy I made some years ago of a "Cahier des charges relatif au projet de construction du Sémaphore de Faraman conformément aux ordres du Ministre de la Marine et des Colonies en date du 15 Mars, 1881," Article 29 of the "Devis Technique," descriptive of the "Maçonnerie de terre de taille," the word "*mœllon*" is not once used. It runs thus, "La maçonnerie de pierre de taille sera faite par assises réglées, les pierres seront posées avec soin," &c.

In the article immediately preceding the above, referring to the wallers' work, it commences, "Dans les maçonneries de mœllons, les assises seront constituées de niveau avec celles de la pierre de taille."

Take another precedent, being a copy of a "Cahier des charges pour l'entreprise des travaux pour l'agrandissement de l'arsenal d'artillerie de terre à exécuter conformément aux ordres du Ministre de la Guerre en date du 2 Décembre, 1882." It reads, "La maçonnerie de pierres de

\* It was not "stated"; only suggested as a possibility. —ED.

\* We take our report from the *Freeman's Journal*. It is correct, the Council seem to take a rather sanguine view. —ED.



taille sera faite," &c., the word "moillon" not once occurring.

In Tolhausen's "Technological Dictionary (English-German-French)," the word "ashlar" is translated "pierre-de-taille," "moillon" is not mentioned, but in the French-German-English part of the same work "moillon" is translated "ashlar" (1).

"Pierre de taille tendre ou dure (as the case may be) on parements vus" is the best and clearest translation I know of for ashlar, say to the front of a building, and for any kind of wallers' work, "Maçonnerie on moillons" describing the nature of work required, and, if the face of the moillons is exposed to view, add a "plus value pour parements vus," stating if "à la boucharde," or otherwise.

"Dégauchis" is more generally used than the word "abouziné" (if applied to moillon, "ebouziné"; if applied to pierre, "ébouzinée").

J. GILKING, C.W.

#### AN OLD LONDON HOUSE.

Str.—At the back of St. Mary-le-Bow there is an old house, seventeenth-century dated. I could not make out the whole date except "16." A square block of stone is let into the wall, with a numeral at each corner, and antique head in centre. The house is closed, and I regretted to notice, from a board in front, that it is to be taken down. Possibly there may be something remaining of interest inside, such as staircase, cupboards, chimney-pieces, &c.

H. R. B.

### The Student's Column.

#### WATER-SUPPLY.—XXV.

##### WATER-RAISING.

**I**N the water-supply to large houses, manions, and such buildings as are used for schools, breweries, asylums, prisons, and various other institutions, away in the country far from towns whose existing water-supply is not available, it is advisable to consider whether such natural means as are at hand may not be adapted to the exigencies of the case and utilised either for the purposes of supply or as a means of power.

If the building which is proposed to be supplied with water is in a hilly district some stream may, by a small dam in the upper part, be converted into a reservoir, and this collected water brought down by gravitation through pipes to the building, and then filtered and used directly; or the stream may perhaps, if the head of water is sufficient or the current fast enough, be more advantageously used as a source of power, whereby other and purer water may be raised from a lower level of supply and distributed from a service reservoir by pipes wherever required.

The machines by which power is extracted from flowing water are hydraulic pressure engines, turbines, rams, and water-wheels.

The whole of the theoretical mechanical effect from flowing water is never obtained in practice, as by loss through friction and after acting on and passing through the machine the water still retains some velocity, and this velocity is, of course, so much power lost. The theoretical horse-power or efficiency of water equals

33,000 or .001893 Q. h., where Q. equals the

quantity of water in cube feet per minute, and H. equals the head of water. Now, it is found by experience that, taking the theoretical horse-power as 1.00, the efficiency of the various water-motors, according to Molesworth, differs from this as follows:—

Water-pressure engine .....	80
Turbine .....	70
Overshot water-wheel .....	68
Hydraulic ram .....	60
Breast water-wheel .....	55
Undershot water-wheel .....	35

It will be seen from the above that a water-pressure engine is by far the most efficient machine, and where a good head of water is available, and the quantity used no object, it does very well; but, unless natural circumstances are favourable, the expense for water is very great. The water-pressure engines generally used are like small steam-engines, and for each revolution of the crank-shaft two complete cylinders full of water must be used, whether the power is wanted or not, as there can be no saving by expansion in the cylinder, as in the case of steam and compressed air-engines.

The hydraulic ram, invented by Montgolfier, is a very useful machine for raising water, and

a great number are in use for supplying houses and their surrounding buildings; the principle upon which they act is that the inertia of a large quantity of water with a small head, suddenly checked, will transmit its energy to a small quantity of water and force it to a greater height. Almost everybody is familiar with the violent shock and rattle in the water-pipes of a high building when a tap which has been running for some time is suddenly turned off. This shock is due to the energy of the inertia of the running water being pent up behind the tap, and if the head of water is considerable will burst the pipes. So much damage has been done by this means to pipes that the water companies have almost universally adopted screw-down taps, in order to insure that the water should be turned off gradually.

In the hydraulic ram this shock is the power, and the usual arrangement of the machine is as follows:—Sufficient head of water having been obtained, the water is conveyed by a very strong injection or drive pipe to the machine, which consists of a compression-chamber and air-vessel, with a large valve at the outlet end and a smaller pipe on the top with a check-valve to prevent the return flow of the water which has been forced up. The large valve at the outlet end, or "pulse"-valve as it is called, is a hinged flap opening towards the head of water, and so balanced that when the water is at rest, the balance-weight raises the flap. The water from the drive-pipe runs freely through the machine and pulse-valve until its velocity is sufficient to overcome the balance-weight of the pulse-valve, which it closes violently, and the inertia of the pent-up running water then opens the check-valve on the top of the chamber, and finds relief in ejecting part of itself into the air-vessel and rising main; the water being now at rest again, the check-valve closes, and, the balance-weight falling, opens the pulse-valve and allows the same series of events to occur again.

It will be seen that the hydraulic ram, as described above, simply forces up a portion of its own supply of water, whether pure or impure, to a greater height; but the machine may easily be so modified that it can be worked with impure water to pump up pure water, and this is effected by causing the energy of the pent-up water, when the pulse-valve is closed, to act upon a piston instead of on the check-valve, and so pump up a supply of pure water. This form of hydraulic ram is not recommended, as in a short time the piston wears, and the pure water is mixed with the impure. Very large hydraulic rams are not to be commended; two smaller ones are better, and have the advantage that if one breaks down the other can still work; and, furthermore, if a scarcity of water happens during a dry season, there may still be enough water to work a small ram, when a larger one would be quite useless.

In calculating the quantity of water required to work a ram, it may be assumed that one-seventh of the water may be raised about four times the height of the head; one-half that quantity eight times the head, and so on. The length of the drive- or induction-pipe should on no account be less than three-fourths of the height to which the water is to be raised, or the reaction on the closing of the pulse-valve will take place at the commencement of the drive-pipe instead of in the compression chamber.

Turbines are hydraulic machines whose power is derived from the reaction of water escaping from openings placed in the same direction at an angle around an axis, and this action consequently causes a couple moment around that axis. The simplest form of turbine is the ancient hydraulic tourmiquet.

In practice, turbines consist of a circular series of fixed guide-plates so curved that the water, in passing through them, impinges at right angles on another circular series of curved plates called buckets attached to a central movable axis, or to the inside of a revolving drum.

In Jonval's turbine the guides and buckets are superimposed, and the water flows from the head into a bowl-shaped receptacle, at the bottom of which are fixed the guides, and immediately under them the buckets, attached to a spindle-shaped axis to avoid dead water. In passing through, the water is deflected upon the buckets at right angles, and causes them to revolve. The buckets and guides are so designed that the water, after passing through, has little or no rotary motion left.

In Fourneyron's high-pressure turbine the

guides and buckets are in the same plane, and the water flowing from the centre is spirally deflected by the guides outwards to their periphery, where it impinges at right angles against the buckets disposed in an annular ring around them, and attached by arms to a vertical axis, which it thus causes to revolve.

A third form of turbine is also made; it is something similar to Fourneyron's, the guides and buckets being in the same plane; but it differs from that in the fact that the water flows from the outside to the inside, the guides being fixed to the outside drum, and the buckets to the axis.

It can readily be understood that turbines can be constructed of all sizes and powers, but the principle in all is the same. Where they have been applied to pumping purposes, they are generally found to be most economical. They are usually geared from the vertical axis horizontally to the pumps.

The water-wheel is another simple hydraulic machine extensively used to utilise the power stored up in running water. Water-wheels are of two kinds,—overshot and undershot. In the overshot wheel the water is conveyed by a shoot to the top of a wheel moving in a vertical plane, provided with buckets at the periphery. The water flowing from the shoot at the top and filling the buckets, by its weight causes the wheel to revolve, the buckets emptying themselves as they get lower down.

In undershot wheels, in which are included breast wheels, the current of water is directed against similar buckets from the underside and rear of the wheel, and the power is derived from the velocity of the current.

A very much superior kind of undershot-wheel is that of Poncelet. In this a dam is placed behind the wheel, and the water kept at a head, being only allowed to act on the buckets of the wheels through a sluice at the bottom, whose greatest opening should not exceed one-eighth of the head.

Fairbairn, finding that the stream of water did not fill the buckets, invented a ventilating bucket called after him, in which the air escaped at the back as the bucket filled.

All these kinds of wheels have been applied to give power for pumping purposes, and generally give satisfactory results.

The only mechanical power we have from nature ready to our hands besides that of running water is the wind, and the only form in which this is utilised to raise water is by windmills, machines whose power is derived from the velocity of the air acting on inclined sails attached to a wheel. Despite the proverbial uncertainty of the wind this source of power is extensively used in exposed places to pump water for large houses, factories, &c.; but it will be readily understood that the pumping power and the service-reservoir must be capable of holding many times the daily quantity required. Windmills for this purpose are more used in the colonies and in the United States than at home, but there are still many working in England. The simplest construction of these is as follows:—A timber stage or scaffold is erected sufficiently high to fully expose the sails to the action of the wind, and a crank being made in the axle of the revolving sail-wheel imparts motion to a connecting rod attached to the piston-rod of the pump below. Larger windmills drive a vertical shaft, geared to a pinion on the axle of the sail-wheel. English mills usually have canvas sails. Colonial ones more usually wooden or iron laths. As examples of the use of windmills for water-raising, at Folkestone station a mill, as described, has been pumping water for many years past, and in the Scilly Islands a mill was used a few years ago to supply water for the use of the Trinity House light-keepers.

**Association of Municipal and Sanitary Engineers and Surveyors.**—The Council of this Association have awarded a premium of 10*l.* to Mr. E. J. Silcock, A.M.Inst.C.E., Borough Engineer, King's Lynn, for his paper on "Electric Lighting," read at the annual meeting of the Association held at Portsmouth. A premium of 5*l.* has been also awarded by the same body to Mr. A. E. White, A.M.I.C.E., Borough Engineer, Hull, for his paper on "Municipal Engineering in Hull."

**New Water Supply for San Francisco.**—A proposal is under consideration in San Francisco for supplying the city with water direct from lakes in the Sierras.



## VARIORUM.

"HAZELL'S ANNUAL FOR 1890" (London: Hazell, Watson, & Viney) is the fifth issue of that compilation, and, like its predecessors, it will be found very useful. But we regret to see that the Editor has not supplied one or two important omissions to which we directed attention last year. We are told on the title-page that the work contains "above 3,500 concise and explanatory articles on every topic of current political, social, biographical, and general interest referred to by the Press and in daily conversation." Perhaps it is because the Press and the public take so little interest in architecture that the Editor thinks he can still afford to exclude all mention of the Royal Institute of British Architects,—the chartered and only really representative body of an important profession. Notwithstanding the importance of the examinations of that body in reference to the public welfare, and, despite the fact that for certain examinations the Institute is the statutory examining body, the Editor of the "Annual" takes his cue from the daily papers, and ignores architecture and the architectural profession, to say nothing of builders and District Surveyors. Nor is the work free from errors. To cite one example. In the "Obituary" of the year mention is made of the death of Mr. Norman Bazalgette, who is described as "past President of the Institution of Civil Engineers." As a matter of fact, Mr. Norman Bazalgette was a barrister. The compiler has evidently confounded Mr. Norman Bazalgette with Sir Joseph Bazalgette; Sir Joseph has been President of the Institution of Civil Engineers, and, happily, he is still living.

—The Money, Weights, and Measures of the Chief Commercial Nations in the World, with the British Equivalents, by W. A. Browne, M.A., LL.D. (London: Edward Stanford), is a very handy little book, which is now in its seventh edition. In the preface to this edition the author informs his readers that the work has been revised and corrected up to date, as far as possible, and that, "owing to changes in the currencies, and denominations of moneys of account and exchange, and to the introduction of the metric system of weights and measures in several countries, it has been necessary to make many alterations, and several articles in the present edition have been re-written." The author appears to have done his work very thoroughly, and incidentally gives a great deal of information about "things not generally known" in connection with the coinage of the world.

—"Shortsides Commercial Ready Reckoner" (London: Benmore & Sons) is now in its fourth edition. It is principally designed for the use of merchants and others transacting business in heavy goods, and gives the sum of weights ranging from a quarter of a hundredweight to 50 tons, at prices ranging between 1d. and £2. 10s. per ton inclusive. It is clearly printed and arranged, and random checkings here and there have shown it to be accurate.

—The Christmas Number of the "Publishers' Circular" (London: Sampson Low & Co.) is partially devoted to reviews of new books deemed suitable for Christmas and New Year's gifts, and contains a great many illustrations. The reviews and illustrations are printed on specially-prepared paper.

## ALMANACKS AND DIARIES FOR 1890.

"THE British Almanack and Companion" for 1890 (London: The Stationers' Company) embodies a great deal of useful information in a very compact form, and is clearly printed and arranged. It gives a list of the Acts of Parliament passed during the last session, with abstracts of the more important ones, and a list of the County Councils, with the notable exception of that of London, which seems to have been forgotten altogether. The article on "Architecture in 1888-89" is signed by Mr. E. Langton Cole, and is a tolerably full and accurate record of the building work of the year. It contains nothing worthy of particular remark, however, if we except the fact that Mr. Colcutt's name is inaccurately spelt at least twice. The article on "The Art of the Year" is by Mr. Cosmo Monkhouse, and the article on "The Science of the Year" by Mr. E. W. Maunder.

The "Law Almanack" for 1890 (published by Thomas Scott & Co., Warwick-court, Holborn) is a very useful and well-printed sheet-almanack mounted on cardboard for hanging up.

"Calvert's Mechanics' Almanack and Workshop Companion" for 1890 (London and Manchester: John Heywood) is, as heretofore, a useful compilation for artisans and handicraftsmen, now in its seventeenth year of publication.

Messrs. Hudson & Kearns, of 38, Southwark-street, send us a parcel of their admirable diaries, specially adapted to the requirements of architects, surveyors, engineers, and builders. The present issue is fully up to the standard of excellence and completeness attained in former years. A special feature of the larger editions of the series is that each separate volume may be said to comprise within itself a complete set of account-books, pagged and provided with an index, so that it will be the owner's own fault if he cannot make immediate reference to the record of any particular transaction. "The Architect's Diary," No. 12, is one of this series. It contains one page to a day, besides index, note-book, rent and insurance register, cash-book, ledger, summary of cash transactions for the whole year; also cases tried in the Superior Courts of Justice during the legal year from November, 1888, to August, 1889, of interest to the profession; a complete list of District Surveyors and districts, with official and private addresses, regulations of the London County Council applying to music, dancing, theatre, and other licenses; and much special matter referring to the various architectural and engineering associations. It includes also an alphabetical index to the practical statutes and various items relating to the professional practice of architects, stamp duties, &c. "The Architect's Diary," No. 13, is similar to this, but bulkier, having two pages to a day. The "Builder's Diary," No. 11, is arranged on a similarly comprehensive plan, with a certain variation in the contents to suit the requirements of builders. No. 9 is a diary for general use by others than architects, builders, and engineers. Messrs. Hudson & Kearns also send us an assortment of their excellent date-indexing blotting-pads and desk diaries combined, which have many conveniences.

"The Architects', Surveyors', and Auctioneers' Diary and Almanack for 1890," published by Waterlow Bros. & Layton, Limited, 24, Birch-lane, is a very well-printed and arranged diary for professional men. Besides the usual information contained in such works, it gives lists of the Fellows and Associates of the Royal Institute of British Architects and the Surveyors' Institution, and lists of the Members and Associates of the Institution of Civil Engineers and other societies. It also contains a list of District Surveyors and their offices, the text of the Metropolitan Building and Management Acts and By-laws, and a great deal of other useful information.

"Lamb's Builders' and Contractors' Diary for 1890," published by Alexander Lamb, Devonshire-chambers, Bishopsgate-street, purports to be the seventeenth annual issue of that publication, although we do not remember to have seen it before. Under the head of "Buyers' Guide," we find, curiously enough, a list of architects, but upon what principle the names have been selected we are not told. The names given comprise those of a few eminent architects, together with a majority of comparatively unknown men. Some of the most eminent architects' names are omitted,—Mr. Aitchison and Mr. Waterhouse, for instance. Nothing like the number of architects mentioned in the R.I.B.A. list of members, or in the Post Office London Directory, are given. And we are at a loss to know why some of the names in this meagre list are printed in full capitals. The foregoing remarks and queries apply to most of the other headings under the "Buyers' Guide," which all through appears to be a most partial and unfair compilation. Whether this is intentional, or merely the result of want of knowledge on the part of the compilers, we are unable to say. To quote one instance out of many which we could give in illustration of what we mean. Under the head of "Water-closet Manufacturers," only two names are given, viz., "Brazier & Son," and "J. Tylor & Sons." The compiler has apparently never heard the names of Jennings, Doulton, and other well-known manufacturers of the appliances. Under the circumstances, we cannot recommend this diary to our readers.

**New Theatre in Vienna.**—A new theatre, upon the model of the Paris Eden Theatre, is to be erected in Vienna, capable of holding 3,000 persons.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

## 18,606, Bath Waste Fittings. D. Howarth.

According to this invention, a loose lid and basin-trap is fixed to waste-pipes from baths, lavatories, &c., to prevent the passage of sewer gas or foul air from the drains. The arrangement forms a kind of double socket, which acts as a water seal and yet being loose it is very easy to clean and adjust.

## 430, Venetian Blinds. A. Smith.

The improvements which are the subject of this patent enable the blind to be removed bodily from the window opening, and to be replaced when required without dismantling the blind. The fixed head or pulley lath is dispensed with, and the pulleys are so mounted in the brackets as to be readily removable and permit the removal of the tapes and cords.

## 638, Valves for water-closets. G. Jennings.

The improvements which are the subject of this patent consist mainly in the combination of a regulating diaphragm with the main valve, so arranged that whilst the main valve is opening the water is able to pass the diaphragm freely, but when it is closed the water can only pass slowly by a regulated orifice. The valve seats are of vulcanite, and various mechanical arrangements are described which effect improvements in the control of the flow of water.

## 977, Portable Scaffold. J. Harper.

This invention consists of an upright framing of corner-posts constructed in lengths, and erected on a wheeled base or platform. Rascals and guides are fixed upon the posts, which enable a cage to be moved up or down by means of wheel and pinion or similar gear. The cog-wheels are joined by pairs of bolts engaging with a hand-lever when required.

## 1,240, Motive-power Mortising Machines. E. Cory and Others.

Several mechanical arrangements, designed to effect an improvement in this class of machines, are described at length in the specification. A belt works over reciprocating pulleys carrying the chisel-head of a mortising machine and a counterbalance weight for the purpose of giving a reciprocal motion to the chisel-head, whilst, at the same time, the head can be brought down towards and retired from the work. Two other important features are a compound lever for actuating and steadying the chisel, and a guard for the same when it is thrown up out of work.

## 3,310, Window Frames and Sashes. J. Young.

Many details are enumerated in the specification, among them—(1) The sash-stiles and dove-tail "keeps" by which the sashes are held together to form weathertight joints at the shutting side of the casement in all states of the wood; (2) Flush bolts by which the sashes and hanging pieces are locked together when the sashes are not intended to open into the room; (3) Automatic stops to the hanging cords; and (4) The attachment of the balance-weight cords to the hanging pieces in such a way as to allow of their being connected or disconnected without disturbing the staff or parting-beds.

## NEW APPLICATIONS FOR PATENTS.

Dec. 2.—19,302, R. Little, Mortising Chisel.—19,305, J. Turnponny, Water Waste-preventer and Flushing-tank.—19,308, D. Law and others, Water-closets.—19,312, J. Whitehouse, Brick Kilns, &c.—19,341, R. Pulton, Jun., Paint-caus.—19,343, G. Bischof, White Lead.—19,345, McGuire Slane, Hinges.

Dec. 3.—19,368, H. Horn and J. Effinger, Combined Rule and Protractor.—19,376, J. Cooke, Composition for Floors, &c.—19,393, W. Davis, Enamelled Cork Tiles.—19,399, J. Soboles, Draught-excluders for Doors.—19,427 and 19,442, E. Winchester, Door Latches.

Dec. 4.—19,461, W. Franklin, Stench-trap.—19,468, S. Bots, Sash-fasteners.—19,481, M. Moore, Chimney-cowls, &c.—19,483, J. Robbins, Applying Disinfecting Water-closets, &c.—19,500, J. Hamblin, Fireplaces and Stoves.

Dec. 5.—19,511, J. Crane and W. Windle, Bench-plane.—19,524, S. Empsall and W. Fish, Self-acting Syphon Flusher for Water-closets, &c.—19,541, A. Palmer, Flooring of Bridges, Warehouses, &c.—19,575, S. Burgess, Sash Windows.—19,586, C. Smith, Imitation Marble, Stone and Mosaic.

Dec. 6.—19,604, J. Palmer, Plastic Wall and Ceiling Covering Composition in ornamental relief.—19,616, M. Wardle, Hanging and Re-hanging Window-sashes.—19,617, M. Wardle, Self-acting Window-wedges.—19,627, T. and J. Mann, Kitchen-rancess.—19,634, W. and M. Gray, Ventilators.—19,664, W. Scott Moncrieff, Urinals.

Dec. 7.—19,699.—W. Cook, Baker's Oven.—19,724, H. Aland, Rotary Fans for ventilating, &c.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

15,419, G. Walker, Air-tight Door or Cover for Drains, &c.—15,585, J. Easby, Automatic Appara-



tus for Water Closets, &c.—16,015, E. Johnson, Paving Blocks.—16,831, W. Cowan, Flushing Cisterns.—17,146, J. Mattison, Window Sash Frame.—17,192, H. Board, Roofs and Sides of Buildings, especially Horticultural.—17,442, J. Hamblet and A. Plant, Flooring Tiles, &c.—17,443, W. Lindsay, Tiles, &c.—17,705, J. Braidwood and J. Johnston, Fire Proof Construction.—17,706 The Millers' Patent Reversible Window (Co.), and H. Millar, Holding or Securing Reversible Window Frames.—17,752, T. Collins, Hanging Iron for Ladders.—17,908 S. Warr, Ornamental Bricks or Mouldings, &c.—18,806 J. Empson and J. Hewitt, Syphon Flushing Cistern.—18,098 C. Hickton and J. Clevely, Catch for Cupboard Doors, &c.—18,125, W. Newman, Sash and Window Fasteners.—18,154 W. Luther, Sheet Metal Astragals and Sash Bars.—18,474, G. Arnold, Sanitary Flushing Apparatus.—18,586, H. Grofen, Door Locks.—18,689, J. Millard, Process of Backing Silver Glass.—18,789, R. Webb, Sash Fasteners.—18,809, J. Kaye, Securing Latch Handles and Knobs to Doors.—18,951, W. Hague, Kilns.—19,082, W. Akerman, Boilers for Utilising the Waste Heat of Kilns.

## COMPLETE SPECIFICATIONS ACCREDITED.

## Open to Opposition for Two Months.

874, J. Gilmore and W. Clark, Locks and Fastenings.—1,573, E. Stone, Paint, &c.—2,023, J. Johnson, Rain Water down Spouts.—2,121, G. Wright, Block, Tile, or Slab for building purposes, 4,638, F. Lake, Sawing Machinery.—5,073, G. Wallis, Ventilation and Flushing of Sewers.—5,139, A. Ragg, Carpenter's Planes.—7,318, W. Vyse, Slow Combustion Stoves.—12,333, E. Kerry, Heating Greenhouses.—12,823, J. Metham, Joiners' Clamp.—16,819, J. Sherwin, Opening and Shutting Gear for Greenhouses.—17,032, H. Lake, Portable Scaffolds.—17,335, F. Nickel, Support for Scaffolding.

## RECENT SALES OF PROPERTY:

## ESTATE EXCHANGE REPORT.

Nov. 19.—By WALTON & LEE (at Manchester). Manchester, near to—"The Astley Estate," comprising 1,366a. 1r. 13p., &c. £90,000

Dec. 9.—By R. H. EVANS. Barnsbury—68 and 90, Wynford, u.t. 56 yrs., &c. £8, 10s., r. £20 p.a. 655

By WEATHERALL & GREEN. Bermondsey—33, Bermondsey-wall, 1, including mortgage 3,983  
Tottenham—3 and 4, Keston-villas, u.t. 31 yrs., &c. £6, 6s., including mortgage 613

By PERCIVAL HODSON. Holloway—40, Landseer-rd., u.t. 68 yrs., &c. £8, 6s., r. £30 p.a. 235  
Dec. 10.—By J. P. LASH. Kentish Town—32, Ashdown-st., u.t. 77 yrs., &c. £7, r. £23 p.a. 230  
11, Reglan-pl., 35 yrs., &c. £5, r. £32, 10s. p.a. 175  
Limehouse—1 to 4, Goodwin's Cottages, u.t. 31 yrs., &c. £18, r. £61. 3s. p.a. 50

By FRANK JOLLY & CO. Bromley-by-Bow—31 to 37, Franklin-st., u.t. 63 yrs., &c. £32, r. £171. 12s. 630  
Luton—1, Landowne Villas, u.t. 81 yrs., &c. £25, r. £21 p.a. 205  
Mile End—1, Pl. rd., u.t. 53 yrs., &c. £13, 8s. 6d. 1,000  
63, 65, 67, and 69, Redman's-rd., u.t. 32 yrs., &c. £10, r. £122. 4s. p.a. 425  
49 and 50, St. Peter's-rd., u.t. 31 yrs., &c. £7, 6s. 6d. 640  
31, Carlton-rd., u.t. 34 yrs., &c. £3, r. £22 p.a. 230  
35, Carlton-rd., u.t. 36 yrs., &c. £3, 3s., r. £25 p.a. 220

By MABBETT & ROGERS. Somers Town—17 to 23, Sidney-st., and 64 and 66, Aldenham-st., &c. £35, r. £254 1,650

By CHURCHOCK, GALSORTHY, & CO. (at Selby). Selby, near—Brickyard Farm, 39a. 3r. 21p., &c. £20 p.a. 750  
F. farm, 9a. 2r. 11p., r. £168. 15s. p.a. 3,500  
F. farm, 24a. 3r. £168. 1s. 4d. p.a. 3,350

Dec. 11.—By GROGAN & ROYD. Mayfair—67, Curzon-st., u.t. 332 yrs., &c. £1,000 6,900

By H. GRIFFIN. Battersea—F.g.r. of £8, with reversion in 61 yrs. ... 161  
F.g.r. of £10, with reversion in 62 yrs. ... 245  
F.g.r. of £15, with reversion in 63 yrs. ... 1,182  
F.g.r. of £3, with reversion in 69 yrs. ... 83  
Camberwell—F.g.r. of £44. 12s. 6d., u.t. 72 yrs., &c. £34. 10s. p.a. 150

Dec. 12.—By BOYCE & EVANS. City—The lease and goodwill of 3, Adle-st., u.t. 25 yrs., r. £235 600

By DOWSETT & CO. Stoke Newington—85, Albion-rd., &c. 400

By GLASBE & SONS. Notting-hill—223, Cornwall-rd., u.t. 73 yrs., &c. £5. 10s., r. £50 280  
Lewisham—17, 19, and 21, High-st., u.t. 72 yrs., &c. £24. 16s., r. £144. 1,050

## By NEWSON &amp; HARDING.

2875  
Dalston—38, Wilton-rd., u.t. 63 yrs., &c. £6, r. £32 400  
Camberwell—17, Brunswick-sq., u.t. 62 yrs., &c. £12. 10s. 1,375  
Highbury—110, 112, 116, and 118, Highbury-hill, u.t. 88 yrs., &c. £18. 18s., r. £162 1,268  
120, 122, 124, and 128, Highbury-hill, u.t. 88 yrs., &c. £18, r. £162 1,350  
130, 132, 140, and 142, Highbury-hill, u.t. 88 yrs., &c. £18, r. £162

## By C. C. &amp; T. MOORE.

220  
Shadwell—237, High-st., &c. r. £31 p.a. 128  
Commercial-rd., 47 to 53 (odd), Star-st., u.t. 11 yrs., &c. £10, r. £95  
"The Star of the East," f. beerhouse, r. £90 p.a. 2,180  
No. 709, Commercial-rd., f. r. £100 p.a. 2,650

## By E. STIMSON.

800  
Walworth-rd.—No. 205, f. r. £36 p.a. 800  
Bermondsey—447, 449, and 451, Southwark-pk.-rd., u.t. 53 yrs., &c. £15  
Peckham—165 to 165 (odd), Queen's-rd., u.t. 32 yrs., &c. £30 1,180  
165 to 165 (even), Queen's-rd., u.t. 33 yrs., &c. £12 670  
Hammersmith—81 and 83, Sulgrave-rd., u.t. 86 yrs., &c. £14 410  
Wandsworth—37, 41 to 53 (odd), Pascal-st., u.t. 19 yrs., &c. £40 260  
Kenington—42, Sacroft-st., subject to a life aged 56 yrs. 86  
Lambeth—4 to 7, Philadelphia-rd., u.t. 13 yrs., &c. £20 370  
Borough—8, 9, and 10, Mermaid-court, u.t. 21 yrs., &c. £21 500  
Camberwell—107, 109, 111, Neate-st., u.t. 14 yrs., &c. £8 210  
134 to 142 (even) Neate-st., u.t. 14 yrs., &c. £10 350

## Dec. 13.—By F. A. CAREW.

225  
Camden-town—1, Hawley-cres., u.t. 40 yrs., &c. £5

## By EASTMAN BROS.

100  
Sydenham—2 and 3, Elderton-pl., u.t. 73 yrs., &c. £18

[Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## Miscellaneous.

**Liverpool Engineering Society.**—The sixth ordinary meeting of this society took place on Wednesday evening, the 11th inst., at the Royal Institution, Colquitt-street. Mr. Henry H. West, M.Inst.C.E., took the chair; and there was a large attendance of members. After the customary routine business had been disposed of, Mr. Edward T. Ward, Assoc.M.Inst.C.E., read a paper on "The Salt Industries of Cheshire." He gave a concise and clear account of the geological position and probable formation of the salt-beds, and then passed on to review the history of the "working," "winning," and "getting" of salt from the earliest historical times, in its two forms as brine and rock salt. A vivid description of the method of mining the rock-salt and bringing it to the surface was given by the speaker, who also supplied a sketch of the manufacture of "white salt" from brine, especially with respect to methods of purification. The construction of salt-pans, with their furnaces, flues, and stoves, was then described in detail, and Mr. Ward referred to the subsidences consequent upon the pumping of brine and the mining of rock-salt, and in his concluding observations he gave an account of the present state of the trade under the Salt Union, on which he commented in favourable terms. An interesting discussion followed, and a vote of thanks was tendered to Mr. Ward for his paper.

**The "Daily Graphic."**—The formal opening of the building in which the *Daily Graphic* is to be produced took place on Wednesday evening, all the machinery being kept in motion so as to enable the visitors to see that business is to be done in earnest and on a good scale. The printers' composing-room and the foundry are at the top of the building called Milford House, in Milford-lane, Strand. Illustrated papers usually come from the Strand neighbourhood, as ordinary dailies from the district east of the Griffin. Machine-pits, 24 ft. long and proportionately wide, take up a good deal of space—even in a building over 100 ft. long—so Messrs. J. & S. Flint Clarkson, the architects, have put the engines in the basement, and large Babcock & Wilcox water-tube boilers on the floor above. The total outlay has been about £20,000. When all the large machines are at work from separate stereo- and electrotypes, 50,000 finished copies of the paper will be turned out in an hour.

**India.**—The Kurram bridge, which was formally opened by the Viceroy when he was on tour lately, forms part of the frontier road from Dera Ismail Khan to Khushalgarh, 202 miles long. Running parallel to the frontier boundary, it commands several of the most important passes into Afghanistan. It connects two systems of railways, bringing in touch the important military bases, Rawal Pindi and Mooltan, and linking together the Cantonments of Kohat, Edwardesabad, and Dera Ismail Khan. The old track or road, which was practically impassable in parts for wheeled traffic, has now been supplanted by what is designated a first-class military road, with easy gradients, and bridged and metalled throughout—many of the numerous bridges on it being fine specimens of engineering work. The road has been completed in about three and a-half years under difficulties inseparable from work on the frontier. The importance of the bridge can be imagined from the fact that regiments have been, at times, encamped for a week on the river banks unable to cross.—The work on the Chenab Bridge is getting on fast, and all employed on it appear to be determined to have the bridge ready by Jan. 1 next, in time—it is said—to be opened by our future King. Ten spans of the bridge are complete, or all but complete. The other seven spans, including the 210 Muzaffargarh side abutment, remains to be done. Staging is being erected on some of these too, and so we shall probably have the bridge ready as promised. Every possible precaution has been taken to avoid the fate of the Victoria Bridge over the Uhelum at Drakinsman, when a fire was caused by a red-hot rivet falling on the sleeper staging below, which caused one—and that nearly the last—of the girders to curl up and delay the bridge-opening for two or three months, till a new girder was obtained from England.—*Indian Engineer.*

**The Ruins of Troy.**—The Vienna correspondent of the *Daily News* telegraphs:—"Some time ago Captain Boetticher, in his work 'La Troie de Schliemann une Necropole d'Incineration,' and in several essays and pamphlets, attempted to show that the ruins of Hisarlik were nothing but a prehistoric burying-place of the cremated dead. He asserted that Mrs. Schliemann and Dörpfeld, to prove their theories on these excavations, pulled down certain walls, and thereby extended the single rooms. Dr. Schliemann thereupon went to Hisarlik with a German and an Austrian expert, Major Steffen and the architect Herr Niemann, who have publicly given their opinion that Captain Boetticher's assertions are untenable. They also say that he has withdrawn them after inspecting the ruins, and that Mrs. Schliemann and Dörpfeld most certainly did not manufacture any evidence in favour of their theories."

**The Blackwall Tunnel.**—The *Daily Chronicle* says that the report of Mr. Wolfe Barry, who was appointed by the London County Council, specially to go into and report upon the proposal to construct a tunnel from East Greenwich to Blackwall, is now before the Bridges Committee of the Council, to which committee six additional members have been added, in view of the importance of the matter to be discussed. Mr. Barry's report is exceedingly comprehensive, and he points out the difficulties in the way of the proposed construction. These are so tremendous that it is very likely the scheme will not be carried out in anything like the form originally agreed upon.

**The St. Paul's Reredos Case.**—The judgment of the Court of Queen's Bench, granting a *mandamus* to compel the Bishop of London to entertain the "representation" made to him on the subject of the reredos, and to deal with it as the Act directs, has been reversed by the Court of Appeal, Lord Esher, Lord Justice Lindley, and Lord Justice Lopes being unanimously of opinion that the Court had no power to review the reasons given by the bishop for not allowing proceedings to be taken.

**The late Herr Krupp.**—The legacy of one million marks left by the late Herr Krupp to the town of Essen has been disposed of, it having been decided to expend it in erecting improved artisans' dwellings. Each house is to afford accommodation for two families.

**The Danish Cement Industry.**—A cement factory, the Aalborg Portland Cement Factory,—the first of its kind in Denmark,—has been established, with a capital of 45,000.



**Wind Force.**—The usual monthly meeting of the Royal Meteorological Society was held on Wednesday evening, the 18th inst., at the Institution of Civil Engineers, Dr. W. Marrett, F.R.S., President, in the chair. Thirty-nine new Fellows were elected. The following papers were read:—(1) "Report of the Wind Force Committee on the Factor of the Kew Pattern Robinson Anemometer." This has been drawn up by Mr. W. H. Dines, who has made a large number of experiments with various anemometers on the whirling machine at Hershman. Twelve of these were made with the friction of the Kew anemometer artificially increased, seven with a variable velocity, and fourteen with the plane of the cups inclined at an angle to the direction of motion. In discussing the results, the following points are taken into consideration, viz., the possibility of the existence of induced eddies, the effect of the increased friction due to the centrifugal force and gyroscopic action, and the action of the natural wind. The conclusion that the instrument is greatly affected by the variability of the wind to which it is exposed seems to be irresistible, and if so, the exact value of the factor must depend upon the nature of the wind as well as upon the mean velocity. There is evidence to show that during a gale the variations of velocity are sometimes of great extent and frequency, and there can be but little doubt that in such a case the factor is less than 2.15. The one point which does seem clear is that for anemometers of the Kew pattern the value 3 is far too high, and consequently that the registered wind velocities are considerably in excess of the true amount. (2) "On Testing Anemometers," by Mr. W. H. Dines, B.A. The author describes the various methods employed in the testing of anemometers, points out the difficulties that have to be encountered, and explains how they can be overcome. (3) "On the Rainfall of the Riviera," by Mr. G. J. Symons, F.R.S. (4) "Report on the Phenological Observations for 1889," by Mr. E. Mawley.

**The English Iron Trade.**—Owing partly to the habitual abstention from business on the approach of the holidays and the close of the year, but also partly to the unwillingness of manufacturers to contract forward on the basis of prices which they consider do not represent the actual state of the market, trade has been quieting down during the past week, and will probably not revive before the new year. At the same time, a very steady tone is maintained in all departments, due to the fact that makers are not in want of work for a considerable time ahead. The pig-iron business has been rather quiet, and even speculators in warrants are holding off the market. Scotch warrants have not fluctuated much, but makers are still doing a fair business. What trade there is passing at present in Cleveland iron is done mostly by second-hand holders, who are offering their iron, which they probably bought cheaply, at 60s. 6d. to 61s., while makers quote up to 65s. for No. 3, both for prompt and forward delivery. Although business in pig-iron in other districts is limited, prices remain as strong as they were. There is no change in the hematite trade, either as regards demand or prices; but this much is certain, that the market is firm, and prospects are good. Manufactured iron and steel are fairly active, and values are steady. Ship-builders and engineers continue active. —Iron.

**The Strike of Brickmakers at Shobury.**—We are informed that the strike at the Shobury brickfields, belonging to Messrs. Eastwood & Co., Limited, has ended. The men, who have been paid (Messrs. Eastwood say) 30 per cent. more than the Kent brickmakers, struck for double the advance which had been given to the Kent men. A deputation of the men saw Mr. Wragge, the company's manager, on Monday last, and stated that the men would be willing to resume work on Messrs. Eastwood & Co.'s terms. Mr. Wragge informed the men that on this understanding he would be willing to re-open the field. The strike has lasted over ten weeks. It is stated that it was in a great measure fomented by political agitation, but into this matter we cannot enter. It has caused great suffering, and has stopped for a time the making of a brick ("D.K." brand), well-known in the London market.

**Royal Society of Painter-Etchers.**—The next Exhibition will be opened on Saturday, March 1. The election of Associates will take place on February 6 previously.

## PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	7	0	0	7	15	0
Teak, B.L.	load	13	0	0	14	0	0
Sesquia, U.S.	foot cube	0	3	0	3	0	0
Ash, Canada	load	3	0	0	4	5	0
Elm		3	0	0	4	15	0
Fir, Danstie, &c.		3	10	0	3	10	0
Oak		2	10	0	4	10	0
Canada		5	10	0	7	10	0
Pine, Canada red		2	10	0	3	10	0
" yellow		3	0	0	3	5	0
Lath, Danstie	fathom	4	10	0	8	10	0
St. Petersburg		5	0	0	8	10	0
Wainscot, Riga, &c.	log	0	0	0	0	0	0
Deals, Finland, 2nd and 1st. std. 100		8	10	0	11	0	0
" 4th and 3rd.		7	0	0	8	0	0
Riga		7	0	0	9	0	0
St. Petersburg, 1st yellow		11	0	0	14	0	0
" 2nd		9	0	0	10	0	0
Swedish white		6	10	0	10	0	0
White Sea		7	10	0	14	0	0
Canada, Pine, 1st		16	0	0	26	0	0
" 2nd		11	0	0	17	0	0
" 3rd & 4th		8	0	0	10	0	0
" Spruce, 1st		9	0	0	11	0	0
" 3rd and 2nd		7	0	0	9	0	0
New Brunswick, &c.		6	0	0	8	10	0
Battens, all kinds		8	0	0	17	0	0
Flooring Boards, sq., 1 in., prepared, First		0	11	0	0	14	0
Second		0	8	0	0	10	0
Other qualities		0	6	0	0	7	0
Cedar, Cuba	foot	0	0	4	0	0	5
Honduras, &c.		0	0	4	0	0	4
Mahogany, Cuba		0	0	5	0	0	6
St. Domingo, cargo average		0	0	5	0	0	6
Mexican, cargo average		0	0	4	0	0	5
Telesco		0	0	5	0	0	6
Honduras		0	0	5	0	0	6

TIMBER (continued).		£.	s.	d.	£.	s.	d.
Roe, Turkey	ton	4	0	0	13	0	0
Roe, Rio		15	0	0	20	0	0
Bahia		14	0	0	18	0	0
Satin, St. Domingo	foot	0	0	9	0	1	3
Porto Rico		0	10	0	1	6	0
Walnut, Italian		0	0	4	0	0	6

METALS.		£.	s.	d.	£.	s.	d.
IRON—Bar, Welsh, in London	ton	7	15	0	8	5	0
" at works in Wales		7	5	0	8	0	0
" Staffordshire, in London		8	10	0	9	10	0
COPPER—							
British, cake and ingot		55	0	0	58	0	0
Best selected		57	0	0	58	0	0
Sheets, strong		68	0	0	67	0	0
Chili, bars		49	0	0	0	0	0
YELLOW METAL							
LEAD—Fir, Spanish	lb.	0	0	5	0	0	6
English, com. brands		14	2	0	0	0	0
Sheet, English		16	5	0	16	10	0
Tin—Banks		100	0	0	0	0	0
Billiton		99	0	0	0	0	0
Strait		88	5	0	0	0	0
Australian		97	10	0	0	0	0
English Ingots		102	0	0	0	0	0
Bars		103	0	0	0	0	0
Refined		104	0	0	0	0	0

OILS.		£.	s.	d.	£.	s.	d.
Lined	ton	20	10	0	20	15	0
Coconut, Coochin		28	10	0	0	0	0
Ceylon		23	10	0	23	16	0
Palm, Lagos		25	10	0	0	0	0
Rapeseed, English pale		32	0	0	0	0	0
" brown		32	10	0	0	0	0
Cottonseed, refined		21	15	0	0	0	0
Tallow and Oleine		21	0	0	40	0	0
Lubricating, U.S.		8	10	0	8	10	0
" refined		7	0	0	13	0	0
Tar—Stockholm	barrel	1	8	0	0	0	0
Archangel		0	15	6	0	15	6

## COMPETITIONS, CONTRACTS, &amp; PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

## COMPETITIONS.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
New Baths, Winter Gardens, &c.	Harrogate Corporation	150l. 100l. 75l. & 50l.	Mar. 1st	i.
New Police Buildings	South Shields Corpn.	Not Stated.	Mar. 15th	ii.

## CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Works at Schools, Hanwell	Central London School District	Jarvis & Son	Jan. 6th	xii.
Sewerage Works	Barrow & S.A.	— Mansbridge	Jan. 8th	xi.
Removal of Dust and Slop	St. George the Martyr Vestry	Official	Jan. 14 h	xii.
Works and Materials (one year)	Liverpool Corporation	do.	Not stated.	xii.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
City Engineer	Liverpool Council	£50l.	Dec. 27th	xvii.
Chief Surveyor of Main roads	Stafford C.C.	£80l.	Jan. 8th	xvii.

## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

**CANNING TOWN.**—For road and sewer works on the Canning Town Estate, for the United Land Company, Limited, 31, Norfolk-street, Strand, London, W.C.:

J. Cook, Spaling	£1,695 10 0
J. W. & J. Neave, Woodford	1,688 0 0
E. Wilson, Watlington	1,665 0 0
J. Garston, Stamford-hill	1,658 3 4
G. G. Rutter, Bromley-by-Bow	1,499 0 0
E. & W. Rice, South Wimbledon	1,435 0 0
L. Bottoms, Upper Roding	1,391 0 0
R. Mayo, Brixton	1,345 0 0
B. Saunders, Fulham	1,338 0 0
J. Jackson, Leyton	1,333 0 0
J. Adams, Kingland	1,285 0 0
G. Bell, Tottenham	1,233 0 0
Holme & King, Canning Town	1,179 2 10
J. Jackson, Plaistow (accepted)	1,100 0 0

**LONDON.**—For works in repairing, painting, &c., at the St. Olave's Union Offices, Tanner-street, Bermondsey, for the Guardians of St. Olave's Union, Messrs. Newman & Newman, architects, 31, Tooley-street, London-bridge, E.C.

Randall, W. K.	£2185 0 0
Mills, W. & E.	160 0 0
North, D.	133 0 0
Lilly, W. G.	134 0 0
Castle, W. & H.	124 0 0
Furniss, W.	122 10 0
Williams, H. T.	112 0 0
Venborn, G. T.	116 0 0
Hemchroy, T.	68 10 0
Knight, J.	97 0 0
Edwards, B., jun.	95 0 0
Rhodes, C.	90 10 0
Miles, D.	81 10 0
Gordon, P., & Son	73 0 0
Bullers, J.	69 0 0
Wales, G.	68 0 0
Belchamber, C. W., & Son	69 18 0
Stewart & C.	57 13 6

Accepted subject to inquiry.

**LONDON.**—For alterations to drainage and sanitary works and fittings at the Rotherhithe Infirmary, for the Guardians of St. Olave's Union, Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge, S.E.

Christie, J. & C.	£728 0 0
Jilly, W. G.	612 0 0
Holding, J., & Son	600 0 0
Bullers, J.	560 0 0
Edwards, R., jun.	508 0 0
Randall, W. K.	500 0 0
Knight, J.	477 0 0
Castle, W. & H.	465 0 0
Aldridge & Pegg	450 0 0
Belchamber, C. W., & Son	379 12 0
Godson, G., & Son	361 0 0

Accepted subject to inquiry.

**LONDON.**—For sanitary fittings, &c., underground conveniences, Broadway, Hammermith, W. Mr. H. Mar. C.E. surveyor—

G. Jennings	£228 15 0
H. G. Haywood	224 10 0
B. Finch & Co.	146 2 0
Doulton & Co.	222 19 1

**NOTTINGHAM.**—For proposed Board School, Seers Side, Nottingham, for the Nottingham School Board, Mr. A. H. Goodall, architect, Nottingham. Quantities by the architect—

John Hutchinson	£3,895 0 0
Enoch Hind	3,827 0 0
J. J. Adams	3,850 0 0
Gilbert & Gabbittas	3,834 15 0
Thos. Cuthbert	3,803 0 0
H. Green	3,790 0 0
Wheatley & Maule	3,780 0 0
J. Hodson & Son	3,774 0 0
James G. Thomas	3,769 0 0
B. Keeling	3,760 0 0
A. B. Clarke	3,760 0 0
Enoch Kent	3,671 0 0
J. H. Clarke	3,659 0 0
J. Turton	3,620 0 0
P. Wattmaby	3,600 0 0
Barlow & Whitaker	3,498 0 0
James Wright	3,388 14 0
John Oseroff	3,361 0 0
James F. Price	3,360 0 0
John Cooper (accepted)	3,354 13 0

LONDON.—For the erection of industrial dwellings, Southwark, second section in continuation of present buildings, for the trustees of the Hayes Estate. Messrs. Waring & Nicholson, architects. Quantities by Mr. H. Smith:—

Hall, Beddall, & Co.	£11,370 0 0
Mills Bros.	10,600 0 0
Hill, Higges, & Co.	10,440 0 0
Martin Wells & Co.	10,000 0 0
Rider & Son	9,849 0 0
Ford & Son	9,812 0 0
W. Smith	9,825 0 0

SOUTHAMPTON.—For 1,000 tons broken granites delivered on Corporation Wharf, Southampton, for the Corporation:—

	Total amount.	s.	d.
J. Jennings, London (Guernsey granite) ...	2875	0	0
Mowlem & Co., London (Guernsey granite) ...	854	3	4
Stranger, Guernsey (Guernsey granite) ...	615	8	8
Manuelle, A. & F., London (Guernsey granite) ...	808	6	8
Falls, F., Guernsey (Guernsey granite) ...	575	0	0
Skelton & Co., London (Guernsey granite) ...	541	13	4
Perry, Oberbourg (Cherbourg granite) ...	495	16	8
Snell & Sons, Southampton (no description) ...	447	18	4
	Accepted.		

UPTON PARK (Essex).—For the erection of a block of school buildings and appurtenances to be known as "Elmhurst-road School," Upton Park, in the county Borough of West Ham, for the West Ham School Board. Mr. J. T. Newman, architect, 2, Fen-court, Fenchurch-street, E.C. Quantities by Messrs. R. L. Curtis & Sons:—

	Buildings.	Foundations.
G. J. Hoskings	£15,184 0 0	£715 0 0
J. Hearle & Son	14,983 0 0	525 0 0
J. W. Wyles	14,138 0 0	591 0 0
J. W. Maddison	13,400 0 0	585 0 0
J. Catley	13,080 0 0	475 0 0
G. Sharp	12,950 0 0	570 0 0
J. Norrie	12,810 0 0	527 0 0
Norton & Son	12,414 0 0	424 0 0
A. Reed (accepted)	12,399 0 0	389 0 0

WEST HAM.—For making up Connaught-road, for the Corporation of West Ham. Mr. Lewis Angell, M.Inst.C.E., Borough Engineer.—

Perry & Co.	£10,148 0 0
Holme & King	9,188 19 11
Hes.	9,781 0 0
Mowlem & Co.	9,487 0 0
Rutty	8,714 0 0
Neave	8,718 0 0
Bell	8,656 0 0
Jackson	8,612 0 0
Griffiths	8,593 0 0
Cook & Co.	8,574 0 0
Adams (accepted)	8,289 9 0

WEST HAM.—For the West Ham Main Drainage Extension Contract No. 6, Mr. Lewis Angell, M.Inst.C.E., Borough Engineer.—

Holme & King	£11,618 15 2
Neave	11,491 0 0
Perry	10,794 0 0
Road	10,239 3 0
Adams	9,944 1 4
Bottoms	9,908 0 0
Bell	9,821 0 0
Cooke & Co.	9,426 11 6
Jackson	8,900 0 0
Gentry	8,675 0 0
	Accepted.

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#### TO CORRESPONDENTS.

F. B. (not any danger worth considering in comparison with the advantage to a town of a nearly noiseless traffic).—W. A. B. (too late).—Important Decision Under the Building Act: (see sender's name appended, and therefore cannot be inserted).—H. G. H. (we have space to set out all the minutiae of estimates for works under the head of "Tenders"; we can only give the totals. Nor do we insert anything for which the highest tender is less than 100s.).—C. M. B. (too late). All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications. Letters or communications (beyond newsworthy) which have been duplicated for other journals, are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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# The Builder.

VOL. LVIII. No. 2447.

SATURDAY, DECEMBER 28, 1890.

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Stens Cathedral: Library Door.—Drawn by Mr. Thomas MacLaren .....	Double-Page Ink-Photo.
Church of St. Alban, Teddington: North Elevation.—Mr. W. Niven, F.S.A., Architect .....	Double-Page Photo-Litho.
St. Alban's Church, Teddington: West Elevation and Plan .....	Single-Page Photo-Litho.
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### "The Viking Age."



HE main point which is sought to be established in the remarkable book\* which Mr. Du Chaillu has brought out under the above title is suggested in the sub-title — "The

Early History, Manners, and Customs of the Ancestors of the English-speaking Nations." We have been accustomed to think of the Vikings or Norsemen as a piratical horde who harassed the shores of Britain and Northern Europe, settling where they could find foothold, and with whom we modern English have a partial relationship through early admixture of Saxon with Norse blood. Mr. Du Chaillu's position is that the Norsemen were the great dominant race of Northern Europe for some time previous to the Roman conquest of Gaul and Britain; that the Saxons themselves were a portion of the Norse race, and not a local and opposing race; and further, that the Norse or Vikings had their original cradle on the shores of the Black Sea; that they had close connexion with Greece and Egypt in art and civilisation, and worked their way Northward across Europe; and that the English-speaking race generally are the direct descendants of this sea-loving and invading people; that we are far less mixed in race, far more purely Norse, than has been hitherto admitted.

Among the reasons given by the author in his opening chapter for this subversive theory the following may be shortly summed up. There is evidence both in the pictures of life given in the Sagas and Eddas, and in the numerous archaeological remains of Norway and Sweden, that the people of the North, even before the time when they carried their warfare into Gaul and Britain, were possessed of a high degree of civilisation, consequently that they had been a great and powerful nation for a long time, as nations do not start up at once fully equipped with arts and civilisation. As to one portion of this argument we may say at once that the long and multi-

farious translations from the Sagas and Eddas with which Mr. du Chaillu's book is filled do not convey any such idea to us; they rather represent the simplicity and childish faith of a half-civilised people. The art is another matter. "The weapons found with their peculiar Northern ornamentation, and the serpent-ring coats of mail, show the skill of the people in working iron. A great number of their early swords and other weapons are damascened even so far back as the beginning of the Christian and era, show either that his art was practised in the North long before its introduction into the rest of Europe from Damascus by the Crusaders, or that the Norsemen were so far advanced as to appreciate the artistic manufactures of Southern nations." Stress is laid also upon the fact (not to be denied) that many objects of Northern art show a strong affinity with Greek, Etruscan, and Roman forms. But the conclusion from this cannot in these days be pushed very far, at least in the direction in which the author wishes to push it. Many forms once supposed to be characteristic of Early Greek ornament have been found in Mexico; and, in fact, the further research goes in regard to early ornament, the more we are led to think that many early forms of ornament may be expected to be found in any quarter of the globe. There is more importance in the argument derived from the evidently advanced and powerful state of the navy of the Viking nation or nations. Mr. Du Chaillu quotes Tacitus as referring in the first century A.D. to the northern nation of the "Sueones," who were strong in ships, and ships described as having a prow at each end, and therefore corresponding to the typical form seen in the remains of Viking vessels. The author says "it stands to reason that the maritime power of the Sueones must have been the growth of centuries before the time of Tacitus, and from analogy of historical records we know that the fleets of powerful nations do not remain idle. Hence we must come to the conclusion that the Sueones navigated the sea long before the time of Tacitus." This of course is a rational conclusion, involving also the idea of an important nation with an independent existence extending some time back. Then the author alludes to the fact that Roman writers later than Tacitus make mention of maritime expeditions by the Saxons and Franks, and the same argument is applied, that the maritime power of these people referred to could not

have arisen suddenly, nor could that of the Sueones have disappeared suddenly, though they cease to be mentioned by Roman writers. Hence the conclusion that the Franks and Saxons of later Roman writers, alluded to as a race powerful in their equipment for naval warfare, were only the Sueones under other names. If not, what had become of the formidable Sueones after the days of Tacitus?

The argument of course only holds good on the supposition that the maritime nation referred to was one of great power and extent. A mere marauding tribe, however brilliant its achievements for a time, might soon die out or disperse and give place to another carrying on a somewhat similar existence. In fact, the author's argument so far rather approaches to arguing in a circle. The northern maritime nation mentioned by the Romans must have been a great and important people to have had the navy they evidently had, and to have been spoken of with so much respect by the Romans. This first nation, A, being such a powerful nation, could not have disappeared suddenly, and therefore when the Romans spoke of another powerful maritime nation, B, in the next century, they must have really referred to A. And A and B being the same nation under two different names, must have filled a great place in early European history, and must be the real parents of the whole English-speaking race. That is pretty much the way the argument stands, and it is a loose one enough. When we come to consider the immense extent and the frequent richness and beauty of the remains of northern art work we get a firmer and more logical ground on which to rest a conviction that the people who left all this behind them were a good deal more than a tribe of sea-pirates. It is only of late years that we have realised how rich and interesting are the remains of Norse ornament and art workmanship, and how fine was the design and construction of their ships; and this is, as far as it goes, a fact in favour of Mr. Du Chaillu's theory which cannot be ignored. As to the similarity between Norse and Greek forms in some examples, we have already observed that the argument from similarities of this kind cannot be pushed very far, — certainly it can hardly justify the author in putting forth a map of Europe as the land of the Viking, with the names of the principal countries spelt so as to suggest their "Viking" origin, — "Grikland," "Tyrvland," "Spänn," &c.; or for

\* The Viking Age: The Early History, Manners, and Customs of the Ancestors of the English-speaking Nations, Illustrated from the antiquities discovered in mounds, cairns, and bogs, as well as from the ancient Sagas and Eddas. By Paul B. Du Chaillu. With 1,366 illustrations and map. London: John Murray; 1890.



placing the more or less mythical city of Asgard on a bend of the Dnieper. This is obviously trying to prove too much; and it is a pity the author should have added to his book a map which he himself can hardly, in his inmost conviction, have expected his readers to take seriously.

The real value of the work, from our point of view, is not so much in its historical theory (which it is not our special business to consider, but which we should think open to somewhat more than doubt,) as in the unusually voluminous collection it includes of illustrations of ancient Norse art. The general conclusion to be derived from these illustrations is in itself, we must observe, adverse to the theory that the English are more directly and specially the descendants of the Vikings than has been usually supposed, or that the so-called Saxon element in our descent is really a Viking element. As a general rule national character is very decidedly shown in the style and taste of decorative work; and peculiarities in this class of work are very distinctly traceable in the same people from one generation to another. Now the mass of Norse design illustrated here is not in harmony with what we have been accustomed to regard as the characteristics of English mediæval art. They have a *cachet* of their own which is not English; and therefore so far they are adverse

blances is not always or necessarily that which the author would draw. There does seem however to be sufficient to justify an idea that early Norsemen had wider connexions through commerce than has been realised. The author gives one illustration, in the chapter on "bronze weapons" of a curious form of one-edged sword or scimitar, with the point curled round into a scroll. He notes that "Professor Stephens in his 'Runic Monuments' shows that this type is Assyrian, and that it has come by the trade route through Russia into Sweden from Asia." There is a note in the chapter on "the graves of the earlier Iron Age" as to the finding of objects of Roman manufacture in these graves, but the statement is rather vaguely put and does not appear to be directly borne out in any of the objects illustrated. The most interesting and characteristic articles illustrated in the chapter on bronze weapons are the axes, of which we illustrate, by the permission of the publisher, one of the most artistic examples in point of design (fig. 1); this exceedingly business-like type of narrow axe-head, thick in the upper part and thinning down into a sharp wedge, is shown in a good many forms, nearly all of them exhibiting a good deal of character and force of design in a simple manner; and they are certainly thoroughly well made for their purpose. The spiral bracelet of gold (fig. 2), one of the illus-

likeness in potters' work of this kind; in reference to which we may subjoin a sketch which has been sent us (fig. 5) of a

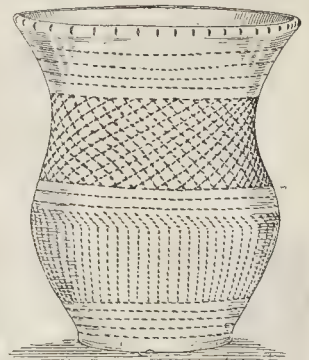


Fig. 5.—Clay Vessel, found at Ardgour, Argyllshire.

small earthen vase recently dug up at Ardgour in Argyllshire, and bearing a simple incised ornament as indicated. The shape of this is very similar to that of some in the chapter before us. The one we have numbered here as fig. 3 we selected as an interesting specimen of simple but effective design formed by the receding faces at the neck, the double series of handles alternating, and the parallel lining on two of the faces. Fig. 4 is curious as an example of a remarkably classic-looking form (also found at Kannikegaard); but there is a bronze Japanese vase of very similar shape in the South Kensington Museum. The glass vessel illustrated as fig. 6, however, found in a round tumulus in Norway (precise place not stated), is a really curious example to have come from that latitude, and has a singularly classic look about it, as indeed is the case with other objects illustrated in the chapter on glass vessels. The author asserts that "many of them are evidently of Greek some perhaps of Roman origin"; but it is not clear whether he means to imply that the designs are of Greek type, or that the actual objects were of Greek or Roman manufacture. The latter we should think very doubtful. It is with glass as with gold: it is a peculiar substance lending itself most readily to certain special forms of treatment, especially in its ductile state when heated; and it is not surprising if the same conditions should lead to somewhat similar methods of treatment even among two people who had no direct connexion with each other.



fig. 1.—Bronze Axe; half real size.

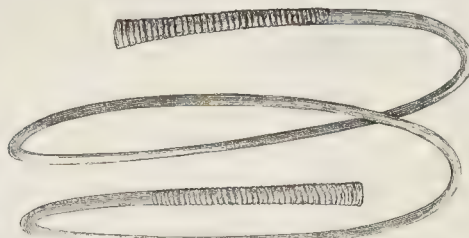


Fig. 2.—Spiral Bracelet of gold; real size. Found in a stone cairn.



Fig. 3.—Clay Urn; one-eighth real size.



Fig. 4.—Clay Urn.

to the theory that Anglo-Saxon and Norman are one race, and that the English are its lineal representatives; and the portion of the book which constitutes its chief interest seems in opposition to what the author would have made his main point.

This is how the matter appears to us, though we admit that to form a settled and logical conviction in regard to the historical views propounded would demand long and careful examination, and that further light on the subject may show that there is more basis for Mr. Du Chaillu's opinions than appears probable at first sight, though we do not think that his South European cradle for the Viking will be likely to be ultimately accepted. But his book has brought in a popular form before English readers the characteristics of ancient Norse art by a multitude of engravings which give it a high illustrative value.

There runs through all the sets of illustrations the attempt to connect them with similar forms found elsewhere, though the deduction to be drawn from these resem-

blances is not always or necessarily that which the author would draw. There does seem however to be sufficient to justify an idea that early Norsemen had wider connexions through commerce than has been realised. The author gives one illustration, in the chapter on "bronze weapons" of a curious form of one-edged sword or scimitar, with the point curled round into a scroll. He notes that "Professor Stephens in his 'Runic Monuments' shows that this type is Assyrian, and that it has come by the trade route through Russia into Sweden from Asia." There is a note in the chapter on "the graves of the earlier Iron Age" as to the finding of objects of Roman manufacture in these graves, but the statement is rather vaguely put and does not appear to be directly borne out in any of the objects illustrated. The most interesting and characteristic articles illustrated in the chapter on bronze weapons are the axes, of which we illustrate, by the permission of the publisher, one of the most artistic examples in point of design (fig. 1); this exceedingly business-like type of narrow axe-head, thick in the upper part and thinning down into a sharp wedge, is shown in a good many forms, nearly all of them exhibiting a good deal of character and force of design in a simple manner; and they are certainly thoroughly well made for their purpose. The spiral bracelet of gold (fig. 2), one of the illus-



Fig. 6.—Glass Cup; one-quarter real size. Found in a round tumulus.

Reference has been made to the use by the Vikings of the process subsequently called Damascening, of which we presume the author intends the scabbard ferrules, of which one is shown as fig. 7, to be taken as examples. These are iron, inlaid with flat hammered gold wire. This is from a class of objects found largely in bogs, and classified by the author as "bog finds." These appear to be all on sites near the sea, and are stated to have





Fig. 9.—Buckle of a Belt in silver and bronze, ornamented with garnets; real size.



Fig. 10.—Bracteate of gold; real size. Tuft Church, Sandver.

yielded a certain number of Roman coins and other objects. We cannot help feeling, however, that the author is under rather a temptation to attach a Roman origin to things



Fig. 7.—Iron Ferrule to Scabbard, inlaid with gold wire.

which appear to afford any excuse for it, and which can thus support the theory as to the relations, either in peace or in warfare, between the Norsemen and the Romans. The fragment of chain armour shown as fig. 8, also a "bog find," is certainly Northern



Fig. 8.—Fragment of Chain Armour; real size.

enough in character, and indicates a very fine and elaborate piece of work, with each ring formed of a small serpent; the illustration is the real size. The buckle in silver and bronze (fig. 9), belonging to what we are told is "the

earlier iron age," is a very forcible and characteristic piece of Northern workmanship: so also is the fine and elaborate piece of gold-work, real size, shown as fig. 10, and which is an example of a class of ornaments which the author terms "bracteates," a term the meaning and origin of which he does not define: the etymology of the name would imply that these were to be worn on the arm, but what is stated is that they were worn round the neck, and were possibly protective amulets. "They are formed by embossing or stamping upon a disc, and the gold is extremely thin." Some of them have devices on them to which some meaning was evidently attached; this is obvious in some of the examples illustrated, but not, we think in this one, which appears to be purely ornamental work of a very charming type.

The few illustrations we have reproduced, selected mainly because they illustrated one or other of the points we wished to touch upon, must not be taken as giving any idea of the wealth of illustration in the book, which in this respect has a value quite independent of the historic theory which underlies it, and the artistic reader may accept or reject this as he pleases without any prejudice to the interest which he will certainly derive from so rich and compendious a book of illustration of the characteristics of Norse design.

#### THE PROPOSED FORTH AND CLYDE SHIP CANAL.


**T**HIS scheme, instead of making practical progress, as was expected, has passed for a time into a condition of mere controversy on the question of route. There has been undue haste at the last, and crude estimates of cost have been made up and published on no other survey than that afforded by the Ordnance map. An Edinburgh firm of engineers, thus pressing the pace, want the canal carried round by Loch Long, a chief arm of the Clyde estuary, over a track fully fifty miles in length by way of the Forth Valley and Loch Lomond, and involving the cutting of mast-high tunnels through two intervening ridges. At the same time they profess to have looked critically

into the natural crossing between the Forth at Grangemouth and the Clyde at Glasgow, *via* Falkirk, Kilsyth, and Kirkintilloch, and to have found in it many drawbacks. In the main the Loch Lomond proposal has, in the North, been met with something very like derision, and the opinion is frequently hazarded that if the scheme is confined solely to this mode of solution it never will be carried into effect at all; but the objections taken to the central route have been receiving serious consideration, and it is on these that the discussion now turns. Those of them dealing with the amount of excavation necessary can only be decided by the results of a competent engineering survey of the track, and there is every probability that this will be obtained; but others are on the surface, and may be answered without waiting. A chief objection, singular to say, consists in the presence of the already-deepened Clyde along part of the proposed central route from fifth to fifth, but most people will rather be disposed to regard this as a foremost inducement, and, further, to perceive no great matter of ultimate difficulty in the reconciliation of the two interests of canal and river for purposes of harmonious working. The Clyde is Glasgow's peculiar property, and Glasgow, as a port, must recognise the enormous advantages to it of a direct passage to the eastern sea, and is, no doubt, prepared to purchase these by abundant facilities and every reasonable concession. It is assumed in this table of drawbacks that the sea-to-sea waterway must offer free passage at all times of the tide to ships of the highest class and to war-vessels; but this is, perhaps, straining after too high a standard to begin with. A ship canal, capable of passing at stated daily tidal periods such vessels as the Clyde at present accommodates up to Glasgow Harbour under similar conditions, would certainly be an important acquisition, and even a brilliant achievement as a beginning. All but the deepest-laden craft might thus pass, by choosing fitting time and opportunity. Some of our natural sea channels are frequented by the largest class of vessels; the Pentland Firth, for instance, affords safe passage only at intervals of tide and wind, and navigators do not regard it as much of a hindrance to study these. It is also assumed that the land along



the central valley, being of high value, would be very costly to purchase, but, in point of fact, the land at present is only of very poor value, slightly built upon, and part of it morass. The making of a ship-canal would, probably, enhance the value of this unproductive tract tenfold at some points, and certainly raise it largely in value on either side all the way, so that proprietors will probably not be found difficult to deal with, if they know their own interests, as most likely they do. For some miles the canal (if constructed as a tidal work) would be sunk 100 to 150 ft. in its cutting, and this, it is pointed out, would be most inconvenient for public works, &c., on the banks. The Tyne from Newcastle to the sea is similarly sunk between high and precipitous banks, but these banks are clad and crowded with marine works and manufactories to an extent unmatched, perhaps, in any other part of the world, and this objection, also, may therefore be taken as not of very serious account. Even the much-commended straightness of the route is called in question, and the fact significantly pointed out that the river Kelvin over the last few miles of its course is tortuous; but there is no real significance in this objection, for at the elbow where the river and valley thus leave the straight there is only a very narrow ridge of quite low elevation, after cutting through which the surface-level falls steadily on the direct line, till the Clyde is reached just below the boundaries of Glasgow harbour. Indeed, so trifling is this ridge as an obstruction, that some geologists have surmised that anciently the course of the Kelvin was not deflected here, but held straight on to the Clyde, and was two or three miles shorter than now. It will be seen that at least a few of the exceptions thus taken to the direct central crossing are very trifling in character, betokening, perhaps, no more than the existence of a perhaps unconscious prejudice, coupled with an anxiety to marshal every possible feature likely in the smallest degree to tell unfavourably. Another objection advanced is in regard to the cost of excavation, which it is alleged will be so heavy as to preclude all chances of the canal paying as a commercial and financial undertaking. This, however, is a mere assertion unsupported as yet by ascertained knowledge; and in the absence of adequate surveys, the same must be said of the alleged financial feasibility of the roundabout Forth Valley and Loch Lomond route. If the natural surface depression, stretching between Grangemouth and Glasgow, although low, be still not low enough to permit of the construction of a canal, except at a lasting loss to the original investors, it would be better not to begin the work at all; but this cannot be decided in any off-hand manner, or in any way except by a careful survey in the hands of engineers who enter on their work with perfectly open mind, that is to say without prejudice either for or against. Such a survey, it is to be hoped, the committee now being formed in Glasgow will be able to procure, and till then the controversy may as well rest. One feature there is which neither the advocates nor the opponents of the "direct" scheme have touched, and that is the striking facilities of the valley as it stands for the carrying on of an undertaking involving the bringing to bear of ponderous engineering plant and the removal of a mountain of debris. The existing Forth and Clyde Canal, which no doubt would have to be bought up by the new Company, could be utilised unquestionably with most important economical results; and there is a railway also from end to end, which at present is not overburdened with traffic. Forces of men and material could be concentrated here at a fraction of the initial costs attaching to remote works like the Panama Canal or the Nicaragua undertaking, and there would likewise be a liberal choice of landing and shipping ports within easy reach at either extremity. Granting other things equal, there is no other crossing in Scotland in the least to be compared with it in respect of the constructive advantages named.

## NOTES.

SE your property so that it does not injure your neighbour" is one of those apparently plain and simple maxims of law and conduct which over and over again lead judges and less able men very much astray. We believe this maxim has lately led Mr. Justice Kekewich wrong in the case of *Reinhardt v. Mentasti* (Law Reports 42, Chancery Division, p. 685). As the judgment stands it is of great importance, and, as the judge rightly remarked, "may affect many localities and many persons." The facts were very simple. The plaintiff had a small wine-cellar in his house separated from the hotel kept by the defendant by a party-wall only. The defendants put into their kitchen a stove so near to the wine cellar of the plaintiff, that the cellar became too hot for the storage of wine. Mr. Justice Kekewich granted an injunction to prevent the continuance of this stove. It is obvious that if this decision is good law it opens the door to a really appalling amount of litigation between adjoining house-owners. Now, as it seems to us, Mr. Justice Kekewich has been misled by the principle that a man must not use his own so as to injure his neighbour. He finds, rightly enough, that the law lays it down that, however reasonable may be the use by a man of his property, that is no answer to his neighbour's complaint that such use is injurious to him. But where Mr. Justice Kekewich has gone wrong seems to be in the application of these principles. He cites a dictum of the present Lord Chancellor that, "what makes life less comfortable and causes sensible discomfort and annoyance is a proper subject for an injunction." But is the fact that a particular spot in a house is rendered unfit for the storage of wine "a sensible discomfort and annoyance"? Let us see if we can find an answer in the dictum of the late Master of the Rolls that "serious annoyance must be caused," and that "the ordinary use and enjoyment of a dwelling house must be interfered with" in order to cause the law to step in. It is clear, as it seems to us, that to cause a cellar to become too hot for the storage of wine is not such an interference with the ordinary enjoyment of a dwelling-house as is contemplated by the late Master of the Rolls. In the case before him, the nuisance complained of was the stamping of horses in an adjoining stable, whereby the inmates of the house were prevented from sleeping at night. If those who live in a dwelling-house are prevented from obtaining their necessary rest, clearly sensible discomfort and annoyance has been proved. Mr. Justice Kekewich states that if for "horses" you read "stove," and for "sleep" read "use of cellar," "you have a test exactly applicable to the case in hand." He admits, however, immediately before, that the use of a cellar is less necessary than sleep. That admission takes away the whole value of his reasoning. It is possible to conceive that a cellar too warm for wine may be used for other purposes, such as the storage of linen, and that the wine may be kept in some other place. Again, a total abstinence would not require the use of the cellar at all, nor the prudent individual who got in a dozen of light claret when he required it. Tested in this way, it is clear Mr. Justice Kekewich was led astray by a legal maxim—otherwise every trifling discomfort caused by the use of adjoining premises would become actionable. It has never been supposed that a piano next to a philosopher's study could be removed by the Court of Chancery, but the discomfort of not being able to work without interruption is surely as material an interference with a neighbour as over-warm wine. Whether the decision will become the subject of appeal we know not, but while it stands in the Law Reports it is one which can scarcely fail to lead to endless litigation and to upset the existing give-and-take rules which alone keep the peace among neighbours in large towns.

**D**URING the excavations at Rome for the construction of the great drain on the right shore of the Tiber, in Via della Lungaretta,

some imposing remains of a very ancient viaduct have been recently found. It consists of some arches of masonry in horizontal courses, almost Etruscan in their style. The period of its construction is not known, but from its massive nature, consisting of huge rectangular tufa blocks, and the similarity of its style of masonry to that of the tabularium of the Capitol, it is considered to belong to the same period.

**S**OME interesting excavations have been recently commenced by the Italian Government, under the direction of the royal inspector, Signor Orti, on the site of ancient Locri, the ruins of which exist near Gerace, a city on the south-east, on the coast of the Bruttian peninsula, not far from its southern extremity, and one of the most celebrated of the Greek colonies in this part of Italy. The date of the foundation of Locri is uncertain. Eusebius puts it at a.c. 673. At the period of Pyrrhus it appears that Locri, as well as Rhegium and other Greek cities, had placed itself under the protection of Rome. The few ruins that still remain have been carefully examined and described by the Duc de Luynes. The site of the ancient city, which may be distinctly traced by the vestiges of the walls, occupied a space of nearly two miles in length, by less than a mile in breadth. Numerous fragments of ancient masonry are scattered over the site, but the only distinct vestiges of any ancient edifices are those of a Doric temple, probably of the celebrated Temple of Proserpine, about a mile from the sea, which we know to have occupied a similar position (Livius, xxix., 18). In the course of the present researches, however, the remains of a great temple of Ionic style have been found, which are estimated to be of the fifth century B.C. This discovery is very important, because no temple of Ionic style, belonging to so early a period, has hitherto been discovered in Italy. The parts found are the following:—  
1. The basement and the flight of steps of the temple, formed with large tufa blocks.  
2. Portions of colossal fluted columns of tufa, with traces of their capitals.  
3. Some remains of marble statues,—perhaps of divinities,—and horses, also of marble, in the archaic style, probably belonging to a decorative group of the pediment. Unfortunately, no inscriptions are found, and it is, as yet, impossible to form a distinct opinion about the divinity to whom the temple was originally dedicated.

**A** REPORT by Dr. R. Bruce Low to the Local Government Board (Dec. 2nd) on an outbreak of diphtheria at East Haddon, in the Rural Sanitary District of Brixwood, Northamptonshire, gives the following description of the condition of drainage and water supply of this favoured district:—

"There is no proper sewerage system. The main sewer of the place is a road drain constructed some years ago by the Highway Authority. It is said to consist of 931 yards of glazed socketed pipes, varying in size from 4 in. to 12 in. . . . The house drains are very defective. In many instances they are made of field drain pipes. The size of these drain pipes is often different in the same section, and they are carelessly laid, with resulting blocks and escape of their contents through open joints into the porous soil. There are no sink stones in the houses. The slopes are thrown into the open gullies, often of considerable size in the yards. Soakage of slops into the soil round the gullies was apparent. Sometimes the slop water runs in a bricked channel on the surface; here again the same sort of soakage was seen.

Excrement Disposal is by means of pit-privies, usually situated in close proximity to dwellings. The pits are mostly made with brick, the joints being often imperfect. Storm water gains entrance to some, and occasionally overflows again on to the surface. Frequently the pits are of considerable size; in some cases they extend beneath the whole of the privy itself, and can only be emptied by removing the stone flags forming the floor. They are emptied at long intervals; occasionally not for years. One such privy, which smelt abominably, had not been emptied for two years, although it was situated close to a house occupied by a tradesman and his large family. In cases where the pit is of moderate dimensions it is now and again allowed to overflow on the surface. Many of the privies are three-seated. Often they are situated near to wells. One instance was observed in which a large privy pit



was only 8 ft. from the well supplying several houses. . . . The water supply is derived from pump and draw-wells, the depth of which vary from 9 to 20 ft. The inside of the walls is not protected; the staining is open, and leakage of dark fluid was seen trickling between the joints of the stones. On a wet day during the inspection a considerable quantity of dark-coloured water was seen pouring into a well. The cottagers in many cases admit that the well-water is muddy and discoloured after rain. In certain cases, even in fair weather, the water actually 'sinks.' By common consent some wells are not used, their pollution is so evident. The unfortunate occupiers in such cases have to beg water from their neighbours. Almost the whole of the wells in the village are so situated as to be constantly liable to pollution from the leakage of privy-pits, refuse-heaps, slop-drains, pigstyes, and accumulations of manure."

A further light is thrown upon this pleasing picture by the note as to the provision in the district for official inspection and supervision in sanitary matters:—

"The Medical Officer of Health, Mr. F. A. Williams, is appointed for the whole of the Brixworth Rural Sanitary District, which contains an area of 60,374 acres, and had a population at the last census of 13,886. He receives a salary of £4. per annum. His instructions are to undertake no inspections, and make no special reports unless he receives notice to do so from the Sanitary Authority, and for any such report he is paid a further sum of 12. 1s. He is seldom required to make more than one, or at most two, reports during the year; but it is to be said, he is not asked to report unless something special arises. Under such terms of appointment, it is not wonderful that practically nothing is done until mischief has happened. . . . The fault of this is certainly not due to the Medical Officer of Health, but to the Sanitary Authority, who have made it impossible for him to take any proper action. Systematic and skilled supervision of health of the district there is none, and without this no locality can be kept in a good sanitary condition."

A CORRESPONDENT, "H. R. B.," called attention in our pages last week to an old London house behind Bow Church. The house, originally two houses, is No. 10, Bow Church-yard, close to the southern side of the church. It was tenanted, until September last, by Messrs. W. Sutton & Co., patent-medicine proprietors and dealers. The house was formerly distinguished by the sign of the "Boar's Head." Its identity with the emporium of a well-known nostrum, and to the ownership whereof Messrs. W. Sutton & Co. succeeded, is supported by an advertisement inserted in the *London Journal*, 1728:—

"DAFFEY'S ELIXIR WAREHOUSE.

"At the Maiden-head behind Bow Church, in Cheapside, is sold for two shillings the Bottle, that admirable Cordial, DAFNEY'S ELIXIR SALUTIS, . . . well-known throughout England, where it has been in great use these 50 years."

The numerals at the lower two corners of the mural tablet upon the western half of the house are by no means clearly to be read; they may be 69, thus making the date 1669. This sign is now worn and almost shapeless; but it is claimed to have once represented a boar's head. The early shop-fronts, with their old-fashioned shutters, are worthy of notice. The pediment of the doorway contained a carving of the royal arms and supporters in wood; this has been painted and removed to Messrs. W. Sutton & Co.'s new premises in Chiswell-street. Beneath the shield are the rose and thistle, and the bearings on the shield are probably those of our first or second Sovereigns of the line of Brunswick. As touching "H. R. B.'s" conjecture in respect of the interior fittings, we are informed by the late occupants that in the basement is a leaden cistern or tank, bearing the initials and date—T. S., 1670.

THE local Archaeological Committee of Genoa has decided to preserve their historic and artistic Palace di San Giorgio, or dei Capitani del Popolo, threatened with demolition in order to set in order that part of Genoa, and thus demolish all that large quarter and change it into wide streets. The Palace di San Giorgio was built in 1260 by the Capitano del Popolo, William Bocanegra, under the direction of the Monk Oliviero. This palace is a rare example of the Lombard architecture in Liguria in the thirteenth century.

A COMMISSION of Inquiry was held in Glasgow on Friday and Saturday last week in regard to the causes of the Templeton mill disaster, Col. Malcolm, commanding the Royal Engineers in Scotland, and Mr. W. W. Robertson, Surveyor in Scotland of Her Majesty's Office of Works, having been appointed by Lord Lethian as Commissioners. Their report will not, of course, be issued till they have had time to carefully consider the evidence before them; and until the report is issued we decline to enter into any comment on the evidence, which is, however, by no means without matter for comment.

WE have received the portfolio of etchings which the Art Union of London has this year distributed to its subscribers in place of the large engravings which have been the usual staple of the annual issues. How far the change will be popular with subscribers we know not, but to our thinking the portfolio of eight etchings, though they are not all equal in merit, is very much better worth having than the single large engraving hitherto issued. Some of the etchings fail a little from over working and consequent loss of light. Among the best are Mr. C. E. Holloway's "St. Paul's from the Thames," a fine drawing with a great deal of aerial effect in it; Mr. Percy Robertson's "The Bridge" and Mr. Slocombe's "View on the Kennett." These are really beautiful works, and the others are good, if not equal to these. Taking it that the object is to bring art to the homes of the people, here are eight small works of art which will go far to lighten up a small room, instead of one large engraving out of scale with any but a large apartment: not to mention also the more delicate and tender tone of etching. The change is certainly for the better, and we congratulate the Art Union on having made it.

#### THE LONDON SEWAGE QUESTION.

PRECEDING the reading of Sir Robert Rawlinson's paper at the Society of Arts last week,\* The Chairman, Sir Henry E. Roscoe, F.R.S., M.P., said:—It gives me much pleasure to take the chair on this occasion, when a veteran in sanitary knowledge, Sir Robert Rawlinson, is about to give us his views on a subject of such vast importance to the metropolis as that of "London Sewage," and the purification of the Thames. It is a matter in which I myself have taken a considerable amount of interest, for, as the members present will know, I was consulted by the late Metropolitan Board of Works on the subject of the deodorisation of the effluent, and I presented to them several reports on that subject. In addition to this, I made a statement expressing my views on the whole question of the treatment of the metropolitan sewage, which has been laid before the members of the Main Drainage Committee in the form of a pamphlet. In the first of my reports to the Metropolitan Board I ventured to remark that, "looking at the broad question of the permanent disposal of the metropolitan sewage, and believing that the use of deodorants ought to be regarded only as a temporary expedient, I feel convinced that sooner or later the recommendations of Lord Bramwell's Commission will have to be adopted, and that the sewage, whether previously clarified or not, must either be filtered through land or discharged into the estuary at a point not higher than the sea reach. The growth of the metropolis during the quarter of a century which has elapsed since the adoption of the present main drainage and outfall system has been so enormous that arrangements which worked satisfactorily up to some years ago are found to be inadequate, and will, of course, become more so as time goes on." In the pamphlet above referred to, I pointed out, from a chemical point of view, that the present process of precipitation did not cause any improvement in the quality of the effluent, and, moreover, that the arrangements made for the separation of the sludge from the effluent at Barking and Crossness were, in my opinion, from a scientific point of view, based on false principles, and the consequent barging of the sludge out to sea a mistake. I also suggested that an engineer and chemist be appointed to report to that com-

mittee on the whole question of the treatment and disposal of the sewage of the metropolis, as a basis for future action. It is interesting to find that the County Council only yesterday endorsed these views, by refusing to adopt the recommendation of their Main Drainage Committee to obtain tenders for the construction of two more steamers, at a cost of 20,000. each, for carrying the sludge out to sea, and by instructing that committee to secure the services of an eminent civil engineer to join the Engineer of the Council in a thorough examination of the whole sewage system. It is also satisfactory to find that the Main Drainage Committee agree with the Royal Commissioners of 1884 that it is neither necessary nor justifiable to discharge the sewage of the metropolis into any part of the Thames from the Nore upwards, and are convinced that the probable alternative to the scheme of the Metropolitan Board,—viz., precipitation in underground reservoirs, separation of effluent from sludge, and the carrying out of the latter to sea, would be in the conveyance of the sewage to the sea upon the Essex shore by some such plan as that sanctioned by Parliament in the Act of 1865. The Main Drainage Committee further add that, should separation of sludge from effluent be carried out in the future, such a separation must be conducted at Barking and Crossness. To this I should wish to add my opinion, that should precipitation not be deemed advisable, the reservoirs now constructed might still be used for storage during the flood tide, when it might be undesirable to allow the sewage to flow out even at such a distance from the metropolis. I understand that Sir Robert Rawlinson does not propose to consider the question of the chemical treatment of the sewage, and I therefore venture to make these few remarks as indicating my views of this part of the subject.

In the discussion which followed the reading of the paper,

Mr. J. G. Rhodes (late Chairman of the Main Drainage Committee of the London County Council) said he would state shortly how the question now stood, without entering into past history; but referring to the recommendations of Lord Bramwell's Committee, and showing how far they were carried out, and how far they stopped short of doing what was necessary to prove whether the plan was a success or a failure. That Royal Commission reported that it was not necessary or justifiable to discharge the sewage in its crude state into any part of the Thames. That was clearly the opinion of the Metropolitan Board; and they attempted to carry out that recommendation, and proceeded to construct the Barking and Crossness outfalls. The Commission also said that some process of deposition or precipitation should be used to free the sludge from the liquid portion, and that such a process might be conveniently applied at the main outfalls. The Metropolitan Board accordingly did so, and also adopted the last alternative suggested with regard to the sludge, that it might be applied to the raising of low-lying land, or be dug in or burned, or carried away to sea. The report also said that the sludge might be dealt with in such a way as not to be a nuisance to the neighbourhood where the process was carried on, and as a preliminary and temporary measure the liquid portion might be allowed to escape into the river, but only at a particular position. The plan had not yet been fully tried, and therefore they could not say whether the subtraction of the sludge would sufficiently relieve the river from nuisance, so that the continued passage of the effluent might be permitted. His point, however, was that the recommendations of the Royal Commission had been carried out by the Metropolitan Board as far as possible during the time they held office; large works had been erected, and in order that they might have a fair trial they ought to be allowed to remove the sludge deposited. It was not a question whether a right or wrong method of precipitation was adopted; though the one adopted was the result of observation over a large area in all parts of the country. But it had hitherto been found that when you precipitated sludge, you always had about 80 per cent. of water left in it, though possibly that might be reduced in future. The report of the committee, which was yesterday defeated in the County Council,\* was in its essence a mere paraphrase of the recommendations of the Royal Commission, up to the point which had practically been arrived at. They wanted to

\* See *Builder*, p. 444, ante.

See *Builder*, p. 446, ante.



remove daily about 3,000 tons of sludge, and the simple question was what was the best method of doing so, at all events for the present. There were two sludge barges which were not adequate to the business, and therefore it was suggested that others should be added. It might be shown by and by that a cheaper mode of disposing of sludge than carting it away was practicable, but the first thing was to get rid of it somehow, and they had had experience of the use of ships, and knew what they could do. It seemed to him, therefore, that it was the bounden duty of the County Council to continue in the line which had been shown to be practicable, and to give a reasonable trial to these new works which had been constructed under the direction of the Royal Commission. The state of the river last summer was disgraceful,—and why? During the construction of the works it was absolutely necessary to get rid of the sewage somehow or other, and it had to be cast into the river at all states of the tide. The consequence was that the bed of the river for a considerable distance above and below the outfalls was covered with sludge; it had, in fact, been converted into a great sludge-settling tank, and that went on over a period of something like two years. Last summer it all bubbled up, and gave what was called "black water," and so horrible was the condition of things that it was necessary to deodorise the river with one of the ships. The process went on for a couple of years, but it only made itself known by the results in the hot weather, and if the sludge were not removed, next summer the same evil would be repeated and intensified. When he heard the statement that the recommendations of the Main Drainage Committee had been defeated received with approbation, he could only conclude that the danger was not apprehended by the public. If they went on pouring a portion of the sewage into the river in its crude state until other means of dealing with it were provided, they would be only preparing fresh mischief for next summer. His view was that, although there might be better means provided for getting rid of the sewage, these means would require time to think out, and Parliamentary power to carry out, and in the meantime the immediate nuisance ought to be got rid of.

Admiral Sir Frederick Nicolson, Bart., G.B. (Chairman of the Thames Conservancy Board), said that they now heard from the successors of the Metropolitan Board of Works that the river was full of sludge, but some years ago they were told exactly the reverse. Sir Robert Rawlinson had referred to the upper part of the river, and called it the "Silvery Thames," and if that portion of it had been under discussion he might have given a most satisfactory account of it, but they were dealing with another part, and a very different state of things. Allusion had been made to the arbitration between the Conservators and the Board of Works, but in that case they were unfortunately tied down by a very imperfect Act of Parliament, the clauses relating to dredging being so circumscribed that their hands were completely tied, and that was the chief reason of their failure. They had to prove, what was almost impossible, that the navigation was absolutely obstructed by certain shoals produced by the sewage outfalls. No one could deny that the traffic was going on, though just below the southern outfall, in Halfway Reach, what was once the proper channel for heavily-laden ships, which was on the south side, had become so shallow, solely by deposits from the outfall, that vessels had to go along under the northern shore, where a good deal of dredging had taken place. As they could not show that these vessels were obstructed, because they avoided deposits of mud, the case failed. He had seen, in Erith Bight, a pole pushed down 10 ft. or 12 ft. into sewage mud of the most fetid character, which was never there before the southern outfall was opened. However, he did not think the money spent in the arbitration was entirely thrown away; a great deal of evidence had been collected, and it probably paved the way for the subsequent action on the part of the Corporation of London, who brought the matter before Lord Bramwell's Commission, when the whole question of pollution was gone into, the result being a very strenuous report that the sewage ought not to go into the river at all. On one occasion, when Lord Bramwell went down to Woolwich to inspect the river, he was perfectly horrified at its condition. The whole reach was one mass of ink of the most horrible odour, and they traced this, which was

supposed all to go out with the ebb tide, going up as far as Limehouse with the flood. It was only in very dry seasons and hot weathers that this extreme unpleasantness took place; but, looking at it from a seaman's point of view, if these plans for disposing of the sewage of London went on, there must be a series of shallows formed in that part of the river. His Board hailed with delight any scheme which would keep the solid contents of the sewage out of the river, which was naturally remarkably free from shoals and easy of navigation.

Mr. Aeneas Smith said that, as a member of the Main Drainage Committee of the County Council, and the proposer of the motion that a civil engineer should be appointed to confer with the Engineer of the Council, he had declined to order more sludge ships. Mr. Rhodes spoke of the thoroughness with which this question was dealt with by the Committee, but he, as a member of it, was not at all satisfied with the present condition of things. He thought London was in a disgraceful condition in this matter, and that there ought to be a thorough and complete inquiry, and he went to the Council determined that, before he would vote for the expenditure of 50,000*l.*, to be followed by one or more similar amounts, he would know what the end of the business was to be. He had very little faith in chemicals; for every fifty tons of poison which were removed, 350 tons were thrown into the Thames, and he was not prepared to see all this vile matter stirred up by the paddles of steamers, and he thought it ought to be disposed of in some other way. A great deal had been said about the expense, but that did not rest on the shoulders of the County Council, they were not responsible for the millions which would be spent at Barking and Crossness; this was handed down to them. Some of them thought it might be wise to propose a resolution that the work should be discontinued, and the contractors compounded with for what they had done, but it was found that very little saving could be effected, and, therefore, there was no alternative but to finish the contract as far as Barking was concerned; what might be done with regard to Crossness was matter for future consideration.

Dr. Alfred Carpenter said it was very refreshing to hear such a statesmanlike paper, and he commended the points which had been so forcibly put to the consideration of the ratepayers. The question raised by Mr. Rhodes as to what to do with the sludge ought not to arise, because if the sewage were dealt with properly, there would not be any sludge to remove. If a pint of beef tea were kept for a few days there would be plenty of sludge, but there was none there the first day or two. As soon as putrefaction commenced an immense amount of sludge was formed, and the great principle in dealing with sewage was to keep it moving until it was delivered on to the land. There were two things greatly needed at the present moment in London—meat and milk, and yet they were proposing to pour sewage, which would produce them both, into the sea. The ratepayers must not look to derive any profit from the utilisation of sewage; they would have to do as other localities did, provide an area of land on which it could be utilised, and let the agriculturists have the profit to be derived from its use. If the London County Council would bear this in mind, and provide land—either where Sir Robert Rawlinson suggested, or at Canvey Island, or, as he would suggest, on some of the waste lands round London, which were calling out for sewage—they would find thousands of acres not worth 5*s.* an acre which could be made to yield an average rental of 45*s.* an acre, and the difference between those two figures would provide a fund out of which to pay interest on the capital required. This question was of the utmost importance to the nation. He had watched the utilisation of sewage on land for twenty-five years, and he could say that the subsoil was almost as pure a yard down as it was before it was used. The growth of crops had removed all this stuff which was spoken of as sludge, and it had been formed into meat and milk, and added materially to the wealth of the district. The death-rate of London was low, but nothing like so low as that of the area he referred to round the sewage farm, containing a population of 5,000; the death-rate during the last ten years had never risen above 14, and it was not on account of a low birth-rate, for that was 54. There was an entire absence of zymotic disease. He hoped the County Council would

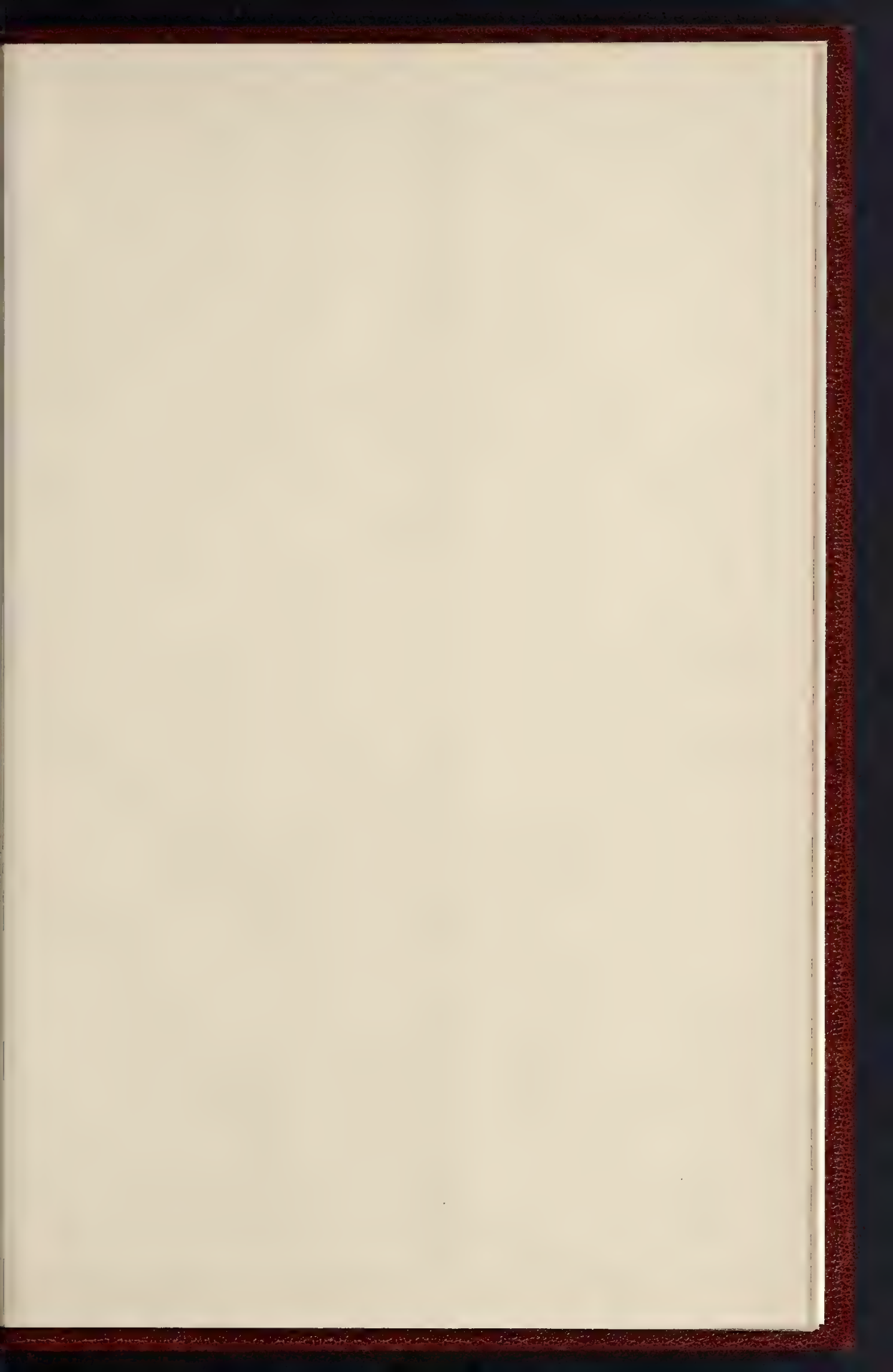
take the matter up seriously and devise measures for preventing the evils which would otherwise come upon them, not immediately, but in a hundred years' time, and which would not only make the neighbourhood much more unhealthy than it had ever been, but would prevent the river being what it had hitherto been—a highway to the Port of London.

Colonel Jones, V.C. (Wrexham), said he could entirely endorse what had been said by Dr. Carpenter. He had been living on a sewage farm for eighteen years, and had enjoyed the best of health, and so had his family. He found every drop of sewage valuable, and had generally managed to satisfy the Corporation to whom he was Sanitary Engineer. He was now engaged in carrying the sewage of Wrexham two miles further to a new farm, solely because the present farm had been so improved that the landlord would not treat for the sale of it at any reasonable price. If a little place, with a population of 12,000, could afford to take its sewage two miles, the City of London could well go twenty miles to Canvey Island; which Sir Robert Rawlinson had indicated as the first outfall. That island contained nearly 5,000 acres, which would suffice for the solid and most offensive part of London sewage for many years, and surrounding it on the coast of Essex there were immense areas of land which would benefit by having sewage poured upon it. He looked upon Canvey Island as sort of safety-valve and experimenting ground to which the Metropolis could carry its sewage, and be content only to take it elsewhere when there was a demand for it. At Wrexham he found the tenant of the new farm to which the sewage was to be taken was only too delighted with it, and his own successor intended to continue it. In the same way, if an experiment were made at Canvey Island on a small scale, there would soon be a demand from the neighbourhood. With regard to the question before the County Council, he might mention that a proposal had been made by his partner, Mr. Bailey Denton, and himself to relieve them of the expense of ships to take the sludge to the Nore, by laying down a 12-in. pipe in duplicate, about 4 ft. above the surface, along the Essex coast, to conduct the sewage under pressure. They had been advised, too, that the existing engines and pumps were capable, with very slight alteration, of putting pressure on sewage in a 12-in. pipe equal to 200 ft. head, if required, to drive the whole of the sewage in a semi-liquid state—and if it were not liquid enough it might be made so—Canvey Island, where it could be disposed of in improving and raising the land to the level of high tides, which at present had to be banked out.

Dr. Charles Drysdale said that all European nations were looking to England for a solution of the sewage question, and many of them had sent engineers over here to study what had been done. Paris had now a very successful sewage-farm of 1,500 acres, which produced most magnificent crops, and the effluent was so pure that any one could drink it, as he had done himself. In Berlin, also, where the authorities had sent engineers to study English sewage farming, they had now about 11,000 acres on the north and south, and not a particle of sewage was now sent into the river. It all went on the land, winter and summer, and Professors Virchow and Koch both said the effluent water was the purest to be found anywhere. Yet London, the Metropolis of the world, still continued the ridiculous system bequeathed to it by the Metropolitan Board of Works, which was silting up the river, and causing it in the neighbourhood of Woolwich to be most pestilential in summer, and all the valuable manurial products of the population to be wasted. It was the same with Dublin and Glasgow; these three towns were a disgrace to civilisation. Every possible plan had been tried, and it was well known now that the only possible way of purifying sewage was by passing it through fitting soils. On the proposed line to the North Sea there were at least 40,000 acres which might easily be bought at a cheap rate, and would soon be found profitable. Two hundred thousand cows could be fed on the grass and root crops which could be raised upon them, and then London would be able to get a supply of milk, which was much wanted.

Sir Robert Rawlinson said he would remind Mr. Rhodes of one fact,—viz., that the so-called clarified sewage, though it might look perfectly clear, was truly polluting sewage, and when it went into the river it was as capable of producing a stench and doing mischief, as it was with the







CHURCH OF ST. ALBAN, TEDDINGTON, MIDDLESEX.  
NORTH ELEVATION.

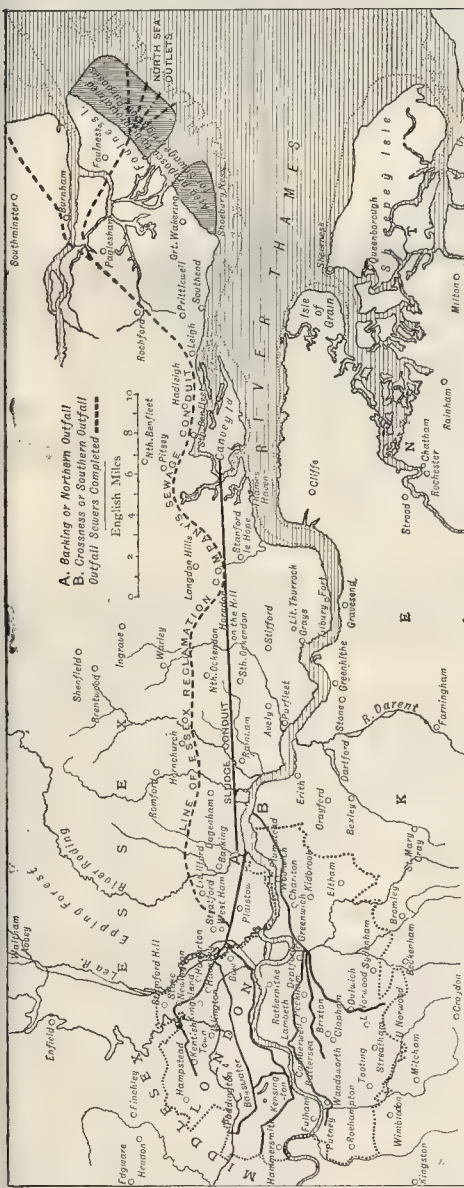




PHOTO LITHO. EPRATUE & CO. 22, MARK LANE CANON ST. LONDON E.C.







MAP OF THE COURSE OF THE THAMES, FROM LONDON TO THE SEA:

Showing the Proposed Outlets for Sewage to Canvey Island and the North Sea.

\* We are indebted to the *Journal of Arts* for the use of this block, but the references in the upper part of it are evidently not correct. A and B correctly represent the position of the Northern (Barking) and Southern (Cressness) outfalls, and the line put forward substantially by Sir Robert Rawlinson. The straight thick line represents the sluice conduit from Barking to Canvey Island, proposed by Mr. Bailey Denton and Colonel Jones. The thin dotted line represents the boundary of the Metropolitan area, lately under the authority of the Metropolitan Board of Works, and now ruled over by the London County Council. It will be observed that this area extends some distance further eastward on the south side of the river than on the north side. The main sewers of the Metropolitan main drainage system are six in number—three on each side of the river, and known as the Northern or Southern low-level, middle-level, and high-level sewers respectively. On the north side these three main sewers converge, as will be seen, in the neighbourhood of Bow and Hackney; on the south side the convergence takes place in the vicinity of Deptford and Greenwich.

Conservators were beaten in their action, but it was proved in the arbitration that no sludge went into the Thames to be dredged; but where did the 3,000 tons every week come from? There had been no creation of sludge since that period. When the inquiry was held, it was stated that the tanks were to receive the sewage, and that none was to enter the river except two hours after the turn of the tide. It was then going in at all states of the tide, had done so ever since, and would continue to do so. The best thing for the County Council to do would be to abolish all methods of dealing with the sludge, establish a conduit as shown on the map, and deal with it on the land. There would not be any profit on it, but the income would be far more than enough to pay the interest on the money required to promote the conduit.

Mr. W. C. Sillar wished to say that there was not a word of truth in the statement as to the A B C process at Leamington. It was only tried there on sufferance for two years while land was being prepared for an irrigation farm, and when the term expired, they received the thanks of the Corporation, and every satisfaction was given while it was in operation. As to an injunction, he did not know where Sir Robert Rawlinson got his information from, but it was entirely without foundation.

Sir Robert Rawlinson said the Earl of Warwick told him he would obtain an injunction, so that the A B C Company was removed by the terror of an injunction if not by its actual operation. The river was most abominably polluted by the effluent.

Mr. Sillar repeated his denial of this statement.

The discussion was adjourned to Wednesday, January 5.—(Slightly abridged from the *Journal of the Society of Arts*.)

COMPETITIONS.

**Board Schools, Burnley.**—A special meeting of the Burnley School Board was held on the 19th inst., when the report of the assessors (Messrs. W. Waddington & Sons) on the competitive plans for the proposed Board School in Burnley Wood were considered. A resolution was passed accepting their award, and it was decided that the premiums be given as recommended:—First, 30*l.*, Mr. G. T. Lawrence, London; second, 20*l.*, Messrs. Smith, Woodhouse, & Willoughby, Manchester; and third, 10*l.*, Mr. Thomas Bell, Burnley. The first prize will merge into the commission if the architect carries out the work. The question was referred to the Building Committee to seek an interview with Mr. Lawrence, with the view of seeing if an arrangement could be made with him to carry out his design. So says the *Burnley Gazette*.

**Chapel, Blackburn.**—The designs of Mr. Fredk. W. Dixon have been selected in a limited competition for the re-building of Zion Chapel, Montague-street, Blackburn. The present edifice was erected in 1837, and has now become inadequate to their requirements. The new building will be on the amphitheatre plan.

**Freckleton-on-the-Ribble Sewerage.**—At the monthly meeting of the Fylde Union Sanitary Authority, held at Kirkham on the 11th inst., Mr. W. S. Hodgson in the chair, it was resolved, on the recommendation of the Freckleton Parochial Committee, to make application to the Local Government Board for power to carry out the scheme of sewerage for the district of Freckleton submitted by Mr. William Wrennall, C.E., of Liverpool. This scheme was selected as the best in an open competition under motto, and, accordingly, was awarded the first premium. Mr. H. B. Nicholl, C.E., of Birmingham, obtained the second premium, and Messrs. Brierley & Holt, engineers, of Blackburn, the third.

**Schools, Southport.**—In a limited competition at Southport, for new Sunday schools for the London-street Primitive Methodists of that town, the designs of Mr. Fredk. W. Dixon, architect, of Oldham, have been selected by the committee. The new buildings, which are to be faced with Rusbon bricks, with stone dressings, are estimated to cost about 2,500*l.*

**Bangoon Drainage and High Pressure Water Supply Works on the "Ekone" System.**—Messrs. Hughes & Lancaster inform us that the opening of the above works by H.R.H. Prince Albert Victor has been included in the programme of the visit to Bangoon.

sludge, minus one point in eight. At Leamington the A B C people proposed to make a valuable manure by their chemical process, but they were driven out of the place because the effluent they sent out polluted the river, and they were restrained by injunction. He had purposely avoided going into the question of irrigation in any detail, though no one in the room had had wider experience of it. He had officially examined every sewage-farm in England, and many of the large ones abroad, and he could say, confidently, that if sewage were to be put to its best uses, and dealt with so as to occasion the least loss, it should be put upon land. If he had proposed, however, to make sewage farms all the way down from Barking, he knew many people would say he was going to poison all the wells and create a nuisance, and therefore he had provided a conduit, without saying anything about utilising it on its way to the outlet. He was quite certain, however,

that as soon as the landowners and farmers saw the value of it, every acre of land along the conduit would be glad to have the sewage, and before many years every gallon would be taken before getting to Canvey Island, and none would have to go into the sea. The legacy which the Metropolitan Board had left their successors with regard to the sludge treatment, was one of the most outrageous things of modern times. They ought to have known that what they termed clarified sewage was not clarified so as to prevent it being mischievous. When he held the inquiry at Barking, they told him there was no crude sewage going into the Thames, and found witnesses to swear there was no deposit at Barking, when at the very time there was 10*ft.* or 12*ft.* of sludge. Yet he was obliged to report that it was not proved that the mud came out of the Metropolitan sewers, because there were so many men swearing it did not. He was sorry for the way the



#### NEW PARISH CHURCH, BISHOPSTOKE.

The new parish church now in course of building at Bishopstoke, Hants., is to form a substitute for the existing church,—a small, ill-built, and exceedingly ugly structure of some sixty years' standing, and described in Murray's Guide as "modern and hideous." The new church is being built upon an entirely new site, and a very attractive one; an acre of land having been presented to the parish by Mr. Alfred Barton to form the new churchyard. The church consists of nave, chancel, western tower, choir and clergy vestries, and one aisle on the south side. The walling is of flint rubble and brick; the internal face of brick, to be ultimately plastered; the external face of snapped flint, with quoins and dressings of Bath stone. The roofs are to be covered with local red tiles. An unusual feature of the design is the little semi-octagonal baptistery at the west end of the aisle. The church is to seat 350.

The builders are Messrs. Wheeler Bros., of Reading; the architect is Mr. E. P. Warren, of London.

#### Illustrations.

##### INTERIOR, CHRIST CHURCH CATHEDRAL, OXFORD.

**T**HIS cathedral interior, as restored by Sir Gilbert Scott, with its mixture of styles, among which the Norman is predominant and seems to form a solid skeleton for the whole, is exceedingly picturesque. The cathedral is one of the smallest in England. It was originally but a priory church, and was only erected into the cathedral of the diocese by King Henry VIII., four years after the dissolution of the monastery. The dedication to St. Frideswide, presumably a Saxon saint, may point to the existence of a church on the spot at a very early date. Mr. Roper's sketch, if a little spotty in the foreground, is in all other respects, a very beautiful and accurate drawing.

The original drawing was in the last Royal Academy Exhibition.

##### THE LIBRARY DOOR, SIENA CATHEDRAL.

This illustration is a reproduction of a drawing in colour by Mr. T. MacLaren. In the original the doorway was drawn to inch scale, and the details to one quarter real size; the scale of the reproduction is a little less. The design is free from the bastard Gothicism which pervades the cathedral as a whole, and has all the delicate refinement of the earliest phase of the Renaissance. The treatment is very suggestive of a reasonable and effective method in

the use of valuable coloured marbles. The library, or Sala Piccolominea, is celebrated for the beauty of the miniatures and illuminations in the twenty-nine choir books, which now comprise the whole collection; and for the frescoes that adorn the walls, some of which were designed by Raphael.

##### CHURCH OF ST. ALBAN, TEDDINGTON.

We give this week the north and west elevations and the plan of this church as it is intended to be when completed. The design, it will be observed, includes a morning chapel beyond the chancel. At present only the chancel and a portion of the nave is being carried out.

We gave an interior of the church as intended, accompanied by a description, in the *Builder* for September 29, 1888.

The architect is Mr. W. Niven, F.S.A.

##### THE ALGERIA PAVILION AT THE RECENT PARIS EXHIBITION.

We do not know whether this very pretty example of the minor buildings of the Paris Exhibition is to be preserved, but we imagine that, being only imitative architecture, it will have to go. It stands or stood at the left-hand side at the top of the Avenue of Oriental buildings which was formed on the Esplanade des Invalides, and with its white plaster and coloured tiles had a very bright and sparkling effect. It was designed by M. Albert Ballu, the talented inheritor of a great name in modern French architecture.

##### THE ART OF JERRY BUILDING.

BY ONE WHO PRACTISES IT.

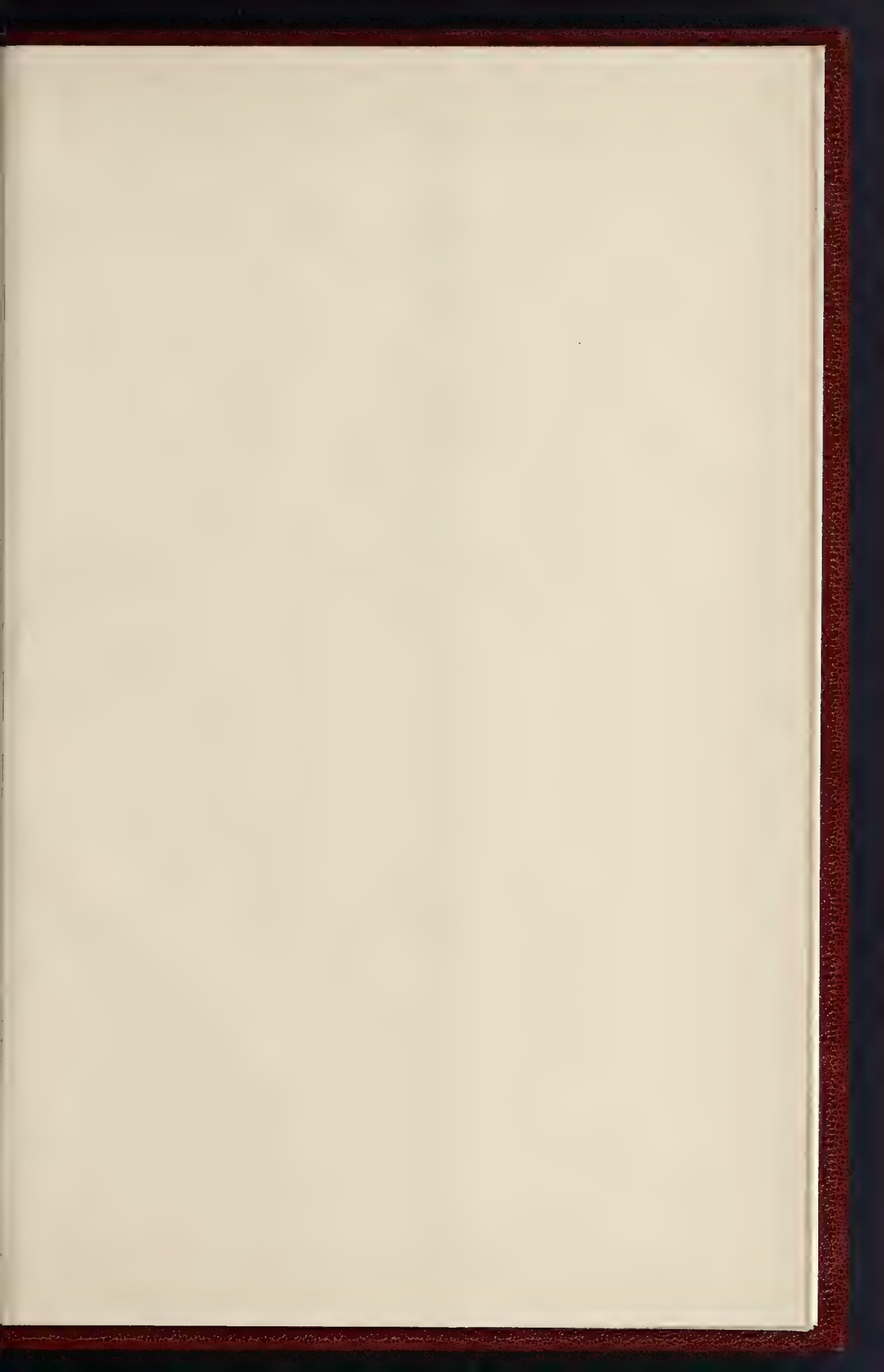
OUT of fellow-feeling for others in the building trade, towards whom I would scorn to cherish any sentiments of ungenerous rivalry, I think it right to initiate them into some of the principles by which I have been guided for many years in the conduct of my business,—principles which, I can truly testify, have been largely conducive to my financial success. I am, and always have been, what is called a jerry-builder. In my youth I well remember being filled with just indignation on hearing some one repeat that ribald adage, "Fools build houses for wise men to live in." I since became inspired with an ambition to reverse the proverb in its application to my own case; and I think I have fairly succeeded in doing so. I think I may venture to style myself one of the wise men who build houses for fools to live in.

As regards my principles, I would advise every young man starting in business to inscribe them upon the tablets of his heart. The first object is, of course, to get work; and I say

emphatically, get it, no matter how. If I tender in competition, I cut low, and trust to lumping it on in extras and provisions. As a rule, I prefer working without an architect, because these gentry are so inquisitive and meddlesome; but if this cannot be avoided, I would rather choose to work under some nice, easy-going gentleman in an official position, who draws his salary just the same whether he attends to his duties or not, and who understands the doctrine of "live and let live." In buying building materials, let me impress upon everyone the importance of buying those of the best quality. I mean to a certain extent, because it is the only way to inspire confidence. For instance, when I've got a job on hand, and the building-owner or his architect comes on to the site to have a general look round, he sees a heap of bricks, we'll suppose, and he remarks what capital bricks they are. So they are,—those that lie on the top. My men always know where to find the materials that they've got to use, and they know when and where to use them. I recollect once I had a mound of nice, dry, fine mould, that I was going to use in mixing my mortar. Of course, I took care to cover it over to a depth of 2 in. or 3 in. with the best sharp sand. One day the District Surveyor came round,—they're always prying about, those fellows,—and he said to me, "That's beautiful sand you've got there, Mr. —." That shows the advantage of having good materials on the site. Of course, while the surveyor was there, he saw the best sand being used for mixing mortar, but as soon as his back was turned, my men began shovelling in the mould.

As it is necessary to hide your worst materials as much as possible while they are stacked on the site, the same principle should be followed in executing the work. Thus, for instance, I always use up my worst bricks in my footings—that is, when I build any footings at all. I remember once, when I had built a brick pier without footings, the District Surveyor, unfortunately, came and saw it before the earth had been filled in. He drew my attention to it, and of course the first thing I did was to turn round and scold my foreman for allowing the footings to be omitted. "I declare," said I, "if I don't look after every little thing myself, something is sure to go wrong." The surveyor said that the pier must be pulled down and rebuilt with proper footings, and I promised him that it should be done. He then asked me why I did not discharge my foreman, if I found him so careless. I told him that they were all alike,—one was as bad as another; and that I might only make a change for the worse. He went away, looking very thoughtful; and, as soon as he was well of sight, my foreman and I went and had a pint together, and enjoyed a good laugh over the business. There was, of course, no necessity to pull down the pier at all.







INTERIOR, CHRIST CHURCH CATHEDRA

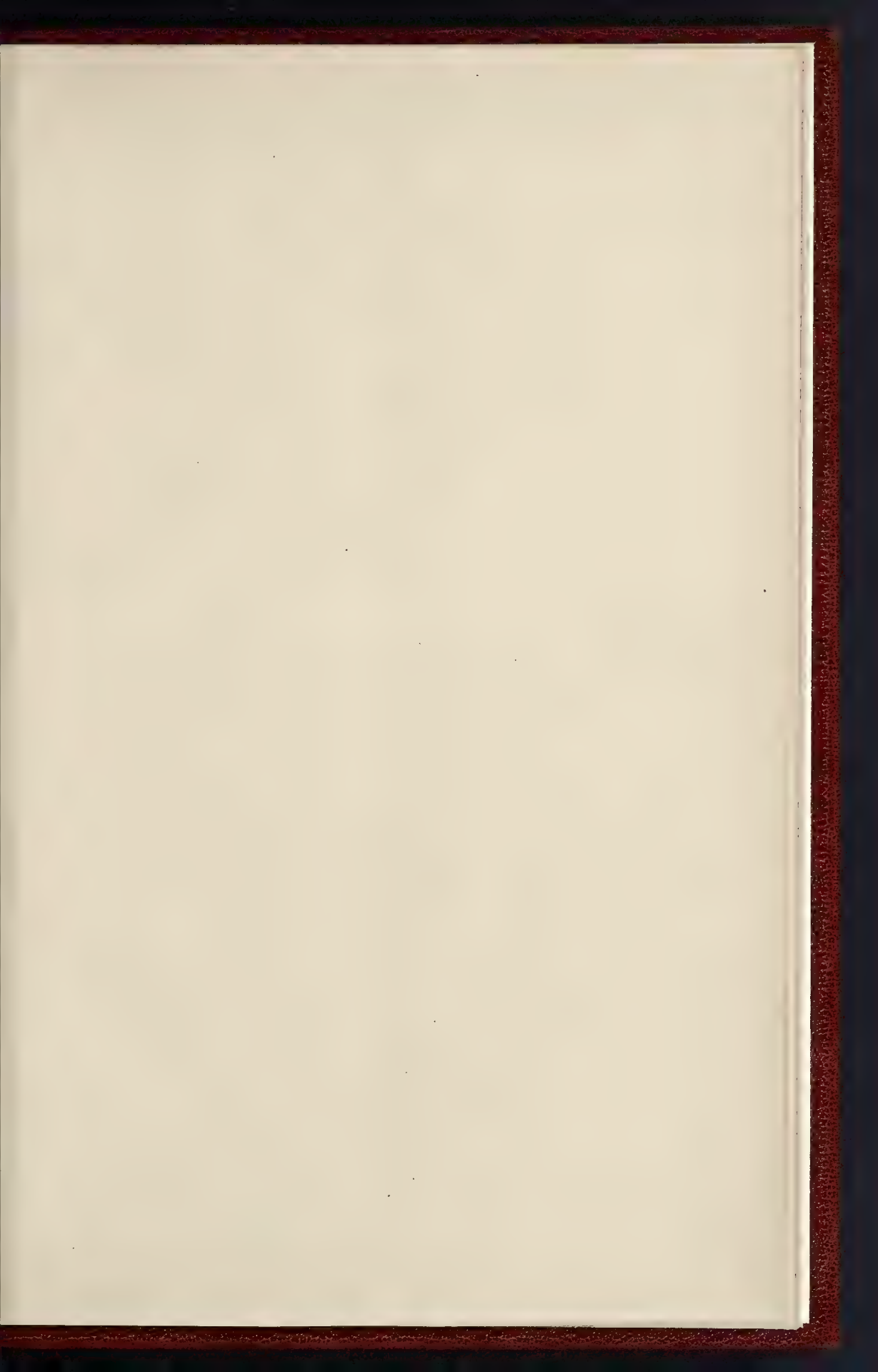




FORD—FROM A DRAWING BY MR. CECIL B. ROPER.







THE BUILDER, DECEMBER 28, 1889.



THE ALGERIA PAVILION AT THE RECENT PARIS EXHIBITION.—M. ALBERT BALLU, ARCHITECT.

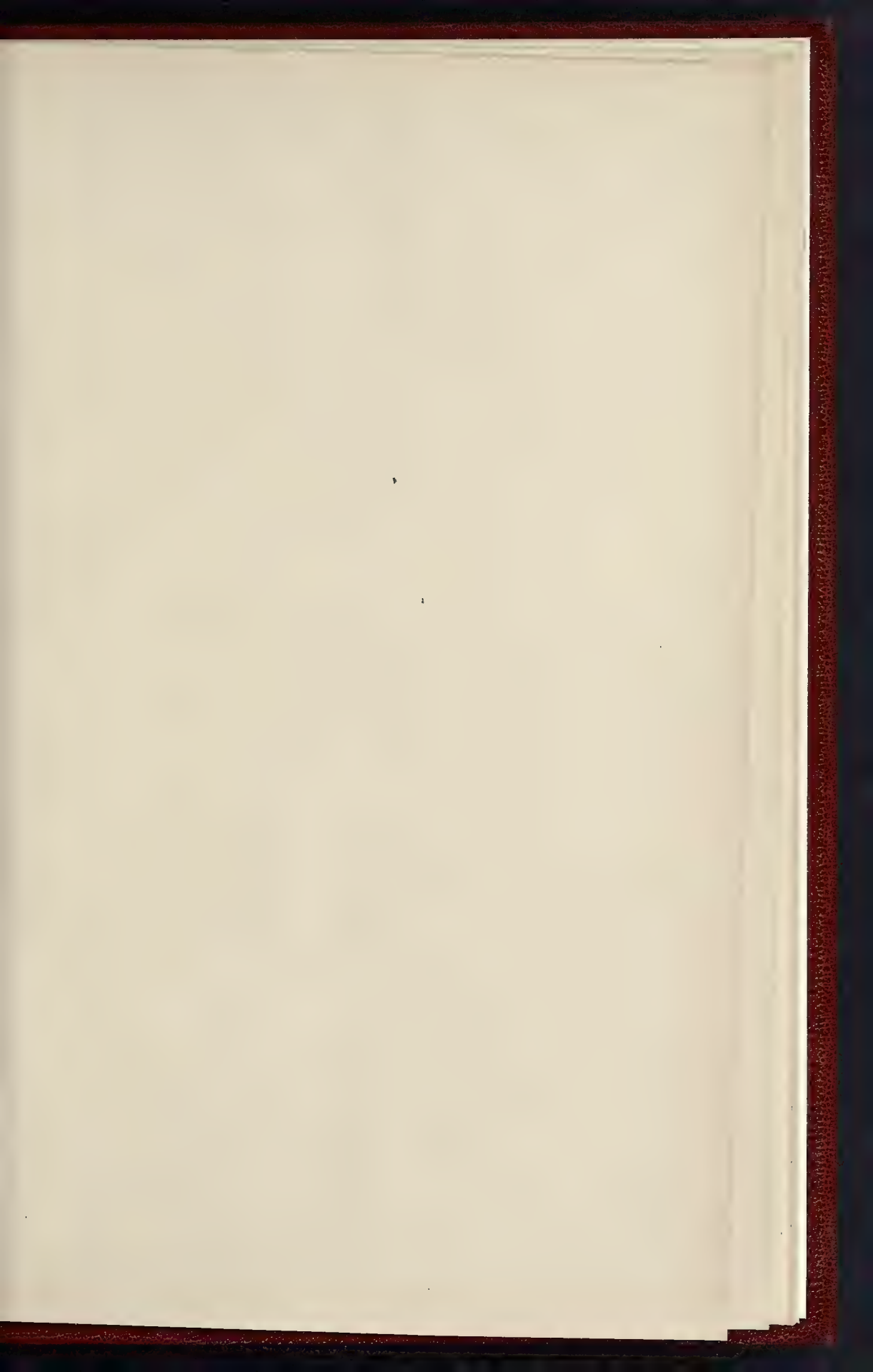


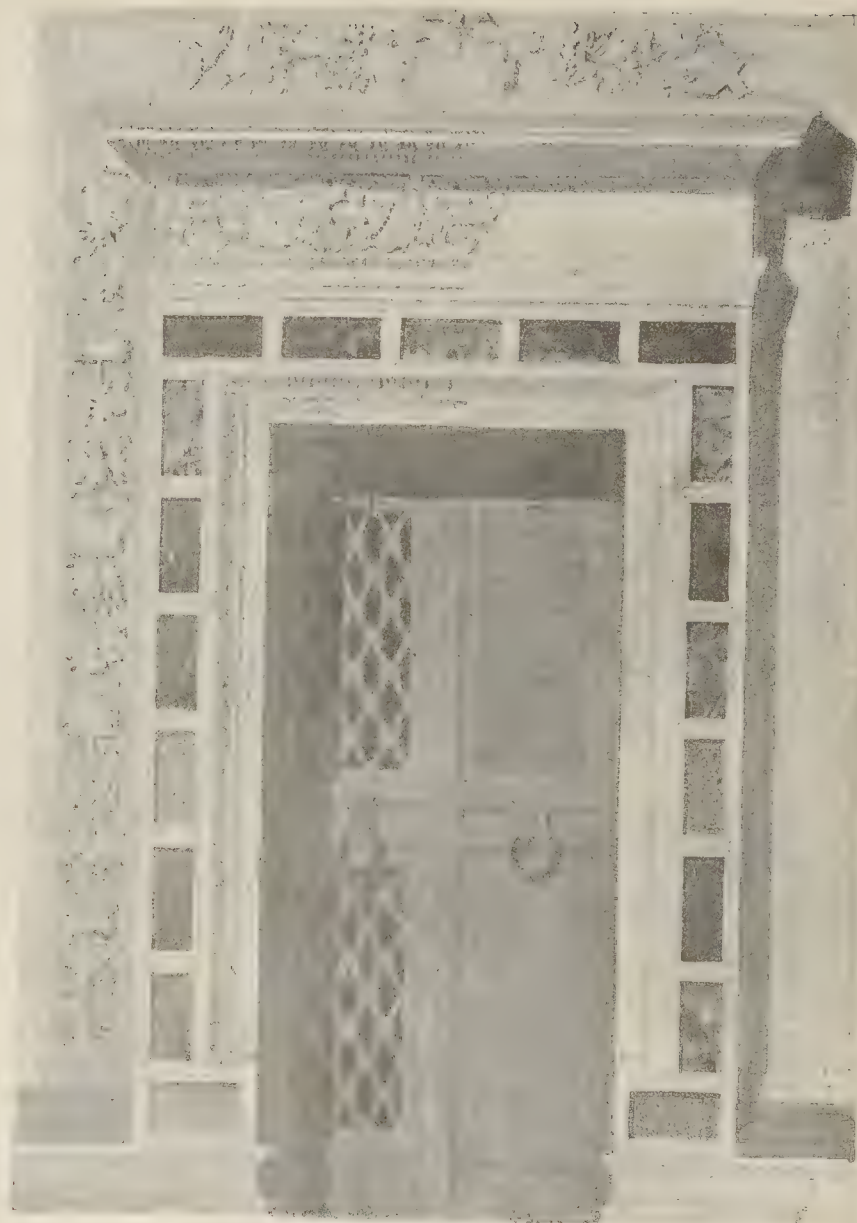


CHURCH OF ST. ALBAN, TEDDINGTON.—MR. W. NIVEN, F.S.A. ARCHITECT.  
WEST ELEVATION AND PLAN.

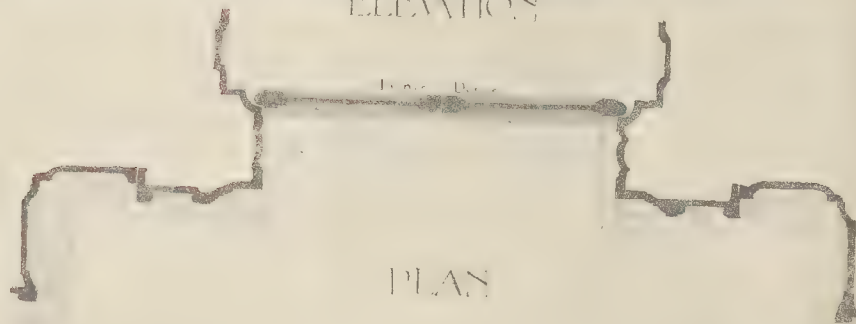






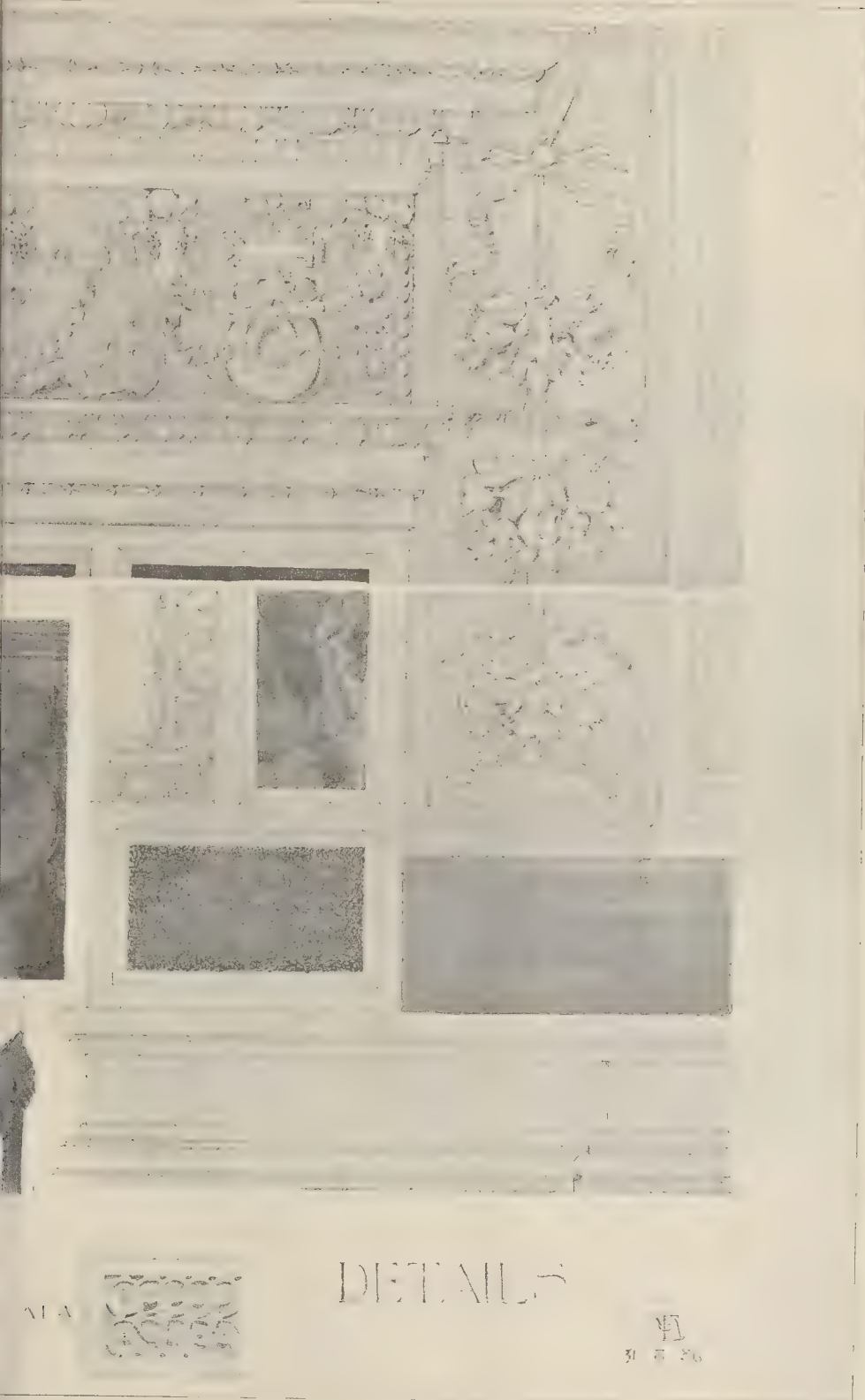


ELEVATION



PLAN



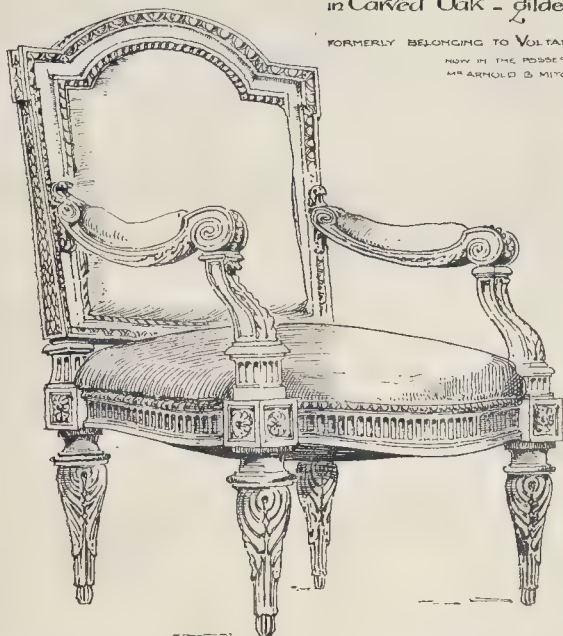






### Old French Chair in Carved Oak - gilded.

FORMERLY BELONGING TO VOLTAIRE  
NOW IN THE POSSESSION  
OF ARTHUR & MITCHELL



We only had to set to work with some bats and closers, and build footings up against the pier just as it stood. When the surveyor saw these footings, he was perfectly satisfied, and rather complimented me on the rapidity with which the work had been done; and I may say that I am a great believer in pushing work on rapidly, although this should, of course, be done with proper discretion. For instance, when the architect or surveyor is absent, you cannot go to work too quickly in using up your place-bricks, faulty stone, and green timber, provided that these things do not show too conspicuously in the building. But when a surveyor is looking on, you must let him see good materials being used, and then you don't want to work quickly, because you must not use them up too fast. But it is as well to let your men make as much noise and dust as possible, because these things help to keep inquisitive people away. As a rule it is better to make the works difficult of access to visitors, and for this purpose mortar, lime, and stacks of bricks may form useful impediments to a tour of inspection. Many persons are in favour of not laying any planks across naked flooring, or only a single plank at most, if wheelbarrows have to pass over. I know that this plan has its advantages. It may prevent an elderly or timid surveyor from inspecting some parts of a building, especially if he would have to walk over joists about an inch thick and loose at one end. But, on the other hand, such an arrangement might cause an accident to one of the men, and it is just as well to remember that there is an Employers' Liability Act. For my part, I am in favour of putting down plenty of planking because it helps to hide the sloppy timber.

I have referred to the necessity of pushing on the works rapidly, and that, of course, in a judicious way. Sometimes it is necessary to make a good show of work in order to get a payment from the building-owner. I was once building a terrace of ten houses. I had got them all roofed in, and the architect said he would certify for another payment as soon as the sashes were fixed. When he came down to inspect the works, I had just got enough sashes on the site for two houses; so I told him that all the sashes were just then being fixed. When I took him into the first house he saw the sashes, which had just been fitted into the openings, and the same in the second house. I kept him in the second house, talking to him and

pointing out the beauties of the work here and there, while my men took the sashes out of the first house, and were busy fixing them in the third house when the architect and I went into it. In this manner, we went over the whole terrace (for the architect was a most particular man); and, when I had shown him all that I wanted him to see, I got him to jump into my trap, which I had ordered to be ready at the end of the terrace, and I drove him to the railway station by what I called a short cut, so that he did not pass the works. The next day he sent me the required certificate. Thus, my readers will see that, by the exercise of a little tact and ingenuity, I have been able to conduct my business with satisfaction to others as well as to myself.

A. JERRY.

#### OLD FRENCH CHAIR.

THIS is an example of a late French Renaissance chair said to have been at one time the property of Voltaire. The treatment of the legs is weak; otherwise it is a good example of the style and date to which it belongs.

#### NEW SANITARY DEPÔT AT HORNSEY.

MR. H. R. WILLIAMS, the Chairman of the Hornsey Local Board, gave the following address descriptive of the new sanitary depôt at Hornsey, on the occasion of its formal opening on the 13th inst. by Mr. R. D. M. Littler, Q.C., Chairman of the Middlesex County Council:—

"One of the chief difficulties besetting local authorities in their efforts to promote more perfect systems of sanitation is, to know what to do with the contents of the domestic dust-bin, which too often is the receptacle of every kind of accumulated garbage, and not unfrequently becomes, from its contiguity to the dwelling-house, a veritable death-trap. Sanitary engineers and scientists have long devoted their energies to minimise the danger arising from this unsavoury receptacle, and to devise means for dealing with the noxious matter which it contains without creating fresh nuisance, but the only successful plan as yet proposed for efficiently dealing with it is that of burning.

This subject had for some time engaged the

attention of the Hornsey Local Board, while the ever-increasing annual cost for the collection and removal of house refuse formed a heavy item in their successive balance-sheets. As the Sanitary Authority of the District, it appeared to the Board that their primary duty was to obtain the best information possible upon this grave and, for the most part, neglected subject. They accordingly instructed their engineer, Mr. T. de Courcy Meade, to visit the various towns in which the dust destructor (or as it might be more aptly designated, the 'dust purifier,') was in use with more or less success, and to report to them generally upon the subject. After extensive inquiries, and with the assistance of the best engineering and scientific advice they could obtain, they at length resolved to build what, with the surroundings, may be called a sanitary depôt, the principal item of which forms a destructor for the economic dealing with the dust and house refuse, which will henceforth be collected by their own staff, brought to the depôt in covered carts, and at once tipped into the furnaces, no accumulation whatever being allowed. The importance of this step will be best understood by sanitarians, when it is mentioned that the population of the Board's district, which in 1881 was 22,485, is now estimated at 43,000, the number of houses having increased in the meanwhile from 4,043 to 7,400.

Having acquired the necessary land, the Board, in the first instance, erected a public mortuary, with coroner's court, a waiting-room, two mortuary chambers, post-mortem rooms, laboratory and caretaker's cottage.\* Subsequently a range of buildings, containing steam laundry, disinfecter, fumigator, and ambulance sheds were built, together with a range of stabling for twenty horses and a horsekeeper's cottage; finally, the buildings in which we are now met, for the treatment of house refuse, viz., furnace-house, engine-house, cremator, mill-house, boiler-house, cart-sheds, smithy, carpenters' workshop, stores, and a chimney-shaft which stands on the north side of the boiler-house, and is a fine specimen of the builder's art.† It was erected principally with London stock bricks. Its total height from the bottom of foundation to the coping is 244 ft., the height from the ground line to top of coping being 217 ft. The outside diameter at ground surface is 18 ft. 3 in., the inside diameter 12 ft. 3 in. The foundation bed is of clay, 27 ft. below the ground line; on this a block of concrete 59 ft. square is laid, containing 927 cubic yards of Portland cement concrete; the brick footings are 33 ft. square at the base, and are built up to ground line with regular offsets. The total weight of the shaft above the concrete is 1,141 tons. In the construction of this chimney 300,000 stock bricks were used, 16,000 blue bricks, 14,000 fire bricks, and about 3,000 glazed white bricks. The weight of the Portland stone cap is 24 tons. Special care has been taken to protect the shaft from lightning. The time occupied in building the shaft was a little over five months. It was commenced in July, 1888, and finished in December. The bricklaying was continued all through the foggy weather, the workmen having a clear light at 150 ft. high, although they could not see through the fog below.

The refuse furnaces at present consist of six separate cells, forming a block of brickwork 25 ft. long, 24 ft. 6 in. wide, and 10 ft. high, to which others can be added if necessary. The doors have wrought-iron baffle-plates perforated for the admission of air to keep them cool. The top of the furnaces forms a level platform from which they are fed with refuse through hoppers. On each side of the hoppers are cast-iron doors for the inspection of the gases passing from the furnaces before entering the cremator. The gases are conducted from the furnaces by a large flue to the cremator (the invention of Mr. C. Jones, C.E., of Kaling), where they are subjected to a temperature of about 1,600 deg. F.; they are conducted from thence either through a by-pass flue, or round the inner of a Babcock & Wilcox's multibutular steel boiler to generate steam which is conveyed to the engine-room for working a horizontal high-pressure expansion engine. In the flues three dust traps are constructed with baffle-walls to check the rush of dust along the flues. Pits are placed in front of the baffles with sliding covers, so that any dust which finds its way into the flue is quickly precipitated into these pits, from

\* Plans and descriptions of these buildings were given in the *Builder* for February 3, 1887.

† Described in the *Builder* for January 28 last, in a letter by Mr. R. M. Bancroft.



which it can be easily removed without stopping the working of the furnaces. In connection with the large steam-engine there is an exhaust injector, fed from a thousand-gallon tank direct into the boiler by means of exhaust steam, at a temperature of 100 deg. The mill-house contains an ordinary mortar-mill for making mortar, the clinker, when ground, forming an excellent grit for that purpose; also a clinker-mill for breaking the clinker into small pieces suitable for concrete, the gritting of roads, and other purposes. The bulk of clinker and fine ash is about 25 per cent. of the refuse consumed, and consists of a mass of fused matter, all organic substances having been consumed by the intense heat in the furnaces, which decomposes the offensive material contained in the collected refuse. Ample space is provided in the yards for storing the clinker, which will be used principally in the making up of roads and footpaths, for which it is admirably suited.

The machinery connected with the destructor works was supplied by Messrs. Goddard, Massey, & Warner, of Nottingham. The shaft and other buildings connected with the destructor were erected by Mr. Charles Wall, of Chelsea, and cost, with the machinery and extra foundations, 8,066*l.*; the stabling, cart-shed, and stores, were built by Messrs. Rudd, of Grantham, and cost 1,840*l.*; the mortuary buildings cost 2,800*l.*; the total cost of the land (exclusive of three-quarters of an acre conveyed to the Board in exchange for the site of the old lock-up), amounted to 950*l.* The whole of the buildings have been erected in a substantial manner, and from plans prepared by the Board's engineer, Mr. T. de Courcy Meade, to whom much credit is due for his skill and painstaking care.

The "destructor" and its accompanying arrangements appear to act very perfectly, and without nuisance. On this point it was stated that the "destructor" had already been at work for two months without the residents in the neighbourhood being aware of the fact, and that there had been no complaints, although, now that the public opening has taken place (Mr. Williams slyly remarked), the Board expect to receive complaints. Horsey, it appears, is highly favoured in that its rates are low, although its sanitary condition is very well cared for; but it was explained that, although the rates were low now, they were once higher, owing to the heavy first cost of efficient sanitary works. Permanent economy of administration, it was remarked, was dependent upon wise and judicious, even if heavy, expenditure at the outset; this, at any rate, was declared to be the experience of Horsey.

#### CRYSTAL PALACE SCHOOL OF ENGINEERING.

ON Saturday this institution completed the seventeenth year of its existence. Mr. James Abernethy, C.E., F.R.S.E., Past President of the Institution of Civil Engineers, presided, and presented the certificates awarded by the examiners, who were on this occasion—for Mechanical Engineering, Mr. D. K. Clark, C.E., M.E.; Civil Engineering, Mr. R. Barker, C.E.; Electrical Section, Mr. Leonard Milne, B.A., B.E., &c.

The retrospect suggested by the close of another year shows a remarkable development in the number of pupils attending, and in the scope of the instruction and training imparted. The school opened seventeen years ago with nine pupils; when Mr. Abernethy presented the certificates twelve years ago the number of students had increased to fifty; during last term the number of students in attendance was one hundred and seven. As regards scope of instruction, new sections have been added to the original course, viz., the Colonial, Electrical Engineering, and Marine Engineering sections.

Mr. Shenton read the Examiners' report, which was highly laudatory of the character of the school, and of the course pursued by Mr. Wilson, the Principal, and his staff, and commendatory of the work of the students in the various departments.

Mr. Abernethy, in a practical address, urged the students to make the most of the great advantages they enjoyed in the thorough system that they passed through in this school; to remember also that these must be supplemented in after-life by incessant and vigilant study of engineering progress. After nearly half a cen-

tury's practice, he found watchful observation and study necessary to keep up with the times. Engineering was eminently a progressive science, of which they had a notable illustration, as regarded iron bridge-building, in the contrast between the Menai Bridge, which was considered an engineering triumph in its day, and the Tay and Forth bridges of our time. In other structures, also, enormous advances in the science of construction were being made continuously, which must be carefully noted by the successful engineer. The certificates were then presented to the students.

The lectures for the term were on "Materials and their Manufacture." The highest number of marks attainable was 284. Fifty-eight students attended the lectures; fifty were eligible for examination; twenty-seven passed with a sufficient number of marks to entitle them to a certificate. Mr. F. W. Wheadon was first with 249 marks; he was also equal first for work in the fitting shop, Mr. E. V. Acton being bracketed with him. Fourteen certificates were awarded for work in the drawing office, Mr. R. W. Mandelay first. Twenty certificates were awarded for work in the pattern shop, Mr. A. Woodhill first. Seventeen certificates were awarded for work in the fitting shop, first named above.

In the Civil Engineering Section, twenty-two certificates were awarded, the firsts in the three terms being, respectively, Messrs. E. M. Pross, A. M. Struben, and R. B. Motley.

In the Electrical Engineering Section, eight certificates were awarded, Mr. E. C. R. Nelson first. Mr. Nelson was also awarded the Bronze Medal of the School, being the fifth student who has achieved this distinction, the necessary condition being the award, during the student's course, of nine certificates, none below the third in order of merit.

Mr. E. B. Hall was awarded a certificate in the Marine Engineering Section; as were six students in the Colonial Section.

Brief appropriate addresses from Mr. Wilson, the Principal, and Mr. Barker, Examiner, brought the proceedings to a close.

#### SURVEYORSHIPS.

*Appointment of Surveyor to the London School Board.*—At the meeting of this Board, on the 19th inst., the Works Committee reported as follows:—"In accordance with the resolution of the Board of Nov. 14, 1889, the Committee have inserted advertisements in the *Times* and five other weekly journals, inviting applications for the appointment of Surveyor to the Board. In reply, the Committee have received seventy-three applications, and nine of the applicants were selected and seen by the Committee. They now beg leave to recommend for appointment Mr. W. S. Cooke. Mr. Cooke is 45 years of age, was for 7½ years engaged in making surveys and valuations for the Great Western Railway Company, and has since been engaged in private practice. The Committee recommend:—

"That in accordance with the resolution of the Board of November 14, 1889, Mr. W. S. Cooke be, and he is hereby appointed Lead Surveyor and Valuer to the Board, at the commencing salary, under the scale, of 500*l.* per annum; that he be required to give his whole time to the service of the Board; that the appointment be on probation for a period of twelve months; and that it be subject to three months' notice on either side for its termination.

"That the engagement of Mr. Cooke, referred to in the preceding resolution, be subject to the resolutions of the Board of January 26, 1888, with reference to the superannuation scheme, and also subject to the production of certificates of health and of birth."

This was agreed to.

*Darlington.*—A special meeting of the Darlington Local Board was held at the Town Hall on the 19th inst., for the purpose of electing a Surveyor in the place of Mr. Debnay, resigned. The Clerk reported that thirty-three applications had been made for the position, and it was decided to reduce them to five. The voting was by ballot, and in the end ten members voted for Mr. J. C. Joyson, of Darlington, and ten for Mr. A. Wilkes, of Wilehall. The Chairman gave his casting vote in favour of Mr. Joyson, who was declared elected. The salary commences at £120 per annum.

*Torquay.*—At a meeting of the Torquay Local Board a few days since, considerable discussion took place upon a motion by Mr. Allans in regard to the recent increase of the salary of Mr. Hall, the Surveyor, from 350*l.* to 450*l.* a year. It was proposed that the resolution adopting this should be rescinded, and that the question of the increase of salary, and also of

the sum to be paid the Surveyor for past services in respect of the harbour works, should be referred to a committee of the whole Board to bring up a special report at the next meeting, and, if possible, to propound some legal mode of liquidation of the last-mentioned matter.—Mr. Tripe seconded the motion.—The Chairman remarked that the present arrangement was satisfactory neither to the Surveyor nor to the public, and he supported the proposal to refer it to a committee of the whole Board.—Dr. Richardson explained that it was not intended to increase the Surveyor's salary for any length of time, the extra 100*l.* a year being to pay him a sum of money owing to him which they could not pay him otherwise without acting illegally. Mr. Allans's motion was defeated by nine votes to two.

*Johannesburg (South Africa).*—The *Johannesburg Star* of the 27th ult. says:—"The Sanitary Board took a very important step yesterday afternoon in the appointment of a Town Engineer and Surveyor. The salary of the new officer is 1,200*l.* a year. The post seems to have been a much-coveted one, there being no fewer than twenty-nine applications sent in. From these thirteen were selected, and yesterday afternoon the Board met in committee for the purpose of making the final selection. The number was by degrees reduced to two, the choice lying between Messrs. W. H. Miles and De Villiers. On a ballot Mr. Miles was elected, and the appointment will have to be ratified by the Board at its ordinary meeting on Monday next. Mr. Miles is comparatively new to Johannesburg, having arrived here but a few weeks ago. Some years ago, however, Mr. Miles was Town Engineer at Port Elizabeth, so that he is by no means unacquainted with South African life and manners. He comes with the best of credentials. For some years Mr. Miles was in practice at Bournemouth with his brother, Mr. C. T. Miles, as engineers and architects, and during that time he had, in addition to the usual fashionable sea-side practice, the management of several large estates in that and neighbouring counties. Singularly enough, during a portion of the time Mr. Miles was in practice at Bournemouth, Mr. Andrews, the new General Manager of the Waterworks Company, held the appointment of Town Engineer; and he is, therefore, able to speak from personal experience of the excellence of Mr. Miles's work and of his entire fitness for the post to which he has just been appointed."

#### EXAMINATIONS FOR PUBLIC SANITARY INSPECTORS.

ON Saturday evening last, at the meeting of the Association of Public Sanitary Inspectors of Great Britain, held at Carpenters' Hall, the discussion on the papers read by Mr. Hugh Alexander and Mr. Robins† was resumed, Mr. Robins again attending and Mr. Alexander again presiding. Before Mr. Tidman, C.E., the first speaker in the debate, was called upon, a letter received from the Clerk of the London County Council was read by Mr. Legg, the hon. sec., replying to a letter to the County Council from the Association, calling the attention of the County Council to the desirability of a consolidation of the various Sanitary Acts. The London County Council states that its Sanitary Committee has from time to time considered the matter to which attention was called, and that it would continue to make every effort as opportunity occurred to remedy the unsatisfactory state of the law.

Mr. Tidman, in resuming the discussion, expressed the opinion that the constitution of the examining body of the Sanitary Institute would be greatly improved by the exclusion of some of its theoretical elements in favour of practical ones, by the admission to seats at the Board of men having a sound knowledge of the actual duties that the sanitary inspector was called upon daily to carry out. As an inspector of dead meat he had to have the knowledge both of a butcher and a veterinary surgeon, and in other circumstances he required the knowledge of a chemist as well as that of a plumber, a builder, and a decorator. The work of the sanitary inspector was of vast importance to the community, and if candidates possessing merely the certificate of the Sanitary Institute were to

\* Mr. G. E. Andrews was subsequently, for a few months, Borough Engineer of Brighton, a post which resigned to go to Johannesburg.

† See *Builder* for Dec. 14, p. 422.



be accepted by the community as competent for the proper performance of the duties of the office, a severer test than that at present applied ought certainly to be required from the Sanitary Institute.

Similar views were expressed by Mr. Davenport, C.E., Surveyor and Sanitary Inspector, by letter; and in the discussion by Messrs. Edwards (Southwark), Osborne (St. Pancras), Fairchild (Clapham), Legg (secretary), and other members, and by Mr. Hugh Alexander, the Chairman, who wound up the discussion before calling upon Mr. Robins to reply. Mr. Fairchild pointed out that in corporate subjects the City and Guilds of London Institute did exact such preliminary practical knowledge as they were contending for in their candidates, and he could not see why the Sanitary Institute should not follow that good example.

The Chairman said he was satisfied with the course of the discussion on the subject, and with the comments *à propos* to it which had appeared in the *Builder* and other organs of the press. The discussion could not fail to prove of the highest service. Mr. Legg and others had pointed out the desirability of having members of the Association upon the Board of Examiners of the Sanitary Institute; and a younger Association than theirs, which had done the latter the honour of copying it in almost everything, had demanded from the Institute that two members of their body should be placed upon the Board. In the medical and other professions, men without practical knowledge would never be permitted to practise; and seeing to what an extent the care of the public health was committed to the sanitary inspectors, it ought to be considered equally intolerable to admit men to practise the duties they had to perform. How was it possible that such duties could be properly performed where there was no special training beyond a three months' course of cram, not above the capacity of a retired soldier, a railway porter, perhaps a tinker, or a tailor? He agreed with Mr. Richards (Battersea) in believing in the necessity of pressing forward towards a higher degree of education and towards an accord with the Sanitary Institute, but he also agreed with the remarks of the Secretary (Mr. Legg) in thinking that more confidence would be inspired in the certificates and the examinations of that body if its board of examiners were more largely composed of practical men.

Mr. Robins, on rising to reply, said he felt justified in thinking the members of that Association regarded him as a friend to them, whatever might be the result of the discussion, and however much they might differ in opinion. He reminded them that he had declared that in his opinion, certainly, practical knowledge was necessary for the sanitary inspector to enable him to do his duty, and that he had looked to them to furnish him with certain information to enable him effectively to maintain that position. He had wished them to point out by reference to their actual work what kind of practical knowledge was required, and to what extent it should be considered an essential. He had not got much information, and he confessed that, judging from the earlier portion of the discussion, he did not expect to get much from them. For that reason, he had asked for a copy of the last report of as many of them as possible to be sent to him at his office, so that he might be able to judge to what extent the sanitary inspector should know "Building Construction." Only four papers had been sent in, viz., from St. Giles's, from Leek, from St. Mary's, Battersea, and from their Chairman (Mr. Alexander). He considered it very important, if he was to defend the question for them, that they should furnish him with those papers. There were members of the Institute who held the opinion that it was not necessary for those seeking inspectorships to have that technical and practical knowledge which they and he insisted upon in order to enable the men appointed to carry out properly their duties; and papers such as he had asked for would have enabled him to meet the arguments of such members. The Association would do well to see what could be done to get people outside itself to support its views. He had suggested the Royal Institute of British Architects because it would have more influence for their benefit than any other body. It might be true that not every British architect had so extensive a knowledge of sanitary science as was desirable. The British architect ("many of us," said the speaker) did not know much

about it many years ago, but he had learned a good deal since then, and they (the sanitary inspectors) would have to learn a good deal more too. It would not be just in him (the speaker) to take the lowest man among them and hold him up as an example of the sanitary inspectors as a body, and they must not take the lowest of the British architects to represent the Institute. It had men on its Council who were determined to press forward the claims to consideration of sanitary science, and who had proved themselves among its best friends. Some remarks had fallen from their Chairman with reference to a proposal he believed of Sir Edwin Chadwick (the whole country knew how much they all owed to Sir E. Chadwick) to apply to Mr. Ritchie to receive a representation. But much care should be taken as to the manner in which they made the application. If it was to meet with perfect success, it must be supported by facts gathered outside their Association. There was not the only body interested in the matter, and a representation from it should be accompanied by representations from other bodies. These representations should be made not only through the Royal Institute of British Architects, but through the Surveyors' Institution and the Sanitary Institute, as well as through the Association. If all these bodies were to come in to help them, the representations of the Association would be much stronger. The Chairman (Mr. Alexander) had reduced the whole contention to the question of the examination tests of the Sanitary Institute, which, he maintained, ought to exact more practical knowledge from candidates. If only those who had practical experience, or held the certificate of the Science and Art Department, could receive the certificate of the Institute, then in future no candidate possessed of a less qualification could be admitted. Such a change would require the most serious consideration. That proposition made in favour of having two grades in their own (the Association's) constitution. He was of opinion that the first step to take was to apply to the Royal Institute of British Architects for a definition of the status of the Sanitary Inspector, and he would conclude by proposing a resolution to that effect. He was very hopeful that they would get a leg-up from the Royal Institute of British Architects, and that they might have the same reason to feel grateful for its intervention as the Willesden Board. That Board having a great deal of land to let, and a great many houses to build upon it, had sent to ask the Royal Institute if it would tell them what sort of person they ought to appoint as Surveyor of these new buildings. It had done so with the best results. The Royal Institute of British Architects might be trusted not to favour the employment of incompetent inspectors. He was glad to learn, as he had that night, that they (the public sanitary inspectors) looked to the Sanitary Institute to be their leader. It had architects, engineers, and professors of hygiene among its members, and a number of their own body. If the Sanitary Institute opened its doors entirely to them it would do others—to the Institution of Civil Engineers as well as to the Royal Institute of British Architects, and the Institute of Surveyors. It must not be supposed that he was the mouth-piece of any of these bodies. He did not represent the Sanitary Institute in any way. The Institute left him to do as he pleased. He might have his own opinion upon any of these matters; he should have the task of defending them (the members of that Association) rather than anything else. He represented himself and no other body. He was of opinion that the public sanitary inspectors should receive greater consideration. They did the dirty work and should have the benefit of their devotion, and all the consideration should be shown to them that might be shown to others. Mr. Robins then concluded by proposing the following resolution:—"That the Council of the Royal Institute of British Architects be asked to define the present status of the sanitary inspector; and having regard to the obvious intentions of the Sanitary Acts of Parliament, the experience of their working since acquired, and the duties actually devolving on such officers, to further define what ought to be the qualifications of candidates for the said office."

The Chairman suggested that it would be better to refer the resolution to the Council of the Association for consideration before proposing it as a resolution to the general body, and a number of members preferring that the

resolution should be put forthwith, the Chairman's proposal was made an amendment. Both motion and amendment having been seconded, the amendment was put first, and carried by fourteen votes to eleven. It was then put as a substantive resolution and carried (*nom. com.*), Mr. Robins agreeing that the best course had been adopted.

The business concluded with a cordial and special vote of thanks to Mr. Robins. Mr. Robins having acknowledged the vote, and some announcements having been made by the Chairman and the Secretary, the proceedings closed.

#### PROPOSED AMENDMENT OF THE METROPOLITAN BUILDING ACT.

SIR,—Having been away for some time, I have not had an opportunity of seeing the wording of Clause 70 in the above, referring to the limit of height of new buildings, and to which you call attention in your leader of this week.

There can be no doubt that this clause may have, if not very carefully considered and worded, a most pernicious effect on the future of our street architecture.

We are but now escaping from the dreary and monotonous horrors of Belgravia or Bloomsbury, flanked by long lines of level topped ugliness, each house front no better than a rectangular box with holes in it.

Surely it would be reasonable to make the limiting height line proportioned to the width of the street; and so to word the clause that where, as in many cases, every inch of height must be used, gable-fronted houses need not be prohibited. It might be specified that the total area of the house front should not, when reduced to a rectangle, exceed some limiting line of height. When gables were wanted, their apices would exceed the limiting line, but the springing must necessarily be below that line. A street would be far less blocked in by gables thus springing below and rising above a line of, say, 70 ft., than by a range of buildings all terminating with a monotonous horizontal line, 70 ft. above the street.

SOMERS CLARKE,

15, Dean's-yard, Westminster, S.W.  
December 21, 1889.

#### FRENCH BUILDING TERMS IN MASONRY.

SIR,—I think the definitions of "pierre de taille" and "moillon" given by you in your issue of December 14th last the correct ones, and in support of this will, with your permission, quote the following extracts from the "Devis et Cahier des charges" for the construction of "Etablissement de la distribution d'eau" of the town of Lille.

Art. 65.—"Les parements vis de briques ou de moillons seront établis légèrement en retraite sur ceux de la pierre de taille. . . . Les lits de rangées de briques et de moillons réguliers seront établis en prolongement de ceux des chaînes en pierre de taille, de telle sorte que plusieurs rangées correspondront toujours exactement sans sautes à une assise de pierre de taille, et se raccorderont régulièrement avec elle."

Art. 64.—"On pourra exiger à volonté pour chaque espèce de taille que la surface du parement vu soit unie ou ciselée sur . . ."

And in the "Bordereau des prix" is the following item:—

"Le mètre carré de taille fine de pierre de Saligny ou de Maffes applicable aux parements vis, avec ou sans moulures."

Art. 51.—"Les moillons bruts . . . seront . . . bien gisants, présenteront des arêtes et des angles vifs et devront cuber 8 décimètres cubes au moins . . ."

Art. 62.—"Les enrochements et blocages de fondation seront exécutés en moillons de la plus forte dimension des canivères d'—"

Art. 63.—" . . . ces moillons seront posés, suivant leur lit de canivère, normalement aux surfaces à revêtir dans toute l'épaisseur de la maçonnerie, en menant de front le remplissage et le parement, de manière à former une bonne liaison entre eux."

From this it would appear that "pierre de taille" is the French equivalent for all masonry of large worked stones laid in even courses, whether ashlar, block facing, or moulded work; and "moillon" that for rough walling in foundations, backing, or random facing.

The past participles "ébousinés" and "dégauchis" are both used in the document quoted from as follows:—

"La pierre de taille blanche. . . . sera ébousinée à vif et . . ."

"Les lits et les joints seront parfaitement dégauchis dans toute l'étendue des surfaces de contact."

FREDERIC ELIE GAY.

"Ébousinée" is the spelling in the best French dictionaries.—Ed.



# THE LONDON COUNTY COUNCIL AND THE PURIFICATION OF THE THAMES.

SIR.—The action of the London County Council, as reported on page 446 of to-day's *Builder*, in regard to the purification of the Thames, is worthy of the highest commendation. The Metropolitan Board before it finally expired set up its own *memento mori* in the shape of a couple of "white elephants" for the Londoners to stare at Barking and Crossness, in the belief that the sanctity of the animals was so great that none would dare to do aught than reverence them. A second Alexander, however, has arisen who has quietly passed his sword through them both, and nothing now remains but to dispose of their carcasses to the best advantage.

As this appears during the festive season, I beg to propose the health of the London County Council, coupled with the name of Councillor Eneas Smith. My reason for doing this is because the question of the purification of the Clyde has for a number of years back been troubling the minds of the citizens of Glasgow. The opinions of two of the most eminent engineers of the day were got as to the best solution of the problem; but, on the plea of expense, the community that aspires to the rank of the second city in the Empire has refused hitherto to rise to the situation, and for the last fourteen years has done nothing. Now, however, it is thinking of making a pretence of doing something. It is going to experiment! It will follow the admirable example of the Metropolitan Board,—at a respectful distance, of course,—and get a nice little white elephant of its own stabled at the east-end of the city; but how the discharge from this curiosity is to be anything better than pouring a teaspoonful of questionable water into a bottle of ink, I cannot conceive. This elephant is to cost about 49,000*l.* or 50,000*l.*, independent of food and attendance. It may be expected, however, that the action of the London County Council on the 17th inst. will cause the Council here to pause before committing itself too far.

Glasgow made a mistake already at its East-end, when it allowed the weir to be taken down. The setting up of chemical precipitation works there for a fifth part or so of the city sewage would be another mistake.

The pollution of the Clyde by chemicals and sewage effluent is not solving the problem of its purification. It would only be a piece of municipal jerry-work, and the Council condemns this sort of work when done by other people.

If Glasgow is not yet prepared to face Sir John Hawkshaw's scheme, carried out on the lines now proposed for London, and which are the same as what have been already advocated for Glasgow, it had better wait a few years longer, and then it will have saved up as much as will pay for the whole of it.

W. P. BUCHAN.

Glasgow, Dec. 21, 1889.

## CHURCH BUILDING NEWS.

**Ilminster.**—On the 4th inst. St. Mary's Church was re-opened, after extensive alterations and improvements. The whole of the church has been re-floored, the vaults filled in and concreted, and new heating apparatus (supplied by Messrs. Collins & Co., Bristol) provided. It is intended to replace the old pews with open benches of oak. The work has been done by Mr. A. Poole, of Ilminster, under the supervision of the Diocesan Architect, Mr. J. D. Sedding. The cost of the alterations will be about 1,500*l.*

**Kingston-on-Thames.**—The new Church of St. Luke, of which the foundation-stone was laid in November, 1888, was consecrated by the Bishop of Rochester on the 14th inst. The style of architecture is Gothic, of the thirteenth century. The plan comprises: nave, north and south aisles, the dimensions of which are 75 ft. 6 in. long by 57 ft. 6 in. wide; chancel, with apsidal termination, 30 ft. by 23 ft. 6 in., having organ-chamber, 12 ft. 6 in. by 12 ft. 6 in. on the north side, and chancel-aisle, 14 ft. 6 in. by 14 ft. 6 in. on the south side. Opening south of the chancel-aisle is a small vestry. This vestry will be a vestibule to a large choir-vestry and parish-room not yet completed. The height of the nave-roof is 60 ft., and the height of the chancel-roof 43 ft. The height of the tower and spire when completed will be 141 ft. In the tower, fixed temporarily, is a bell by Messrs. Warner & Co. The entrances are from a porch opening into the north aisle, and a western door opening into the centre of the nave. The nave arcading consists of five bays, having the arches in three orders, supported by quatrefoil shafts, with carved caps and moulded bases. The stone label terminations to nave arcading are carved, with heads. The chancel arch is supported by shafts

with carved caps and moulded bases. Arches open from the organ-chamber into the chancel and north aisle, and from chancel aisle into chancel and south aisle. The arches are to be filled in with oak screens. The roof principals of the nave and chancel are supported by stone shafts, having moulded and carved corbels, bands, and bases. The stone corbels in chancel are carved with angels bearing emblems of the Passion. The roofs throughout are open-frame-timbered. The nave and aisles have framed principals. The chancel roof has moulded curved ribs, filled in between with diagonal boarding, and has a moulded embattled cornice. Five traceried windows light the chancel, lancet windows light the aisle and clearstory, and a large group of lancet windows light the nave from the west end. The porch and west doors have the orders supported by stone shafts with moulded and carved caps and bases; over the west doorway is a traceried panel having the emblem of St. Luke, with carved foliage. A low traceried stone screen divides the chancel from the nave. On the south side of chancel is a carved stone sedilia, and on the north side a carved stone credence niche. The altar-steps are of polished white veined marble. The moulded oak communion-rail is supported by wrought metal standards. The font, placed near the end of the north aisle, has a carved alabaster bowl supported by eight Devonshire marble shafts resting on a green marble base. The cover is of oak, and is to have ornamental wrought-iron scrollwork on it. The choir-seats and prayer-desks are of oak, with carved ends and traceried fronts. The nave seats are open deal benches, with traceried fronts. The doors are of oak, and have ornamental wrought-iron hinges and furniture. The church is built in brick, and faced throughout with selected red facing bricks, and moulded red string-courses, weatherings, and abaci, and with stone dressings. The roofs are covered with green slates, with red ridgings. The east and west ends, also porch and chancel aisle, have floriated stone crosses. The chancel has a wrought-iron floriated cross. The passages of aisles and nave are paved with wood blocks, laid herringbone pattern, with straight borders. The chancel and porch are paved with Maw's red encaustic tiles. The organ has been constructed by Mr. C. H. Walker, Manchester-street, London. The architects are Messrs. Kelly & Birchall, of London. The contractor for the whole of the works was Mr. W. H. Gaze, of Union-street, Kingston-on-Thames. The contracts, without the tower and spire, amount to 5,139*l.* Messrs. Jones & Willis supplied the wrought-iron work, and executed the font from the designs of the architects. The heating has been carried out by Messrs. Green & Sons, Blackfriars-road, London; and the whole of the stone carving was executed by Mr. Millburn.

**Reading.**—On the 2nd inst. Her Royal Highness Princess Beatrice (Princessa Henry of Battenberg) visited Reading to open a bazaar in aid of the funds for the restoration of the Church of the Holy Trinity, Reading. The bazaar realised 500*l.* The parish is very poor, and is one of the largest in the Diocese of Oxford, having a population of 7,000. The church was in a dangerous condition, and has recently been restored at a total cost of 1,900*l.*, by Messrs. Wheeler Bros., from the designs and under the superintendence of Mr. Geo. W. Webb, architect, Reading.

## PROVINCIAL NEWS.

**Jarrow-on-Tyne.**—A large block of business premises has just been erected in Evison-street, Jarrow, for Messrs. Johnson & Armstrong, consisting of three shops, with show-room, work-room, and offices, &c., above. One of the shops has been specially designed and fitted-up for a butcher's shop, and lined with Minton's tiles and marble. The window sashes, of mahogany, are made to slide out of sight behind the fan-light of ornamental wrought-iron work and stained glass above. The bench is of marble upon a red granite base. Special over-head tramways are fitted up for moving meat to any part of the premises. The building, which is Renaissance in character, is of red bricks (Normandy), and Denwick-stone dressings. The whole of the work has been carried out under the superintendence of the architect, Mr. J. Walter Hanson, of South Shields; Mr. Hugh Shield being the clerk of works, and Messrs. Jas. Storar & Son, the contractors.

**Rotherham.**—At a recent meeting of the

Rotherham Board of Guardians, the recommendation of the committee was unanimously approved with regard to the proposed enlargement of the Workhouse. The enlargement includes taking down the greater portion of the present buildings, and providing new Tramp and Receiving wards, Lunatic wards, Board and Receiving Officers' rooms, Master's house and offices; Able-bodied Blocks for men and women, with large day rooms, children's and nursery day and night rooms, baths, lavatories, &c.; new Dining Hall to accommodate 350; kitchens, and scullery fitted with complete steam cooking arrangement, bakery stores, &c., also laundry, wash-house, &c., with steam washing appliances. The works also include new foul wards and isolation hospital, and workshops, stables, wood-sheds, &c., with complete re-arrangement of the whole of the drainage. The estimated cost of the above scheme is 22,000*l.* Mr. H. L. Tacon, of Rotherham, architect to the Board, has prepared the whole of the plans and specifications, which have been approved by the Local Government Board.

## STAINED GLASS.

**London.**—A stained-glass window has lately been placed in the chancel of St. John's Church, Deptford. The window is of two lights, and illustrates the subject of the presentation of Our Lord in the Temple. This is surmounted by canopy work in white and stain, according with the style of architecture of the church. The window was designed and executed by Messrs. Warrington & Co. of Fitzroy-square. The ceremony of unveiling the west window of Trinity Church, Tredgar-square, Stepney, recently took place. The window, which is of Perpendicular character, comprises three lights and traceries, and illustrates in eight subjects the Life of Christ. It is presented in memory of Mr. Peter Atrell, of Stepney, a constant worshipper at the church for many years, by several of his friends. The work has been designed and executed by Mr. F. W. Chowles, of Eversholt-street, Oakley-square.

**East London (South Africa).**—A large stained-glass window of three lights has been placed in the transept of St. Michael's Church, East London, South Africa, which is now being completed. The subject treated is "The Resurrection of the Dead," the centre light representing our Saviour in this aspect, and the side lights "Jarius's Daughter" and "The Widow's Son of Nain" respectively. A large side window has also been filled, the subject, which has been carried through two lights, being "Christ Blessing Little Children." Both windows are erected to the memory of the late Mr. C. Bradfield Brown, a sidesman of the church, and are the gift of the parents of the deceased gentleman. Messrs. W. James & Co., Kentish Town, were the artists who executed the work.

**Mayne, co. Westmeath.**—Stained glass has lately been inserted by Messrs. Chas. Evans & Co. in the east window of Mayne Church, to the memory of two sisters, at the cost of the congregation.

**Stourport.**—The east window of the old parish church of Astley has recently been filled with subjects illustrating "Christ Instructing His Disciples," the parable of the "Good Samaritan," &c., with an elaborate brass at foot recording that the window is erected to perpetuate the memory of the Rev. Henry Minford Cookes, forty-six years rector of the parish. The ornamental portions are treated in character with the Norman period of architecture, and the whole has been designed and executed by Messrs. Charles Evans & Co., London.

**New Premises in Cornhill.**—A very interesting ceremony took place on Friday, the 13th inst., at 39-41, Cornhill, E.C., the occasion being the setting of one of the large granite bases supplied by Messrs. Whitehead & Sons, of Aberdeen, which forms part of the main entrance doorway for the new premises of the Union Discount Company of London, Limited. The stone was set by Mr. William Dunn, in the presence of his co-directors, Mr. J. Macvicar Anderson, the architect, was unavoidably absent. The contractors, Messrs. William Cubitt & Co., of 258, Gray's-inn-road, were represented by Mr. Benjamin Hannen. Mr. William Lumsden is the foreman of works.



## The Student's Column.

WATER-SUPPLY. — XXVI.

WATER-RAISING (concluded).

**I**F to the present we have been considering the question of water-raising by means of power derived from the water, or the air as found in a natural state; but as has been pointed out it is only where circumstances and surroundings are favourable that these powers can be applied to pumping purposes.

The energy of heat is the only source of power used by man to any extent in those cases where natural power is not available, and without going into the problems connected with the science of thermo-dynamics, we may with advantage briefly consider its leading facts; for whether our prime mover be steam-engine, gas-engine, or hot-air-engine, its laws and principles apply equally, and in the same way to them all.

Heat is a state of being or a state of molecular motion (Osborne Reynolds); it cannot be seen, and its properties can only be inferred from its effects, and, as we know of no substance not in a state of heat, its properties may more correctly be said to be inferred from experiments on different intensities of the same state.

Heat is empirically measured by a unit, which in England is the quantity of heat required to raise 1 lb. of water 1 deg. F.

The first and most important law of heat is—the evolution of heat is proportional to the mechanical energy expended. From some beautiful experiments Dr. Joule (in whose death this year we lose one of our greatest physicists) found that the mechanical equivalent of heat, or one thermal unit for the latitude of Manchester, equals 772.43 ft. lbs.

The second great law of heat deduced from the principles laid down in 1824 by Sadi Carnot is thus expressed by Mr. William Anderson, M.I.C.E.\* “That the proportion of work which can be obtained out of any substance working between two temperatures, depends entirely and solely upon the difference between the temperature at the beginning and end of the operation.”

And the third great law is—that “Heat only flows down the gradient of temperature, and in any particular substance the rate at which heat flows is proportional to the gradient of temperature. Hence to get the heat from the source or furnace into the working substance a certain time must be consumed, and this time diminishes as the difference of temperature of the furnace and the working substance increases.”†

When heat is transmitted from one substance to another the substance that receives heat expands, as is well known; the whole of the heat received by the substance is not expended in increasing the volume of the substance, but may be said to be divided into three portions. The first is employed in raising the temperature of the substance; the second part is occupied in increasing the amplitude of the molecular vibrations, and thus giving the substance increased volume; while the third portion of heat is employed in doing work,—that is, in lifting the atmosphere. All substances expand under heat,—solids least, then liquids, and gases most.

The first law of heat enables us to judge from our coal consumption whether our engine is doing its duty to the best advantage.

The second law tells us that the whole of our engine's efficiency lies in the difference between the temperature of the air in which it is working and the furnace, on the one side, and that of the air and the exhaust steam, or the water from the condenser, on the other side.

And the third great law tells us that the hotter the furnace the shorter the time required to produce a given volume of steam; hence forced draughts.

To do more than briefly indicate the chief points as above, however interesting the subject may be, would be going away from the main object of these articles; but to the engineer, who has to select a motor for continuous work such as water-pumping required, the points indicated are of the very greatest importance.

If we take an indicator diagram from a properly-designed pump, we shall find that we obtain practically a rectangle, thus proving that

the pressure is uniform throughout its stroke, and it therefore follows from this that the very best engine for pumping purposes will be that one in which, by means of some device, the effect of the superfluous pressure of the steam on the piston in the first part of the stroke of expansion working is stored up to be given out later on, when the pressure in the cylinder is less, and by this means make the power uniform throughout the stroke.

The usual way in which this is effected is by means of a heavy fly-wheel, but as moving the weight of the wheel takes up a good deal of the power of the engine, a great many mechanical arrangements have been tried with varying success to dispense with this accessory; one of the best is that in which two small opposing hydraulic rams alternately resist and assist the piston.

Hot-air engines are largely used to drive pumps where a small water supply is desired; they require little skilled labour, are simple in their action, and, not having any boiler, are perfectly safe from explosions. Formerly, hot-air engine furnaces were inside the machine, and great wear and leakage was caused by particles of coal and grit rising with the heated air into the cylinder. There are now, however, several forms of this engine made in which the furnace is separated from the working parts. Hot-air engines are only used for small powers, from 1 to 6-horse power, as larger sizes become unmanageable.

The gas-engine is another form of heat-engine, only in this, as our fuel is clean and free from grit, we can burn it inside the cylinder, and so get the full advantage to be derived from the heat. In this engine, more than in the hot-air engine, great strides have been made during the past few years towards perfection. In using gas-engines for pumping purposes, it is advisable to drive the pumps with reducing gearing.

It is probable from the indication given by recent practice, that in the future our pumping engines for supplying the largest towns and cities will be of the compound condensing duplex type, with compensating apparatus to enable the steam to be worked expansively, and automatically controlled by some form of governor or catract which only allows the engine to travel at the same fixed rate under all sorts of varying conditions of pressure or load.

The ordinary duplex pump is an arrangement of two steam pumps side by side, the valves of the one pump being controlled by the piston of the other pump in such a way that there is no dead point. These pumps work very well, and as they pause at the end of the stroke allow the valves to seat themselves quietly and properly. Both the pumps being double-acting, the flow of water is practically continuous. Steam is admitted for almost the whole of the stroke, and to cushion the ends the exhaust is closed comparatively early. These pumps work best in connexion with shallow wells when they are not more than 25 ft. to 28 ft. from the water, but they can be made to force water to any height required.

The best pumps for large house wells are the old-fashioned lift and force-pumps, and plunger-pumps are better than piston-pumps, especially those in which the plungers are outside packed, and are easily accessible, for then any leakage can be immediately detected and the plunger-gland tightened. It frequently happens that pumps have to be placed in wells in which great difference in water-level takes place; in such cases, the usual plan is to place the working barrel of the pump a little above the lowest water-level, and on the top of this to place a stand-pipe sufficiently high to come above the highest water-level, and of a little larger diameter than the barrel. This forms a wet spear-pump, and the pump-bucket can be drawn up and re-packed or re-leathered whenever necessary.

Pumps should be arranged so as to make the delivery of water as constant and uniform as possible, and for this purpose two or even three barrels are frequently grouped together and worked from the same crank-shaft. It is also advisable to have an air vessel attached to the delivery end of the pump for low or moderate lifts, especially when single pumps are used, whether double acting or not; but in the case of excessive heights or very long lengths of pipes the air vessel is not of much use, and it is then better to have as long a stroke as possible. It is also a good thing to fix a vacuum vessel to the suction-pipe, particularly in those pumps that work at a quick speed, as this checks the

impact of the water against and allows the suction valve to seat itself quietly.

In selecting pumps too much care cannot be taken in examining the arrangement and position of the delivery-pipe, to see that there are no spaces where air can collect, and also that the water has a free way or course right through, for it must be remembered that reversal of current and unnecessary bends do very much to increase the work and diminish the efficiency of a pump.

The best speed at which to run an engine is not always the best speed at which a pump works, and in almost all engines not specially made for and attached to pumps the piston speed is much too great, and in order to obtain the best effect must be geared down to such a speed that the pump has sufficient time to fill the barrel and seat its valves quietly; for the water can only pass through the valves and passages at a certain rate. This, of course, applies rather more to the suction than to the delivery, as in the suction end of a pump we have only the pressure of the atmosphere to force the water into the pump, and this being easily overcome a vacuum is made, which in the return stroke of the pump may have disastrous effects on the machinery. From this it will be seen that the diameter of the suction-pipe and valve in relation to the diameter of the plunger is a very important point, and should never be more than in the proportion of two to three; sometimes they are made of the same diameter; the suction-pipe should, as a rule, be larger than the delivery pipe.

In the machinery for water-supply to large towns some provision should be made for break-downs, either in pumps or engines; this is usually done by duplicating both, as in the Leatherhead waterworks. Duplication is not necessary for supplemental service in the case of those places whose water is derived from only moderate depth, as in such cases large centrifugal pumps, or pulsometers of very much less first-cost, can be used for temporary purposes, or in case of fire, or for other reasons when a greatly-increased supply is suddenly requisite.

## VARIORUM.

“WHITAKER'S ALMANACK” FOR 1890.—Too late for notice last week with other almanacks, we have received this deservedly-popular annual. It is bulkier than ever, containing 728 pages as against 704 last year. Several new supplementary articles are given, and there is a list of the members and principal officers of the London County Council, which has been revised up to date, for Mr. Clement Dunscombe's name is recorded as Engineer, and that of Mr. Andrew Young as Valuer. The salary of the last-named gentleman is mentioned, but those of the Engineer and Mechanical Engineer are not stated, although the amounts were publicly mentioned in the Press (in our own columns and elsewhere) when the appointments were made. Perhaps the Editor wishes to intimate that the salaries in question are not quite what they should be, and are therefore not worthy of mention. The list of “Societies and Institutions” is not as complete as it might be, for neither the Institute of Journalists nor the Shorthand Society are included in it. Under the head of “Professional Education,” the Editor might usefully, in future issues, give a little space to a brief mention of the examination schemes of the Royal Institute of British Architects and the Surveyors' Institution. Nearly all the usual summaries and statistics have been extended in the present issue, and we know of no more useful and carefully compiled work of reference than “Whitaker's Almanack,” which is edited by Mr. Joseph Whitaker, F.S.A., and published at 12, Warwick-lane, Paternoster-row.—“The City Diary” for 1890 (London: W. H. & L. Collingridge), is, as usual, full of information regarding the Corporation of London and City matters generally, but while it gives the names of members of the Corporation and of the School Board, it makes no mention whatever of the London County Council,—an omission which will detract from the usefulness of the diary.—“The Leisure Hour” (London: 56, Paternoster-row) for December continues “The Story of the English Shires,” by Canon Creighton. Derbyshire is the county treated of in this number, and illustrations of Haddon Hall and Bolsover Castle are given, together with views of some of the picturesque scenery of the Peak district. Mr. W. J. Gordon con-

\* Anderson on “The Generation of Steam.”

† Prof. Osborne Reynolds's “General Theory of Thermo-Dynamics.”



## TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

**BROMLEY (Kent).**—For new billiard room, stabling, &c., at the "Two Brewers" Hotel, Bromley, for Messrs. Nalder & Collyer's Brewery Company, Limited. Mr. R. M. Chart, Surveyor, Mitcham:—  
T. Crossley, Bromley ..... £1,520 0 0  
G. H. Lay, Bromley ..... 1,354 0 0  
Satchell, Bromley ..... 1,359 0 0

**BIRMINGHAM.**—Tenders for hot-water warming apparatus and hot-water supply at Selly Oak Workhouse, near Birmingham, for the King's Norton Union. Henry Lea & Thornbery, Birmingham, engineers:—  
Summerscales & Sons, Keighley ..... £5,180 14 0  
Thomas & Taylor, Stockport ..... 3,834 8 0  
W. W. Phipson, London ..... 3,729 2 8  
W. Jenkins & Son, Leamington ..... 3,549 0 0  
G. H. Emett, Daresbury ..... 3,511 7 0  
J. Jackson, Birmingham and Newcastle ..... 2,763 2 0  
Hassall & Singleton, Birmingham ..... 2,481 6 0  
T. Parkes, Birmingham (accepted) ..... 2,283 1 0  
Bagle Iron and Engineering Co., Coventry ..... 1,978 12 6

**DAWLISH (Devon).**—For building Matonic Hall, Dawlish, for the Masonic Lodge Company. Mr. Geo. Soudon Bridgman, architect, of Torquay and Paignton:—  
Shapter, Dawlish ..... £536 0 0  
Lamarche, Dawlish ..... 725 0 0  
Friend, Dawlish ..... 699 0 0  
Westcott, Dawlish ..... 617 0 0  
W. Hatcher, Dawlish (accepted) ..... 614 0 0

**HAMPION.**—For the erection of a boat-shed and workshop on the river front of Marybury Lodge, Thames-street, Hampton, for Mr. Chas. Constable. Mr. Walter J. Ebbetts, architect, 115, Strand, W.C.:—  
W. Steel ..... £545 0 0  
Wright ..... 515 0 0  
Harner ..... 513 0 0  
Wheatley & Son ..... 459 0 0  
Sabey & Son (accepted) ..... 479 0 0

**HARROGATE.**—For stables, &c., Grove House, Harrogate, for Mr. Samson Fox, C.E. Mr. T. Butler Wilson, architect, Harrogate:—  
Wm. Irwin & Co., Leeds ..... £5,499 0 0  
Moulton & Son, Bradford ..... 5,440 0 0  
Gould & Stephenson, Leeds ..... 5,246 6 9  
Walter Dunn, Bradford ..... 5,096 7 8  
Ives & Son, Shipley ..... 4,929 0 0  
Chas. Myers, Leeds ..... 4,912 0 0  
David Simpson, Harrogate ..... 4,900 0 0  
Wm. Nicholson & Son, Leeds ..... 4,868 15 0  
James Simpson, Harrogate ..... 4,842 3 7  
Thos. Linskill, Harrogate (accepted) ..... 4,830 0 0  
Rainforth & Hudson, Harrogate (withdrawn) ..... 4,674 0 0  
\* Declined to agree to complete by May 1.

**LONDON.**—For alterations and repairs to No. 18, Gosfield-street, Marylebone, for Mr. Betteridge. Mr. Alfred J. Hopkins, architect, 27, Mortimer-street, W. Quantities supplied:—  
Berry ..... £554 0 0  
Cooper ..... 520 0 0  
Mattock Brothers ..... 509 0 0  
Birmingham & Co. .... 490 0 0  
Brydgers ..... 475 0 0  
Perkins ..... 444 0 0  
Banks ..... 416 0 0  
Rhodes ..... 412 0 0

**LONDON.**—For repairs, &c., to Nos. 2 and 3, Whitaker-street, Finsley, S.W., for Mrs. Berrell. Mr. Walter J. Ebbetts, architect, 115, Strand, W.C.:—  
H. Baylis ..... £117 10 0  
W. D. Way ..... 109 0 0  
W. Steel (accepted) ..... 89 0 0

**LONDON.**—For alterations and shop-fittings at No. 17, Davies-street, W., for Messrs. Cooper & Co. Mr. William A. Eury, architect, 65, Chancery-lane, W.C.:—  
Larks & Son ..... £454 0 0  
Langham ..... 477 0 0  
Stevens Bros ..... 453 0 0  
\* Amended and accepted at £444 15s. 6d.

**LONDON.**—For alterations to the "Birdage" public-house, Birdage-walk, E. Mr. Christopher M. Shiner, architect:—  
Clark ..... £489 0 0  
Potter ..... 477 0 0

**MICHELMERSH (Hants).**—For new boiler-house and setting boiler, at the South Hants Water Company's pumping works at Michelmarsh, Hampshire. Mr. W. H. Mitchell, architect, Southampton:—  
W. H. Chapman, Woolston ..... £439 0 0  
H. Stevens & Co., Southampton ..... 422 0 0  
G. Wheeler, jun., & Son, Romsey ..... 374 15 0  
T. J. Jukes, Southampton (accepted) ..... 370 0 0

**PAIGNTON (Devon).**—For building a Public Hall, Palace-avenue, Paignton, for Public Hall Company. Mr. Geo. Soudon Bridgman, and Mr. W. G. Coudrey, architects, Paignton. Ten Tenders were originally sent in from quantities supplied by Mr. S. G. Goss, architect, of Finsbury, London, the lowest of which was £2,181, but in consequence of extensions to the site, the plans were somewhat altered, and the four lowest were asked to compete again. Result:—  
H. Weber, Paignton ..... £2,464 10 0  
M. Bridgman, Paignton ..... 2,459 7 0  
E. Bovey, Torquay ..... 2,449 0 0  
R. Yao, Torquay ..... 2,435 0 0  
The lowest will most probably be accepted.

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## TO CORRESPONDENTS.

A. E. M. (your report only to hand on Friday, after we had published last week's number. We had anticipated you).—"Invicta" (write to the Secretary, 74, Margaret-street, Cavendish-square, London)—K. B. M.—F. E.  
All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, and necessarily for publication. We are compelled to decline pointing out books and giving addresses. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.  
We cannot undertake to return rejected communications.  
Letters or communications beyond mere journalistic which have been duplicated for other journals, are NOT DESIRED.  
All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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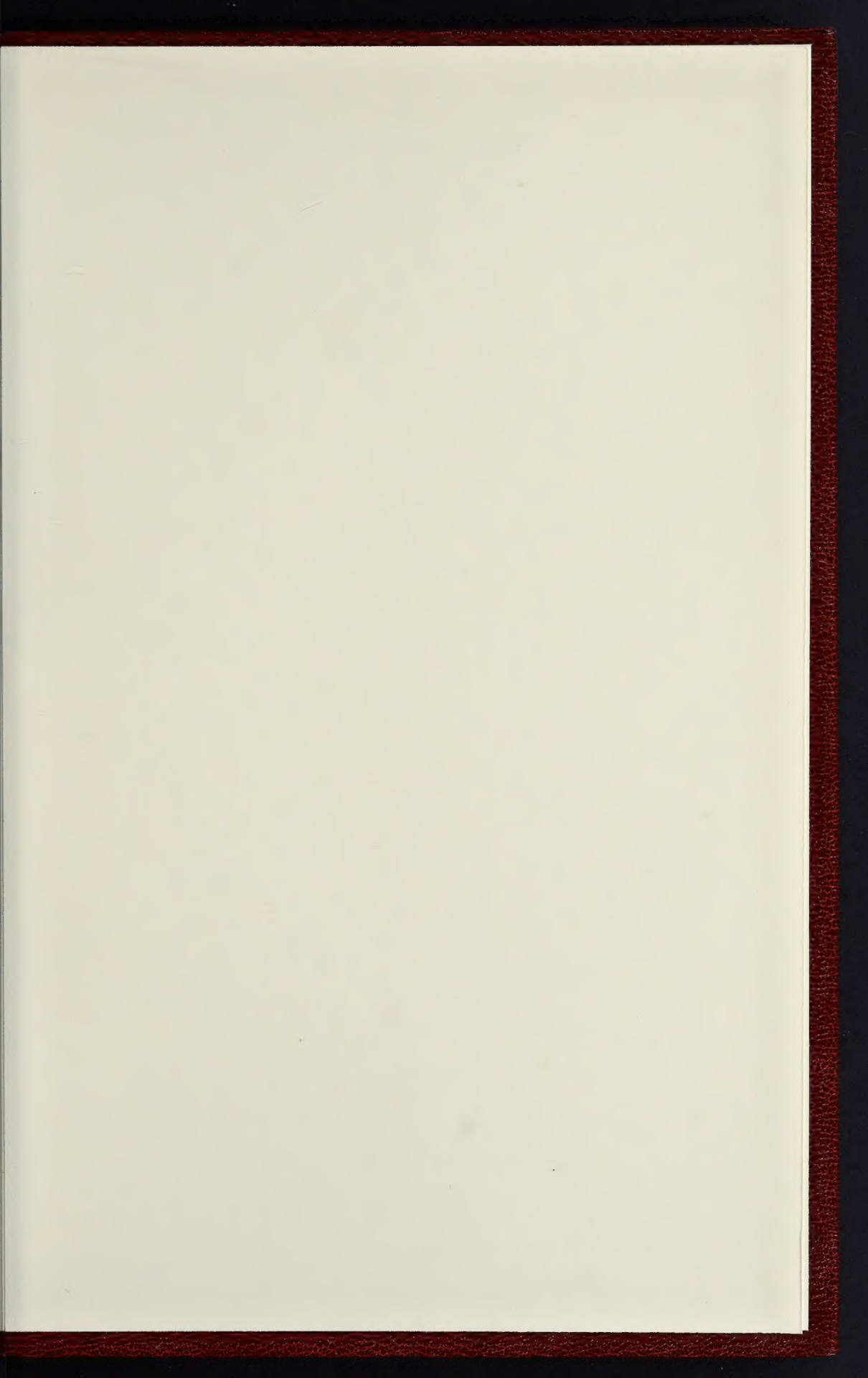
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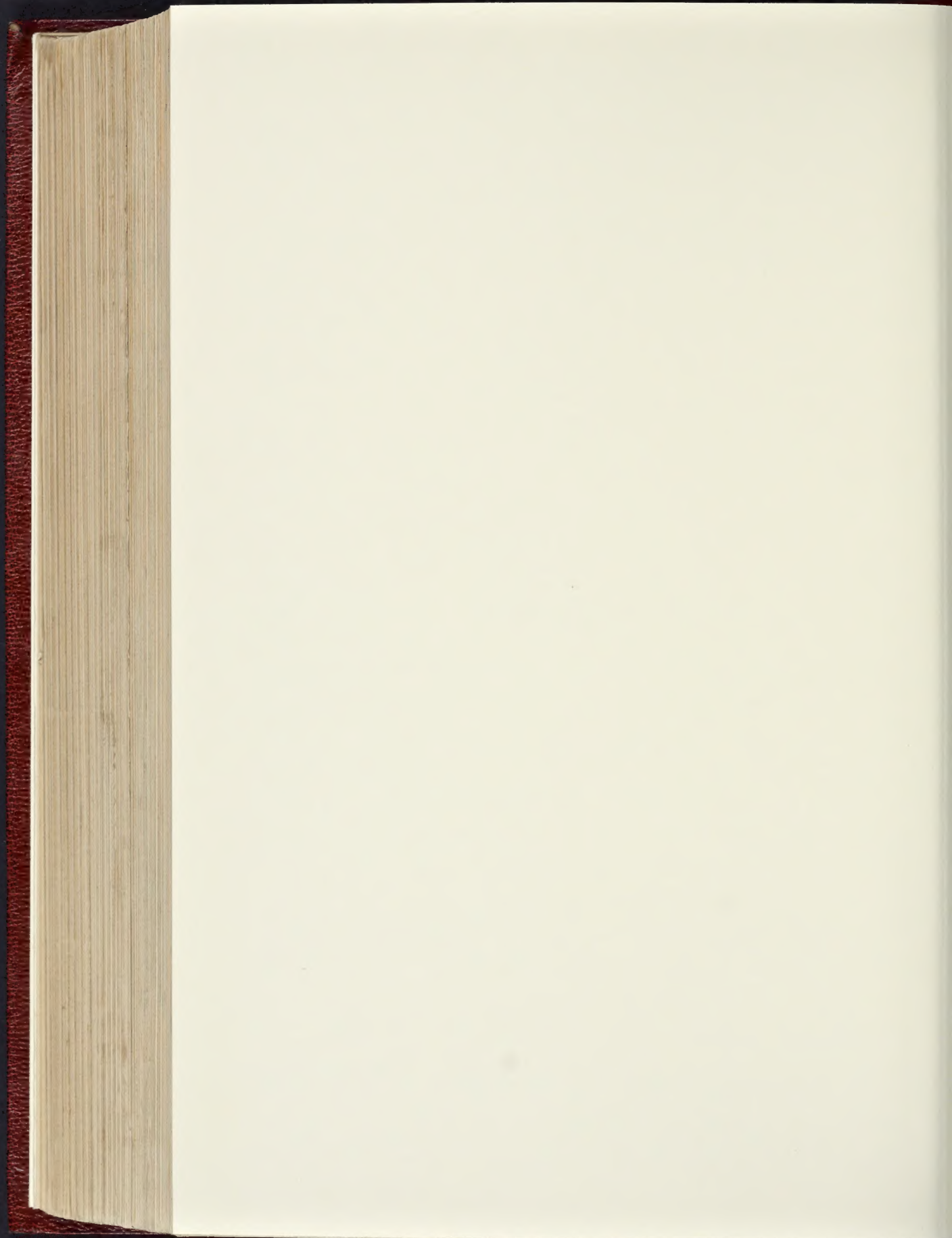
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